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Overview of the Revised Credit Risk Framework

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Prologue

To begin with, this paper defines the importance of Credit Risk Management in late 20^{th} and 21^{st} century. Nowadays there is a bigger attention than ever to banking Regulatory Supervisory and more specifically to Credit Risk Regulations. Many of the supervisors followed the instructions of Basel's Accords.

The paper explains the key changes in the Basel Accords over the years and points out the latest changes that have brought about Credit Risk. The last reforms, known as Basel IV made a lot of reforms , that improved the treatment of unexpected Credit Risk. The paper also introduces the concepts and foundations of European supervision and its purpose in the financial markets. Finally, explains the measures that financial institutions must follow to monitor Credit Risk. Although, the text describes the methodologies and approaches, which are recommended by BSBC, those set by the European Authorities (like EBA) have not been mentioned. Only in the last chapter there are mentioned the IFRS 9 methodologies for the calculation of expected Credit Risk, that belong to IASB publications.

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Abstract

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by Ilias KARAGIANNAKIS

The purpose of this document is to summarize and simplify the Regulatory Framework and to analyse Credit Risk Framework. There going to be represented Basel Credit Models for Unexpected Loss and IFRS Credit Models for Expected Loss. First of all, the analysis introduce European Independent Institutes (Authorities), like ESFS and SSM, whom increase financial integration and stability and ensure the safety and soundness of the European banking system.

Simply, explains how BCBS issues guidelines, methodologies and frameworks. The most significant are the ones about the capital adequacy, because help the financial institutions to treat and estimate better the Unexpected Loss (UL). Although EBA creates guidelines too with more technical standards, their work is to regulate EU financial institutions. Last but not least, SSM is the legislative and institutional framework that grants the ECB sole licensing authority over all EU banks and makes it the prudential supervisor of these banks, directly for the larger ones by JSTs and indirectly for the smaller by NSAs.

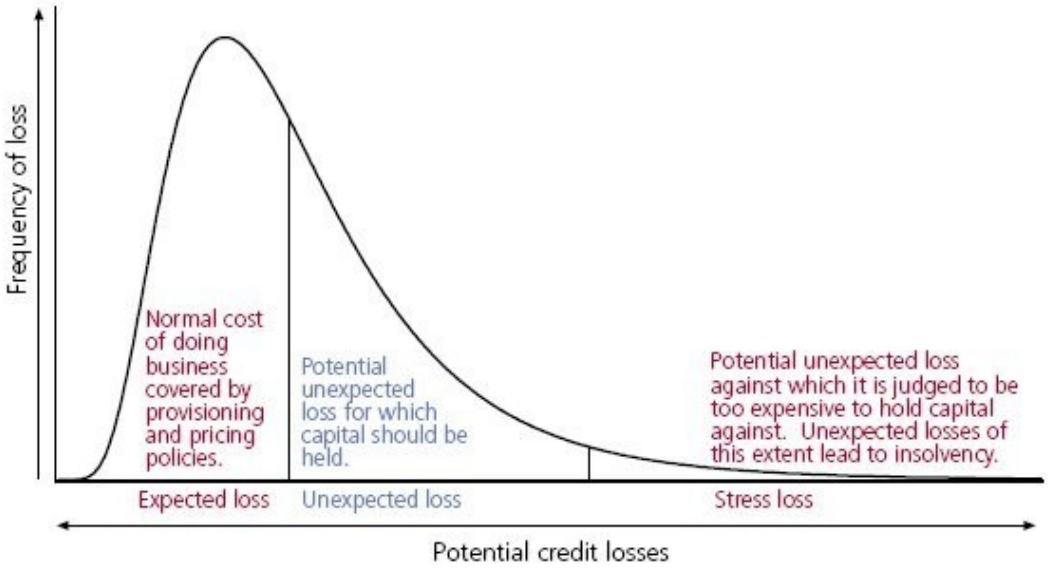

FIGURE 1: Potential Credit Losses

The curve shows that small losses around or slightly below the Expected Loss occur more frequently than large losses. The likelihood that losses will exceed the sum of Expected Loss and Unexpected Loss (i.e. the likelihood that a bank will not be able to meet its own credit obligations by its profits and capital) equals the Stress Loss.

Moreover, Banks are expected in general to cover their Expected Losses on an ongoing basis, e.g. by provisions and write-offs, because it represents another cost component of the lending business. The Unexpected Loss, on the contrary, relates to potentially large losses that occur rather seldomly. According to BCBS concept, capital would only be needed for absorbing Unexpected Losses.

Nevertheless, it has to be made sure that banks do indeed build enough provisions against EL. The IFRS 9 had been established about the calculation Loan's Expected Loss. The impairment model in IFRS 9 is based on the premise of providing for Expected losses. IFRS 9 impairment model requires impairment allowances for all exposures from the time a loan is originated, based on the deterioration of credit risk since initial recognition. If the credit risk has not increased significantly (Stage 1), IFRS 9 requires allowances based on 12 month expected losses. If the credit risk has increased significantly (Stage 2) and if the loan is 'credit impaired' (Stage 3), the standard requires allowances based on lifetime expected losses.

Furthermore, in the credit business, losses of interest and principal occur all the time, due to the fact there are always some borrowers that default on their obligations. The losses that are actually experienced in a particular year vary from year to year, depending on the number and severity of default events, even if we assume that the quality of the portfolio is consistent over time. Figure above illustrates how variation in realised losses over time leads to a distribution of losses for a bank.

The Basel risk weight functions used for the derivation of supervisory capital charges for Unexpected Losses (UL) are based on a specific model developed by the BCBS. The model specification was subject to an important restriction in order to fit supervisory needs (The model should be portfolio invariant, etc).

As recommended by the EBA Guidelines, the SSM strives to take adequate SREP decisions using a wide range of information coming from several building blocks. These include the credit institutions'regular reports, ICAAP/ILAAP, institutions' Risk Appetite, supervisory quantifications used to verify and challenge the credit institutions' estimates, Risk Assessment outcomes (including risk level and control assessments), the outcome of Stress Tests, and the supervisor's overall risk priorities.

There are a number of approaches to determining how much capital a bank should hold. For example, the IRB approach adopted from Basel focuses on the frequency of bank insolvencies arising from credit losses that supervisors are willing to accept. By means of a stochastic credit portfolio model, it is possible to estimate the amount of loss which will be exceeded with a small, pre-defined probability. This probability can be considered the probability of bank insolvency. Capital is set to ensure that unexpected losses will exceed this level of capital with only this very low, fixed probability.

Stress Tests are a key forward-looking tool for assessing institutions' Exposure and Resilience to adverse but plausible future events. They can also be used to test the adequacy of credit institutions' Risk Management procedures, their strategic and capital planning and the robustness of their business models.

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List of Abbreviations

ADC	Land **A**cquisition **D**evelopment and **C**onstruction
A-IRB	**A**dvanced **I**nternal **R**ating - **B**ased Approach
AMA	**A**dvanced **M**easurement **A**pproach
AT1	**A**dditional **T**ier **1**
BCBS	**B**asel **C**ommittee on **B**anking **S**upervision
BIA	**B**asic **I**ndicator **A**pproach
BIS	**B**ank for **I**nternational **S**ettlements
BTS	**B**inding **T**echnical **S**tandards
CCFs	**C**redit **C**onversion **F**actors
CCR	**C**ounterparty **C**redit **R**isk
CEBS	**C**ommittee of **E**uropean **B**anking **S**upervisors
CET1	**C**ommon **E**quity **T**ier 1
CRE	**C**ommercial **R**eal **E**state
CVA	**C**redit **V**aluation **A**djustment
DGs	**D**irectorates **G**eneral
EAD	**E**xposure **A**t **D**efault
EBA	**E**uropean **B**anking **A**uthority
EC	**E**uropean **C**ommission
ECB	**E**uropean **C**entral **B**ank
ECL	**E**xpected **C**redit **L**oss
ECRA	**E**xternal **C**redit **A**ssessment **A**pproach
EIOPA	**E**uropean **I**nsurance and **O**ccupational **P**ensions **A**uthority
ESAs	**E**uropean **S**upervisory **A**uthorities
ESFS	**E**uropean **S**ystem of **F**inancial **S**upervision
ESM	**E**uropean **S**tability **M**echanism
ESMA	**E**uropean **S**ecurities and **M**arkets **A**uthorities
ESRB	**E**uropean **S**ystemic **R**isk **B**oard
EU	**E**uropean **U**nion
F-IRB	**F**oundation **I**nternal **R**ating - **B**ased **A**pproach
FVTOCI	**F**air **V**alue **T**hrough the statement of **O**ther **C**omprehensive **I**ncome
FSB	**F**inancial **S**tability **B**oard
G10	**G**roup of Ten Countries
GAB	**G**eneral **A**rrangements to **B**orrow
GDP	**G**ross **D**omestic **P**roduct
G-SIFIs	**G**lobal **S**ystemically **I**mportant **F**inancial **I**nstitutions
IASB	**I**nternational **A**ccounting **S**tandards **B**oard
ICAAP	**I**nternal **C**apital **A**dequacy **A**ssessment **P**rocess
IFRS	**I**nternational **F**inancial **R**eporting **S**tandard
ILAAP	**I**nternal **L**iquidity **A**dequacy **A**ssessment **P**rocess
IMF	**I**nternational **M**onetary **F**und
IPCRE	**I**ncome **P**roducing **C**ommercial **R**eal **E**state
IRB	**I**nternal **R**atings-**B**ased Approaches
JSTs	**J**oint **S**upervisory **T**eams

LCR	**L**iquidity **C**overage **R**atio
LGD	**L**oss **G**iven **D**efault
LSIs	**L**ess **S**ignificant **I**nstitutions
LTV	**L**oan **T**o **V**alue
MDBs	**M**ultilateral **D**evelopment **B**anks
MoU	**M**emorandum **o**f **U**nderstanding
MS	**M**ember **S**tates
NCAs	**N**ational **C**ompetent **A**uthorities
NRAs	**N**ational **R**esolution **A**uthorities
NSAs	**N**ational **S**upervisory **A**uthorities
NSFR	**N**et **S**table **F**unding **R**ation
OpRisk	**O**perational **R**isk
PD	**P**robability of **D**efault
QRRE	**Q**ualifying **R**etail **R**evolving **E**xposure
RRE	**R**esidential **R**eal **E**state
RWAs	**R**isk **W**eighted **A**ssets
SA	**S**tandardized **A**pproach
SCRA	**S**tandardised **C**redit Risk **A**ssessment Approach
SIs	**S**ignificant **I**nstitutions
SMEs	**S**mall and **M**edium-sized **E**nterprises
SRB	**S**ingle **R**esolution **B**oard
SREP	**S**upervisory **R**eview and **E**valuation **P**rocess
SRM	**S**ingle **R**esolution **M**echanism
SSM	**S**ingle **S**upervisory **M**echanism
T1	**T**ier **1** Capital
T2	**T**ier **2** Capital
UCCs	**U**nconditionally **C**ancellable **C**ommitments
VaR	**V**alue **a**t **R**isk

Chapter 1

Introduction

1.1 Basel Committee On Banking Supervision

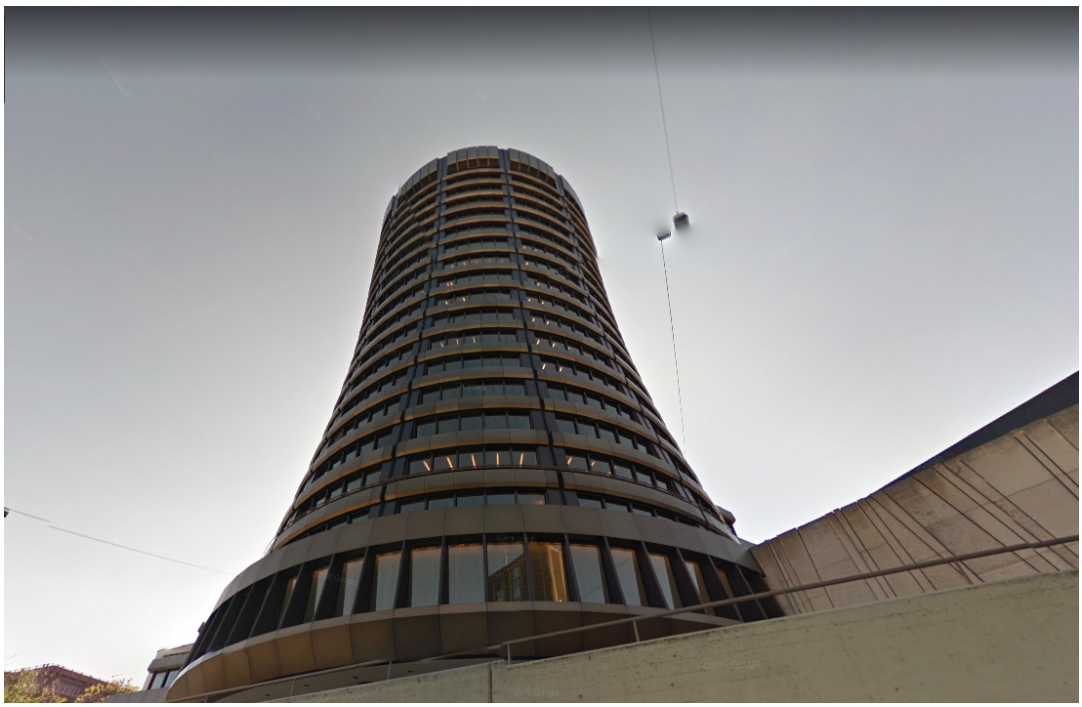


FIGURE 1.1: BIS Tower HQ at Centralbahnplatz in Basel

Much attention has been directed to the emergence of an international framework for financial oversight from the 1970s, and in particular the creation of the Basel Committee on Banking Supervision (BCBS) in 1975 and the subsequent Basel accords. A number of bank failures that spurred fear in international financial markets over the summer of 1974 indeed called for a greater degree of international coordination. Franklin National Bank, the Israeli British Bank (IBB) and the Lloyds Lugano crisis all affected, to different extents, markets that were already shaken by earlier problems, such as the British secondary banking crisis of 1973. The above-mentioned cases all raised significant questions as to who would regulate and supervise what and where. (Mourlon-Druol, 2015)

Among these banking crises, the 1974 Herstatt Bank failure is traditionally considered as one of the most important. It is often said, for instance, that Herstatt's collapse led to the creation of the BCBS In addition to its institutional implications, the

Herstatt failure is also an important case study providing an illustration of the consequences of a poor performance of the regulators as well as of market self-regulation, highlighting the importance and limits of reputation in banking, and finally sketching the implications of a bank failure with the creation of the Liko-Bank. Following risky foreign exchange operations in 1973 and early 1974, the German supervisory office, the Bundesaufsichtsamts für das Kreditwesen (BAKred), decided to close the bank on 26.06.1974. But the closure happened at the end of the working day in Frankfurt, which was in the morning of a working day in New York, thereby leaving a number of operations unfinished [1] This gave birth to the so-called Herstatt risk, that is, the risk taken by making operations across different time-zones. With its international supervisory and regulatory implications, the failure of Herstatt became one of the landmarks of the 1974 international banking crisis. The Herstatt Bank failure is not just a page of distant history. Still in 2008, the leading German economic newspaper Handelsblatt published an article on the surviving of the Herstatt risk and in 2004, the story was even turned into a theatre play, Kölner Devisen!

This incident prompted a Standing Committee set up by, and reporting to the Central Bank Governors of the G10 [2] (who were at that time working towards building new international financial structures to replace the recently collapsed Bretton Woods system) to form the BCBS in late 1974, under the auspices of the BIS[3]. (*About BIS - Overview*)

BCBS is an international committee (initially named the Committee on Banking Regulations and Supervisory Practices) formed to develop standards for banking regulation. The Committee, headquartered in BIS in Basel, was established to enhance financial stability by improving the quality of banking supervision worldwide, and to serve as a forum for regular cooperation between its member countries on banking supervisory matters. The BCBS seeks to provide guidelines for worldwide regulation of banks and improve understanding of important issues in the banking supervisory sphere. The BCBS was formed to address the problems presented by globalization of financial and banking markets in an era in which banking regulation remains largely under the purview of national regulatory bodies. Primarily, the BCBS serves to help national banking and financial markets supervisory bodies move toward a more unified, globalized approach to solving regulatory issues. Finally, the BCBS is the forum for agreeing international regulation on the conduct of banking. The Committee's first meeting took place in February 1975, and meetings have been held regularly three or four times a year since.

Since its inception, the BCBS has expanded its membership from the G10 to 45 institutions from 28 jurisdictions. The BCBS has developed a series of highly influential policy recommendations known as the Basel Accords. These are not binding and must be adopted by national policymakers in order to be enforced, but they have generally formed the basis of banks' capital requirements in countries represented by the committee and beyond.

[1] On 26.06.1974 a number of banks released Deutschmarks to the Herstatt Bank in exchange for dollar payments deliverable in New York City.

[2] refers to the group of countries that agreed to participate in the GAB, an agreement to provide the IMF with additional funds to increase its lending ability.

[3] BIS was established in 1930 (the oldest international financial institution) and is owned by 60 Central Banks, that together account for about 95% of world GDP.

1.2 Banking Supervision

The process for banking supervision can be envisaged as a cycle:

1. Supervisory Policies and regulation provide the foundation for the development of
2. Supervisory Methodologies and standards, which underpin
3. day-to-day supervisory activities.

Lessons learned in the course of supervision and through regular quality checks are used to improve this process.

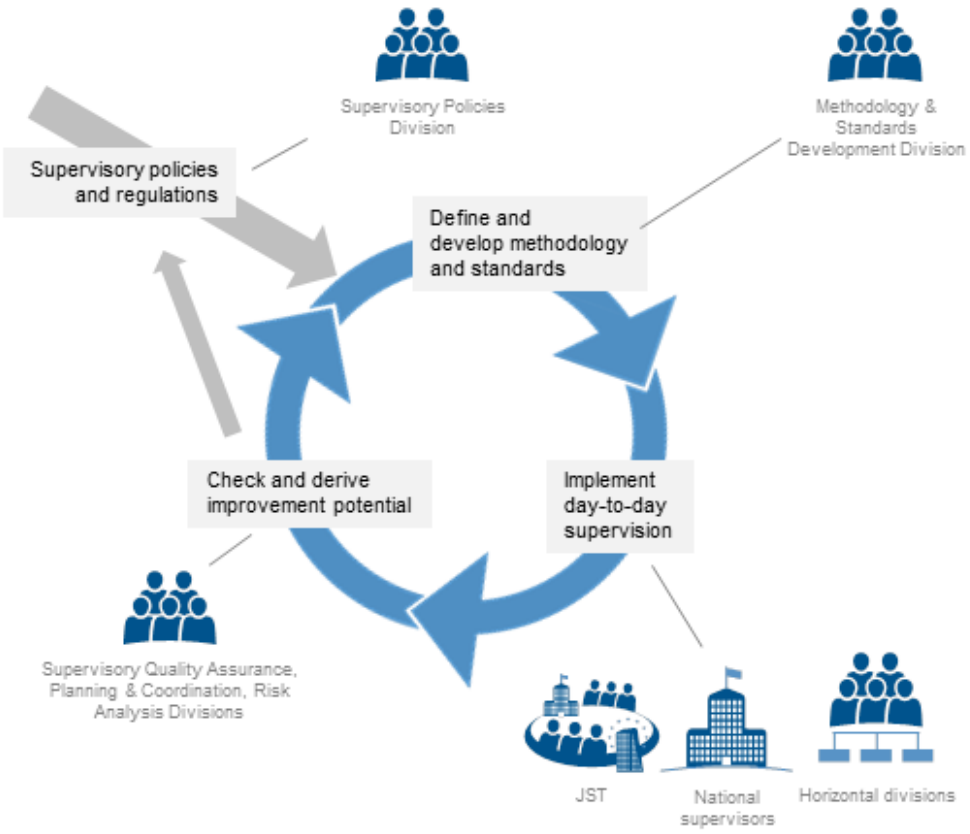


FIGURE 1.2: The EU Supervisory Cycle

The methodologies and standards underlie the day-to-day supervision that is carried out to the same high standards across all credit institutions. There are aimed at achieving consistent and efficient supervisory outcomes. Through various channels, including the SSM's participation in international and European fora, the lessons learnt in the course of supervision and the performance of quality assurance checks feed back into the definition of methodologies, standards, supervisory policies and regulation. Experience gained from the practical implementation of the methodologies and standards feeds through to the planning of supervisory activities for the forthcoming cycle. This planning also incorporates the analysis of the key risks and the vulnerabilities and strategic supervisory priorities (*Guide to Banking Supervision November 2014*).

The ECB can issue its own regulations, guidelines and instructions on topics such as the SREP and the notification and application procedures for supervised banks. The ECB regularly reviews and strengthens its methodologies and standards. It uses the experience gained from their practical implementation when planning supervisory activities for the forthcoming cycle based on: participation in international standard-setting bodies and European authorities; lessons learnt in the course of day-to-day supervision; the performance of quality assurance checks. (*Supervisory Cycle*)

The ECB assists in developing prudential requirements for significant and less significant banks, covering issues such as risk management practices, capital and liquidity levels and remuneration policies and practices. Regulations and supervisory policies for all banks are developed through close cooperation and coordination between the ECB (SSM) and other bodies such as the (European Fora):

- BCBS
- ESAs Joint Committee (especially the EBA)
- ESRB
- FSB
- ESM

1.3 The European System of Financial Supervision

The European system set up for the supervision of the financial sector is made of three ESAs, the EBA, the EIOPA[4], and the ESMA[5], working within a network of NCAs, the Joint Committee of the ESAs (JC) and the ESRB) constitute the ESFS. (*EU*)

Whilst the national supervisory authorities remain in charge of supervising individual financial institutions, the objective of the European supervisory authorities is to improve the functioning of the internal market by ensuring appropriate, efficient and harmonised European regulation and supervision.

The EBA is an independent EU agency established in 2011 at the height of the financial crisis. Its objective is to contribute to financial stability across the EU and safeguard the integrity, efficiency and orderly functioning of the EU banking sector.

Its mission is to build a single regulatory and supervisory framework for the entire banking sector in the 27 EU Member States, so as to ensure an efficient, transparent and stable Single Market that is beneficial to consumers, businesses and the broader economy in the EU.

1.3.1 European Banking Authority

The EBA is an independent EU Authority which works to ensure effective and consistent prudential regulation and supervision across the European banking sector. Its

[4]promotes a sound regulatory framework and consistent supervisory practices in order to protect the rights of policyholders, pension scheme members and beneficiaries and contribute to the public confidence in the EU's insurance and occupational pensions sectors.

[5]works in the field of securities legislation and regulation to improve the functioning of financial markets in Europe, strengthening investor protection and co-operation between NCAs

overall objectives are to maintain financial stability in the EU and to safeguard the integrity, efficiency and orderly functioning of the banking sector. (*EBA at a Glance*)

The EBA was established on 1 January 2011 as part of the ESFS and took over all existing responsibilities and tasks of the CEBS. The main task of the EBA is to contribute to the creation of the European Single Rulebook in banking whose objective is to provide a single set of harmonised prudential rules for financial institutions throughout the EU. The Authority also plays an important role in promoting convergence of supervisory practices and is mandated to assess risks and vulnerabilities in the EU banking sector.

The main task of the EBA is to contribute, through the adoption of BTS [6] and Guidelines [7], to the creation of the European Single Rulebook in banking. The Single Rulebook aims at providing a single set of harmonised prudential rules for financial institutions throughout the EU, helping create a level playing field and providing high protection to depositors, investors and consumers. (*EBA Missions*)

The Authority also plays an important role in promoting convergence of supervisory practices to ensure a harmonised application of prudential rules. Finally, the EBA is mandated to assess risks and vulnerabilities in the EU banking sector through, in particular, regular risk assessment reports and pan-European stress tests.

Other tasks set out in the EBA's mandate include:

- investigating alleged incorrect or insufficient application of EU law by national authorities
- taking decisions directed at individual competent authorities or financial institutions in emergency situations
- mediating to resolve disagreements between competent authorities in cross-border situations
- acting as an independent advisory body to the European Parliament, the Council or the Commission.
- taking a leading role in promoting transparency, simplicity and fairness in the market for consumer financial products or services across the internal market.

To perform these tasks, the EBA can produce a number of regulatory and non regulatory documents including BTS, Guidelines, Recommendations, Opinions and ad-hoc or regular reports.

1.3.2 Single Supervisory Mechanism

The SSM refers to the system of banking supervision in Europe. It comprises the ECB and the NCAs of the participating countries. The SSM is responsible for the prudential supervision of all credit institutions in order to enchance the robustness

[6] The BTS are legal acts which specify particular aspects of an EU legislative text (Directive or Regulation) and aim at ensuring consistent harmonisation in specific areas

[7] The EBA develops draft BTS which are finally endorsed and adopted by the European Commission. Contrary to other documents such as Guidelines or Recommendations, the BTS are legally binding and directly applicable in all Member States.

of the euro area banking system. (*SSM*)

Its main aims are to:

- ensure the safety and soundness of the European banking system
- increase financial integration and stability
- ensure consistent supervision

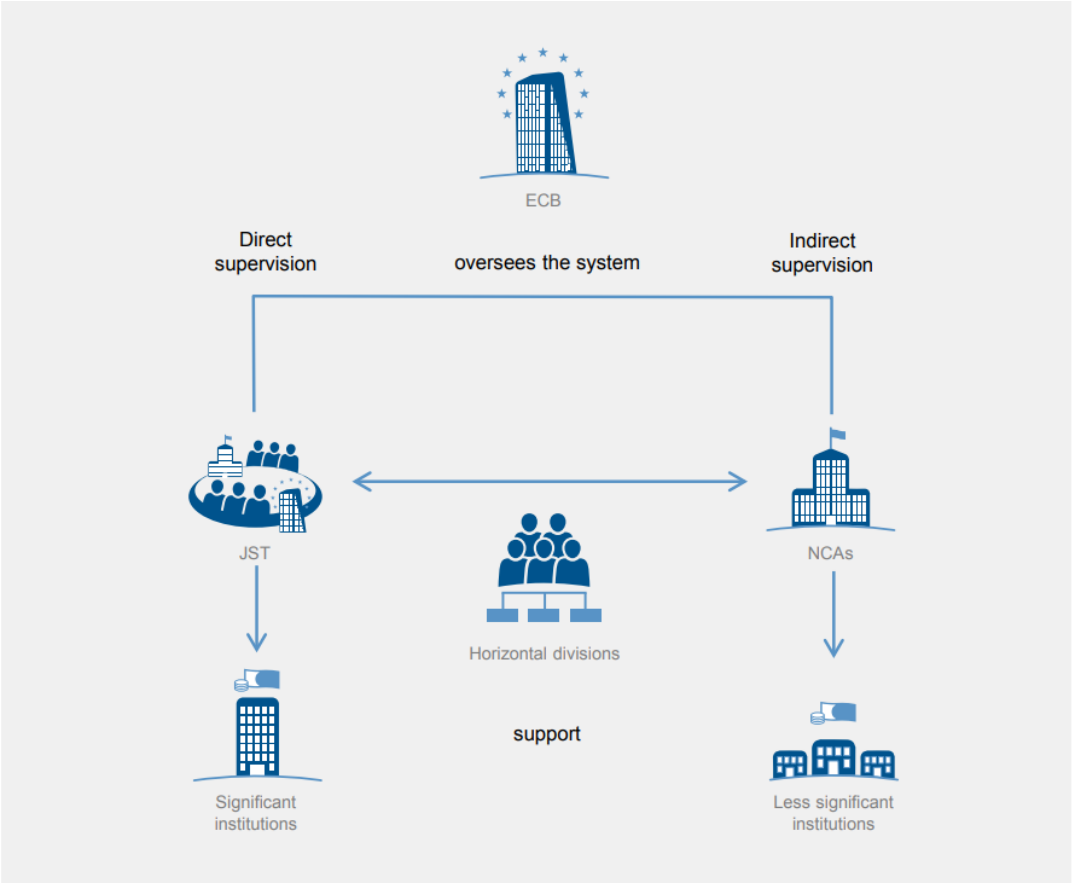


FIGURE 1.3: The distribution of tasks within the SSM

The Supervisory Board plans and carries out the SSM's supervisory tasks, undertakes preparatory work, and proposes draft decisions for adoption by the ECB's Governing Council. The Supervisory Board is composed of the Chair and Vice-Chair, four representatives of the ECB, and one representative of the NCAs in each participating Member State, usually the top executive of the relevant NCA responsible for banking supervision. The Supervisory Board's draft decisions are proposed on the basis of thorough, objective, and transparent information, bearing in mind the interest of the EU as a whole. The Supervisory Board operates in a way that ensures independence of its work.

The decision-making process is based on a "non-objection" procedure. If the Governing Council does not object to a draft decision proposed by the Supervisory Board within a defined period of time that may not exceed ten working days, the decision is deemed adopted. The Governing Council may adopt or object to draft decisions but

cannot change them. The ECB has created a Mediation Panel to resolve differences of views expressed by the NCAs concerned regarding an objection by the Governing Council to a draft decision of the Supervisory Board.

Finally, the ECB has established an Administrative Board of Review, which will carry out an internal administrative review of decisions taken by the ECB in the exercise of its supervisory powers. Any natural person or supervised entity may request a review of an ECB decision, which is addressed to them, or is of direct and individual concern. The Administrative Board of Review may also propose to the Governing Council that it suspend the application of the contested decision for the duration of the review procedure. The Board is composed of five independent members who are not staff of the ECB or an NCA. A request for a review of an ECB decision by the Administrative Board of Review does not affect the right to bring proceedings before the Court of Justice of the EU.

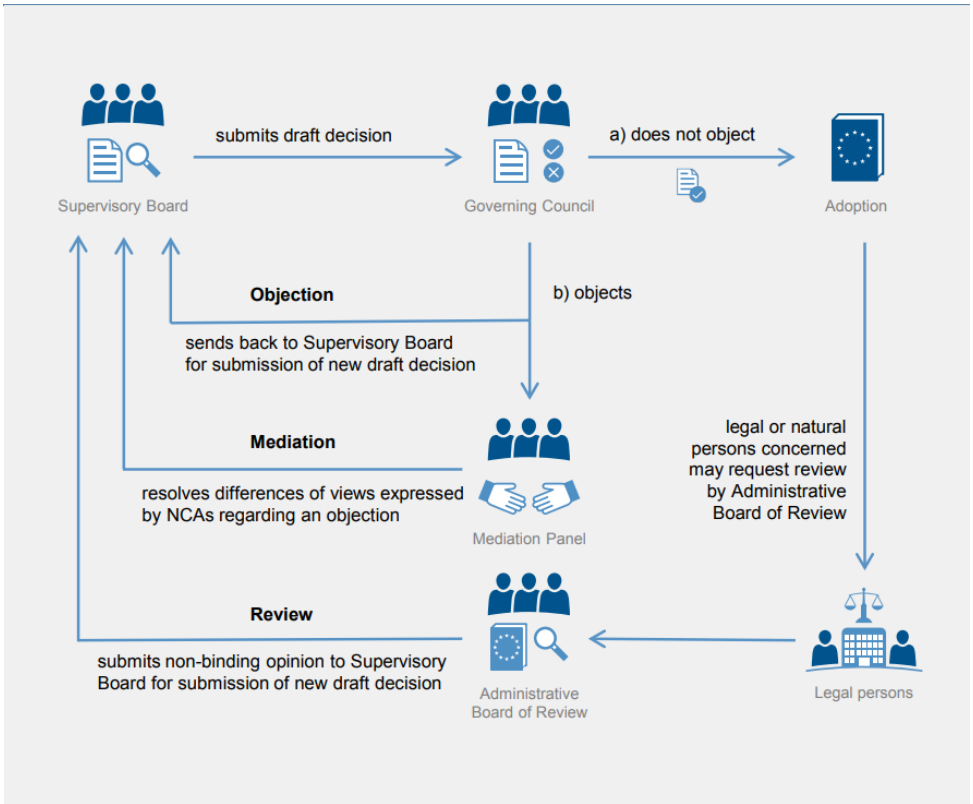


FIGURE 1.4: Non-objection procedure

The SSM follows a supervisory approach based on best practice for independent, forward-looking, fair and risk-based supervision. While using the ability to compare banks and assess their risk profiles and ultimately their viability, the SSM focuses its resources on those areas where it perceives the greatest risks, at the level of individual banks and for the banking system as a whole. Where the SSM sees severe shortcomings in banks' capital or liquidity levels or in their risk management and controls, the intensity of supervision is increased in a proportionate manner. The SSM uses the powers granted to it by the legislator, with the ultimate objective of achieving the best impact while minimising the downside risks and unintended consequences.

Therefore, the objective of the SSM is not to prevent bank failures in themselves. A zero-failure policy is neither feasible nor desirable. Banks can and should exit the market if they are managed in a risky and unsound manner, or if they are structurally incapable of maintaining their competitiveness based on a sound business model. Furthermore, a zero-failure policy would be inconsistent with the principle that the owners and managers of banks are ultimately responsible for the consequences of their decisions and actions. A zero-failure policy would thus foster moral hazard. Some banks will prosper and some will exit, either through consolidation or, in the extreme scenario, through outright failure.

After assessing the sustainability of a bank's business model, its risk profile and plausible recovery measures, the SSM may determine that the bank is no longer viable from a capital or liquidity perspective, and declare it to be failing or likely to fail. The SRB subsequently takes charge of the decision whether to resolve the bank in question.

Given that the failure of a bank has the potential to destabilise the banking system as a whole, if not managed effectively, our role is also to prepare for the orderly exit of the bank from the market, if necessary. We therefore also promote orderly recovery and resolution planning at banks, working closely with the SRB, which is primarily responsible for resolution strategies. (*SSM*)

1.3.3 Single Resolution Mechanism and Board

The SRM is one of the two pillars of the EU banking union, along with the SSM. Resolution is the orderly restructuring of a bank by a resolution authority when the bank is failing or likely to fail. This procedure ensures that a bank failure does not harm the broader economy or cause financial instability. The SRM applies to banks covered by the SSM. If a bank fails despite stronger supervision, the SRM allows bank resolution to be managed effectively through a single resolution board or/and a single resolution fund that is financed by the banking sector. The purpose of the SRM is to ensure an orderly resolution of failing banks with minimal costs for taxpayers and to the real economy. The SRM regulation establishes the framework for the resolution of banks in EU countries participating in the banking union. (*SRM*)

In 2014 SRM established the SRB, a fully independent EU agency acting as the central resolution authority within the banking union. Together with the NRAs of participating countries (MS), it forms the SRM. Its mission is to ensure an orderly resolution of failing banks with minimum impact on the real economy, the financial system, and the public finances of the participating MS and beyond. Finaly, the role of the SRB is proactive: rather than waiting for resolution cases to manage, the SRB focuses on resolution planning and enhancing resolvability, to avoid the potential negative impacts of a bank failure on the economy and financial stability. (*Single Resolution Board*)

1.3.4 European Central Bank

The purpose of European banking supervision is to help rebuild trust in the European banking sector and increase the resilience of banks. The recent financial crisis has shown how quickly and forcefully problems in the financial sector can spread, especially in a monetary union, and how such problems directly affect people across

the euro area.

As an independent EU institution, the ECB oversees banking supervision from a European perspective by:

- establishing a common approach to day-to-day supervision
- taking harmonised supervisory actions and corrective measures
- ensuring the consistent application of regulations and supervisory policies

The ECB, in cooperation with the national supervisors, is responsible for ensuring European banking supervision is effective and consistent. The ECB has the authority to:

- conduct supervisory reviews, on-site inspections and investigations
- grant or withdraw banking licences
- assess banks' acquisition and disposal of qualifying holdings
- ensure compliance with EU prudential rules
- set higher capital requirements ("buffers") in order to counter any financial risks

The ECB has established four dedicated Directorates General (DGs) to perform the supervisory tasks conferred on the ECB in cooperation with NCAs:

- DGs Micro-Prudential Supervision I and II are responsible for the direct day-to-day supervision of significant institutions;
- DG Micro-Prudential Supervision III is responsible for the oversight of the supervision of less significant institutions performed by NCAs;
- DG Micro-Prudential Supervision IV performs horizontal and specialised tasks in respect of all credit institutions under the SSM's supervision and provides specialised expertise on specific aspects of supervision, for example internal models and on-site inspections.
- Additionally, a dedicated Secretariat supports the activities of the Supervisory Board by assisting in meeting preparations and related legal issues.

DG Micro-Prudential Supervision I is responsible for the supervision of the most significant groups (around 30); DG Micro-Prudential Supervision II is in charge of the remaining significant groups. The day-to-day supervision of significant groups is conducted by JSTs, supported by the horizontal and specialised expertise divisions of DG Micro-Prudential Supervision IV.

Horizontal and specialised divisions of DG Micro-Prudential Supervision IV support JSTs and NCAs in the conduct of supervision of both significant and less significant credit institutions. These ten divisions are: Risk Analysis, Supervisory Policies, Planning and Coordination of Supervisory Examination Programmes, Centralised On-site Inspections, Internal Models, Enforcement and Sanctions, Authorisations, Crisis Management, Supervisory Quality Assurance, and Methodology and Standards Development. The horizontal divisions interact closely with the JSTs in, for example, defining and implementing common methodologies and standards, offering support on methodological issues and helping them to refine their approach. The aim is to ensure consistency across the JSTs' supervisory approaches.

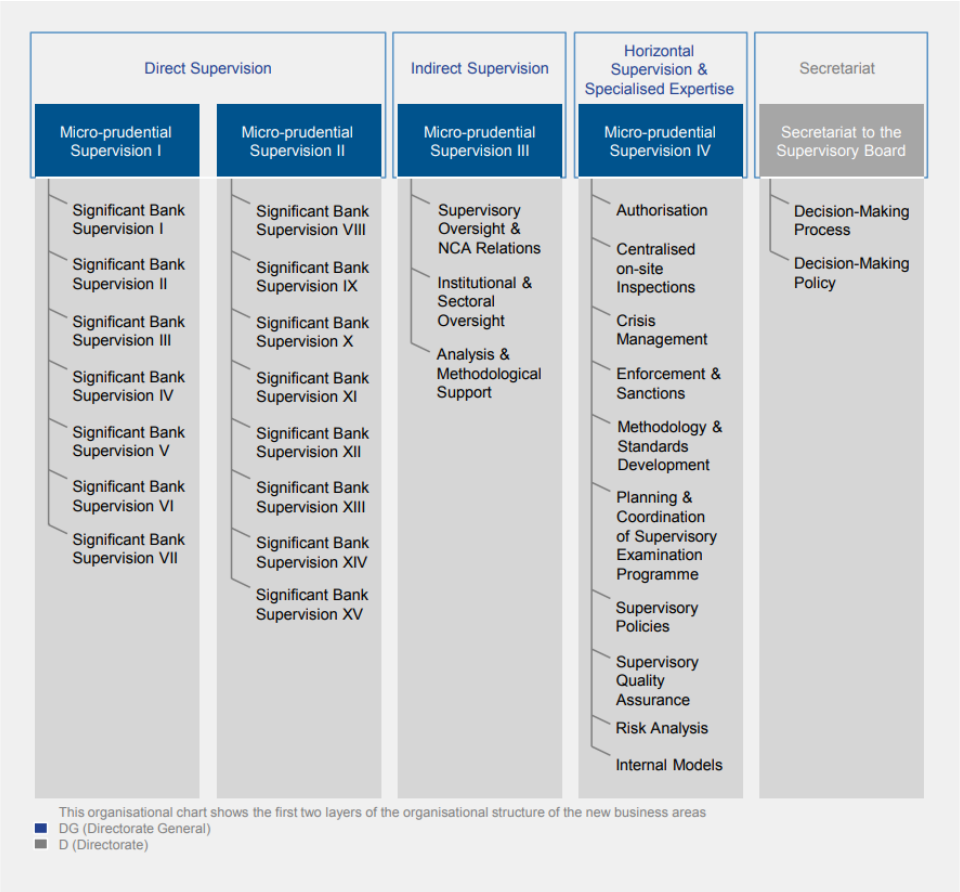


FIGURE 1.5: Organisation of the SSM supervisory units in the ECB

1.3.5 Joint Supervisory Teams

The day-to-day supervision of SI is conducted by JSTs [8]. The JSTs comprise staff from both ECB and the NCAs of the countries in which the credit institutions, banking subsidiaries or banking subsidiaries or significant cross-border branches or a given banking group are established. They actively foster a common supervisory culture and promote consistent supervisory practices and approaches. The size, overall composition and organisation of a JST is tailored to the size, business model and risk profile of the bank it supervises.

Their main tasks are to:

- perform the SREP
- propose the supervisory examination programme, including a plan of on-site inspections
- implement the approved supervisory examination programme and any supervisory decisions
- ensure coordination with the on-site inspection teams and liaise with the national supervisors

[8] supported by the horizontal and specialised expertise divisions of DG Micro-Prudial Supervision IV. Macro-prudential supervision involves oversight of the financial system as a whole. Its main aim is to prevent or mitigate risks to the financial system. (*ESFS*)

Each JST comprises:

- a coordinator at the ECB
- national sub-coordinators
- a team of experts

The JST coordinator (as a rule of a different nationality than that of the supervised institution) leads the team and steers its supervisory activities. The coordinator is responsible for the implementation of the supervisory tasks and activities as included in the Supervisory Examination Programme for each individual significant credit institution.

The NCA sub-coordinators are responsible for clearly defined thematic or geographic areas. They also support the coordinator in the ongoing supervision. For certain tasks with a specific thematic focus, or tasks where particular technical expertise is needed, the JST may require additional support from the horizontal and specialised expertise divisions at the ECB (i.e. DG Micro-Prudential Supervision IV).

In the case of JSTs comprising a large number of staff, the Coordinator and the NCA sub-coordinators form a "Core JST", which allocates tasks among the team's members and brings the views of the JST members together.

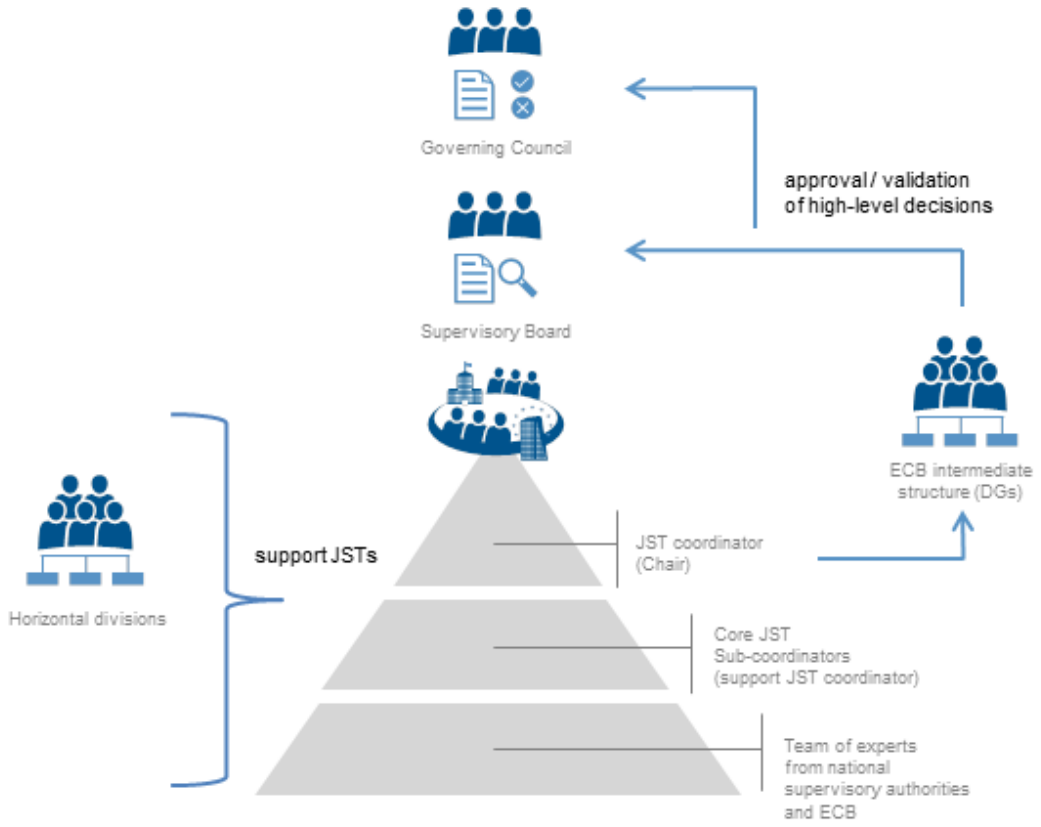


FIGURE 1.6: JSTs

1.3.6 National Supervisory - Competent Authorities

The SSM was established by Council Regulation (EU) 1024/2013 conferring specific tasks on the ECB concerning policies relating to the prudential supervision of credit institutions (the SSM Regulation). Its operational framework was specified by Regulation (EU) 468/2014 of the European Central Bank establishing the framework for cooperation within the Single Monitoring Mechanism between the ECB and national competent authorities and with national designated authorities (SSM Framework Regulation).

All euro area countries participate automatically in the SSM. EU Member States outside the euro area can choose to participate. To do so, their national supervisors enter into "close cooperation" with the ECB.

Within the SSM, the ECB directly supervises all euro area credit institutions that are classified as SIs. The NCAs [9] conduct the direct supervision of LSIs, subject to the oversight of the ECB. The classification of credit institutions into significant and less significant is based on the criteria laid down in Regulation (EU) 1024/2013 and further specified in Regulation (EU) 468/2014. (*Bank of Greece*)

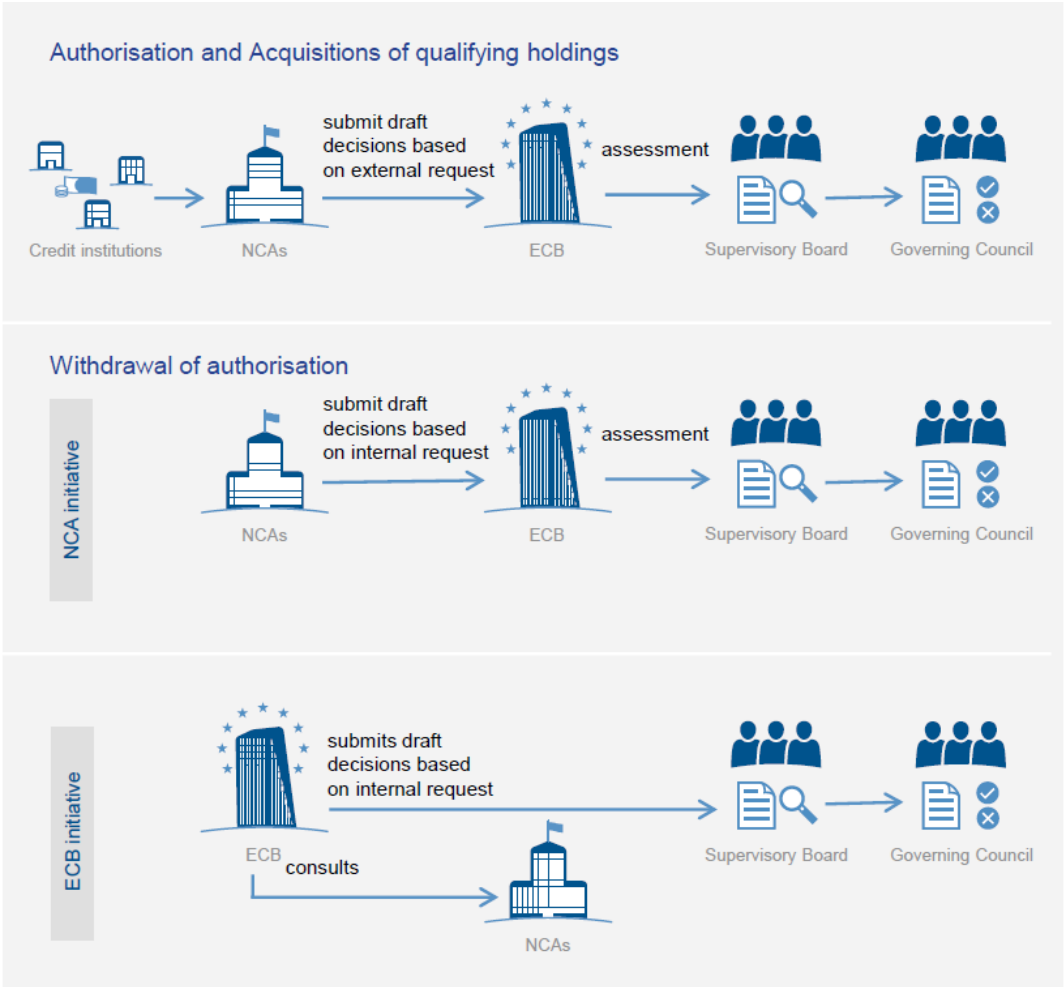


FIGURE 1.7: Authorisations & Acquisitions of Qualifying Holdings, Withdrawal of Authorisations

[9] These are the NCAs in charge of banking supervision in participating countries.

Chapter 2

Basel Accords

2.1 Basel I

With the foundations for supervision of internationally active banks laid, capital adequacy soon became the main focus of the BCBS activities. In the early 1980s, the onset of the Latin American debt crisis heightened the Committee's concerns that the capital ratios [1] of the main international banks were deteriorating at a time of growing international risks.

Basel I or the 1988 Basel Accord, was primarily focused on Credit Risk [2] and appropriate RWAs [3]. Assets of banks were classified and grouped in five categories according to credit risk, carrying risk weights of 0%, 20%, 50%, 100% and some assets given No rating. Banks with an international presence were required to hold capital equal to 8% of their RWAs.

Later in 1996 the Committee also refined the framework to address Market Risk ("Amendment to the capital accord to incorporate market risks"). It describes two alternative approaches to the measurement of Market Risk, a Standardised Method and an Internal Models Approach (VaR Models), closing with a number of worked examples. This was designed to incorporate within the Accord a capital requirement for the market risks arising from banks' exposures to foreign exchange, traded debt securities, equities, commodities and options.

2.2 Basel II

The Basel II Accord was published initially in June 2004 and was intended to amend the Basel I Accord and incorporate Operational Risks. Basel II attempted to accomplish this by establishing risk and capital management requirements to ensure that a bank has adequate capital for the risk the bank exposes itself to through its lending, investment and trading activities. One focus was to maintain sufficient consistency of regulations so to limit competitive inequality amongst internationally active banks.

Basel II aims at:

[1] The Capital Ratio is the amount of regulatory capital divided by the amount of Risk-Weighted Assets. The greater the amount of risk-weighted assets, the more capital is needed, and vice versa.

[2] Credit Risk, the risk of loss due to a borrower being unable to repay a debt in full or in part, accounts for the bulk of most banks' risk-taking activities and regulatory capital requirements

[3] RWAs are an estimate of risk that determines the minimum level of regulatory capital a bank must maintain to deal with unexpected losses.

- Ensuring that capital allocation is more risk-sensitive;
- Enhancing disclosure requirements which would allow market participants to assess the capital adequacy of an institution;
- Ensuring that credit risk, operational risk and market risk are quantified based on data and formal techniques;
- Attempting to align economic and regulatory capital more closely to reduce the scope for regulatory arbitrage.

While the Basel II has at large addressed the regulatory arbitrage issue, there are still areas where regulatory capital requirements diverge from the economic capital.

2.2.1 Three Pillars

Basel II uses the "Three Pillars" concept, namely:

1. Minimum Capital Requirements (Addressing Risk)
2. Supervisory Review
3. Market Discipline

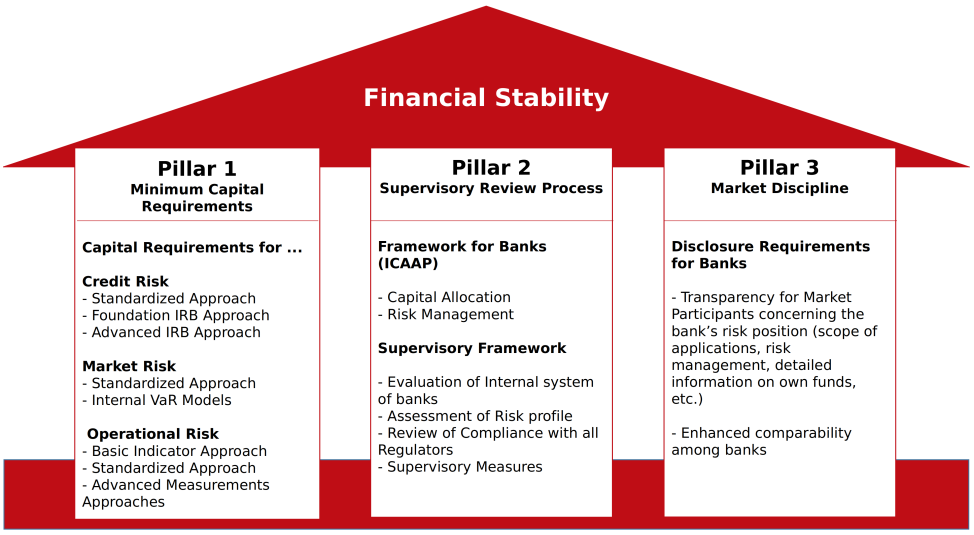


FIGURE 2.1: Requirements of 3 Pillars

2.2.2 1st Pillar: Minimum Capital Requirements

The First Pillar deals with calculation of the minimum regulatory capital required for three major components of risk that a bank faces: credit risk, operational risk, and market risk. Other risks are not considered fully quantifiable at this stage.

The Credit Risk component can be calculated in three different ways of varying degree of sophistication, namely:

- SA, which is required to use ratings from External Credit Rating Agencies to quantify required capital for credit risk.

- F-IRB, which under this approach the banks are allowed to develop their own empirical model to estimate the PD for individual clients or groups of clients. Banks can use this approach only subject to approval from their local regulators.
- A-IRB, which under this approach the banks are allowed to develop their own empirical model to quantify required capital for credit risk. Banks can use this approach only subject to approval from their local regulators.

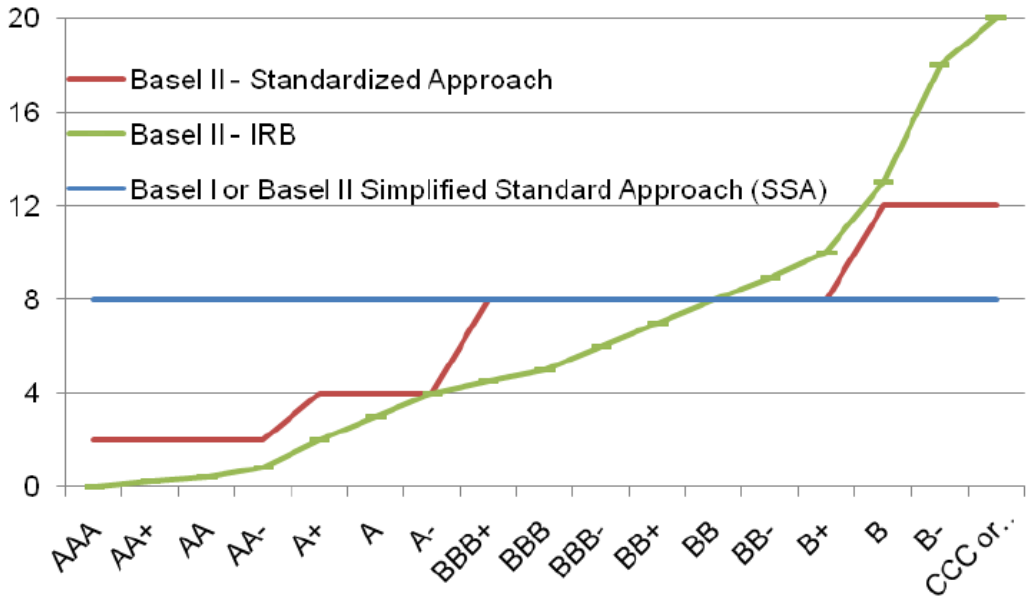


FIGURE 2.2: The benefits to banks of calculating via the IRB Approach rather than the SA. (EUROPEEN, 2013)

About Market Risk, the standardised methodology uses a "building-block" approach in which specific risk and the general market risk arising from debt and equity positions are calculated separately. The focus of most internal models is a bank's general market risk exposure, typically leaving specific risk.(i.e. exposures to specific issuers of debt securities or equities [4]) to be measured largely through separate credit risk measurement systems. Banks using models should be subject to capital charges for the specific risk not captured by their models. Accordingly, a separate capital charge for specific risk will apply to each bank using a model to the extent that the model does not capture specific risk. (Banking Supervision (BCBS), 2006)

For OpRisk, there are three different approaches:

- BIA, which calculates operational RWAs based on a coefficient (set at 15%) multiplied by the rolling three year average revenue of the bank as a whole.
- SA, which derives operational RWAs by applying predefined coefficients (set 12, 15 or 18%) to the rolling three year average revenue of eight broadly defined business lines.

[4]Specific risk includes the risk that an individual debt or equity security moves by more or less than the general market in day-to-day trading (including periods when the whole market is volatile) and event risk (where the price of an individual debt or equity security moves precipitously relative to the general market, e.g. on a take-over bid or some other shock event; such events would also include the risk of "default").

- AMA, which utilizes the institutes' own internally developed risk measurement framework to develop a VaR to a 99.9% confidence level.

2.2.3 2nd Pillar: Supervisory Review

The Second Pillar sets the Key Principles for the Supervisory Review, giving regulators better tools over those previously available. It also provides a framework for the assessment of the overall capital adequacy by the Banks based on the assessment of all material risks faced by them.

When the Committee introduced the Basel II framework in 2004, a fundamental objective of the Committee's work was to reinforce the minimum capital requirements of the first pillar with a robust implementation of the second pillar. This included efforts by banks to assess their capital adequacy and by supervisors to review such assessments.

Pillar 2 of the Basel Framework does not include prescriptive guidance or direction on supervisory approaches. Rather, it is principles-based and intended to be tailored to the risks, needs and circumstances of the respective jurisdictions. Supervisors thus use a range of approaches, methodologies and strategies to execute their supervisory review process to meet the overall objectives of a sound supervisory approach to Pillar 2. Notwithstanding some differences in jurisdictional approaches, the Pillar 2 outcomes across jurisdictions are directionally similar. Furthermore, Basel Committee jurisdictions try to minimise any potential effect on banks from jurisdictional differences through cooperation in supervisory colleges and other forms of collaboration and coordination.

2.2.4 3rd Pillar: Market Discipline

The Third Pillar aims to complement the minimum capital requirements and supervisory review process by developing a set of disclosure requirements which will allow the market participants to gauge the capital adequacy of an institution.

Market discipline supplements regulation as sharing of information facilitates the assessment of the bank by others, including investors, analysts, customers, other banks, and rating agencies, which leads to good corporate governance. The aim of Pillar 3 is to allow market discipline to operate by requiring institutions to disclose details on the scope of application, capital, risk exposures, risk assessment processes, and the capital adequacy of the institution. It must be consistent with how the senior management, including the board, assess and manage the risks of the institution.

When market participants have a sufficient understanding of a bank's activities and the controls it has in place to manage its exposures, they are better able to distinguish between banking organizations so that they can reward those that manage their risks prudently and penalize those that do not.

These disclosures are required to be made at least twice a year, except qualitative disclosures providing a summary of the general risk management objectives and policies which can be made annually. Institutions are also required to create a formal policy on what will be disclosed and controls around them along with the validation and frequency of these disclosures. In general, the disclosures under Pillar 3 apply

to the top consolidated level of the banking group to which the Basel II framework applies.

2.3 Basel III

The Third installment of the Basel Accords was developed in response to the deficiencies in financial regulation revealed by the financial crisis of 2007–08. It is intended to strengthen bank capital requirements by increasing bank liquidity and decreasing bank leverage. In addition, it introduces requirements on liquid asset holdings and funding stability, thereby seeking to mitigate the risk of a run on the bank.

The original Basel III rule from 2010 required banks to fund themselves with 4.5% of common equity (up from 2% in Basel II) of RWAs. Since 2015, a minimum CET1 [5] ratio of 4.5% must be maintained at all times by the bank. This ratio is calculated as follows:

$$\frac{Total\ Exposure}{RWAs} \geq 4.5\%$$

The minimum T1 increases from 4% in Basel II to 6%, applicable in 2015, over RWAs. This 6% is composed of 4.5% of CET1, plus an extra 1.5% of AT1 [6]. Furthermore, Basel III introduced two additional capital buffers:

- A mandatory "capital conservation buffer", equivalent to 2.5% of RWAs. Considering the 4.5% CET1 capital ratio required, banks have to hold a total of 7% CET1 capital ratio, from 2019 onwards.
- A "discretionary counter-cyclical buffer", allowing national regulators to require up to an additional 2.5% of capital during periods of high credit growth. The level of this buffer ranges between 0% and 2.5% of RWA and must be met by CET1 capital.

Moreover, Basel III introduced a minimum Leverage Ratio. This is a non-risk-based Leverage Ratio and is calculated by dividing Tier 1 capital by the bank's average total consolidated assets (sum of the exposures of all assets and non-balance sheet items). The banks are expected to maintain a leverage ratio in excess of 3% under Basel III.

$$\frac{Tier\ 1\ Capital}{Total\ Exposure} \geq 3\%$$

Furthermore, Basel III introduced two required liquidity ratios.The LCR requires a bank to hold sufficient high-quality liquid assets to cover its total net cash outflows over 30 days. Mathematically it is expressed as follows:

$$LCR = \frac{High\ Quality\ Liquid\ Assets}{Total\ Net\ Liquidity\ Outflows\ over\ 30\ days} \geq 100\%$$

The NSFR requires the available amount of stable funding to exceed the required amount of stable funding over a one-year period of extended stress.

$$NSFR = \frac{Available\ Amount\ of\ Stable\ Funding}{Required\ Amount\ of\ Stable\ Funding} > 100\%$$

[5] CET1– common shares, retained earnings and other reserves.
[6] AT1 – capital instruments with no fixed maturity

2.4 Basel IV

In December 2017 the BCBS published a package of proposed reforms for the global regulatory framework of our industry which is frequently referred to as Basel IV. (Ioannis Akkizidis, 2018)

The BCBS itself calls them simply "finalised reforms" (the UK Government has called them "Basel 3.1") and concerns the changes agreed in 2016 and 2017 to Basel III. Regulators argue that these changes are simply completing the Basel III reforms, agreed in principle in 2010–11, although most of the Basel III reforms were agreed in detail at that time. This set of rules has been adopted on 7 December 2017 (14.01.2019 for

Motivation	Main changes
Reduce mechanistic reliance on external credit ratings	• Requirement for banks using credit ratings to conduct sufficient due diligence • Adoption of a sufficiently granular non-ratings-based approach for jurisdictions that cannot or do not wish to rely on external credit ratings
Improve granularity and risk sensitivity	• Adoption of a more granular risk weighting approach, particularly for the following credit risk exposures in which a flat risk weight currently applies: o residential real estate o commercial real estate o subordinated debt and equity o unrated exposure to banks • Adoption of a more granular risk weighting approach to rated exposures to corporates, and a more granular treatment of retail exposures • Recalibration of risk weights for rated exposures to banks and of credit conversion factors for off-balance sheet items

FIGURE 2.3: The main changes to the credit risk SA. ((FSI), 2018)

the adjustment to the Market Risk Framework) and has to be implemented by 2022 (2027 for the output floor) 3.2. As the BCBS does not have the power to issue legally binding regulation, the Basel IV standards have to be implemented by national authorities. The 2017 reforms seek to restore credibility in the calculation of RWAs and improve the comparability of banks' capital ratios. A prudent and credible calculation of RWAs is an integral element of the risk-based capital framework.

The 2017 reforms address weaknesses that were revealed by the global financial crisis, like:

- Credibility of the framework: A range of studies found an unacceptably wide variation in RWAs across banks that cannot be explained solely by differences in the riskiness of banks' portfolios. The unwarranted variation makes it difficult to compare capital ratios across banks and undermines confidence in capital ratios. The reforms will address this to help restore the credibility of the risk-based capital framework.

- Internal models: Internal models should allow for more accurate risk measurement than the standardised approaches developed by supervisors. However, incentives exist to minimise risk weights when internal models are used to set minimum capital requirements. In addition, certain types of asset, such as low-default exposures, cannot be modelled reliably or robustly. The reforms

introduce constraints on the estimates banks make when they use their internal models for regulatory capital purposes, and, in some cases, remove the use of internal models.

Motivation	Main changes
Address the lack of robustness in modelling certain asset classes and enhance comparability in banks' IRB capital requirements	• Removal of the option to use the advanced IRB approach for certain asset classes • Adoption of "input" floors (ie for internal estimates of PD and LGD) to ensure a minimum level of conservatism in model parameters for asset classes where the advanced IRB approach remains available • Provide greater specification of parameter estimation practices

FIGURE 2.4: The main changes to the credit risk IRB Approach. ((FSI), 2018)

2.5 Improve the Treatment of Credit Risk

Most banks around the world use the Standardised Approach (SA) for credit risk. Under this approach, supervisors set the risk weights that banks apply to their exposures to determine RWAs. This means that banks do not use their internal models to calculate RWAs. The main changes to the SA for Credit Risk will (Banking Supervision (BCBS), 2017b):

- Enhance risk sensitivity while keeping the SA for credit risk sufficiently simple. Provide for a more detailed risk weighting approach instead of a flat risk weight, particularly for residential and commercial real estate.
- Reduce reliance on external credit ratings.
  - Require banks to conduct sufficient due diligence when using external ratings.
  - Have a sufficiently detailed non-ratings-based approach for jurisdictions that cannot or do not wish to rely on external credit ratings.

The IRB Approach for credit risk allows banks, under certain conditions, to use their internal models to estimate Credit Risk, and therefore RWAs. The 2017 reforms introduced some constraints to banks' estimates of risk parameters. There are two main IRB approaches: F-IRB and A-IRB.The main changes to the IRB Approach for Credit Risk will:

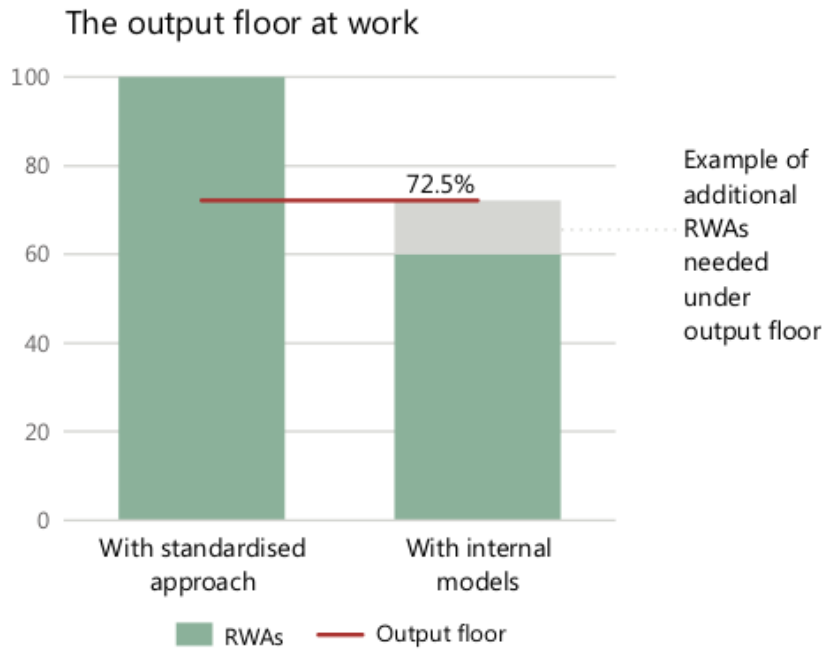
- Remove the option to use the A-IRB approach for exposures to financial institutions and large corporates. No IRB approach can be used for equity exposures.
- Where the IRB approach is retained, minimum levels are applied on the probability of default and for other inputs.

2.6 Create a more robust, risk-sensitive output floor

The 2017 reforms replace the existing capital floor with a more robust, risk-sensitive output floor based on the revised standardised approaches. Jurisdictions have not implemented the existing floor consistently, partly because of differing interpretations of the requirement and also because it is based on Basel I standards, which many banks and jurisdictions no longer apply (Banking Supervision (BCBS), 2017a).

Exposure class	Methods under Basel IV credit risk standards	Change in methods relative to Basel iii credit risk
Banks and other financial institutions	SA or F-IRB	A-IRB removed
Corporates belonging to groups with total consolidated revenues exceeding EUR 500m	SA or F-IRB	A-IRB removed
Other Corporates	SA, F-IRB or A-IRB	No change
Specialised Lending	SA, supervisory slotting, F-IRB or A-IRB	No change
Retail	SA or A-IRB	No change
Equity	SA	All IRB approaches removed

- The revised output floor limits the amount of capital benefit a bank can obtain from its use of internal models, relative to using the standardised approaches.
- Banks' calculations of RWAs generated by internal models cannot, in aggregate, fall below 72.5% of the risk-weighted assets computed by the standardised approaches. This limits the benefit a bank can gain from using internal models to 27.5%.



2.7 Standardised Approach for Credit Risk

The key revisions that Basel IV proposed to the Standardised Approach for Credit Risk, are in summary (Banking Supervision (BCBS), 2017b):

1. A more granular approach has been developed for unrated exposures to banks and corporates, and for rated exposures in jurisdictions where the use of credit ratings is permitted.
2. For exposures to banks, some of the risk weights for rated exposures have been recalibrated. In addition, the risk-weighted treatment for unrated exposures is

more granular than the existing flat risk weight. A standalone treatment for covered bonds has also been introduced.

3. For exposures to corporates, a more granular look-up table has been developed. A specific risk weight applies to exposures to SMEs. In addition, the revised standardised approach includes a standalone treatment for exposures to project finance, object finance and commodities finance.

4. For residential real estate exposures, more risk-sensitive approaches have been developed, whereby risk weights vary based on the LTV ratio of the mortgage (instead of the existing single risk weight) and in ways that better reflect differences in market structures.

5. For retail exposures, a more granular treatment applies, which distinguishes between different types of retail exposures. For example, the regulatory retail portfolio distinguishes between revolving facilities (where credit is typically drawn upon) and transactors (where the facility is used to facilitate transactions rather than a source of credit).

6. For commercial real estate exposures, approaches have been developed that are more risk-sensitive than the flat risk weight which generally applies.

7. For subordinated debt and equity exposures, a more granular risk weight treatment applies (relative to the current flat risk weight).

8. For off-balance sheet items, the CCFs, which are used to determine the amount of an exposure to be risk-weighted, have been made more risk-sensitive, including the introduction of positive CCFs for UCCs.

More details are outlined about Revisions to the Existing SA as follows:

- **Exposures to Banks**
  Bank exposures will be risk-weighted based on either the ECRA or SCRA. Banks are to apply ECRA where regulators do allow the use of external ratings for regulatory purposes and SCRA for regulators that don't.

- **Exposures to Multilateral Development Banks (MDBs)**
  For exposures that do not fulfil the eligibility criteria, risk weights are to be determined by either SCRA or ECRA.

- **Exposures to Corporates**
  A more granular look-up table as well as a specific risk weight for SMEs have been developed.

- **Retail Exposures (Excluding Real Estate)**
  Retail exposures are broken down into more granular types such as transactors and revolvers. A QRRE transactor is the exposure to an obligor in relation to a revolving credit facility where the balance has been repaid in full at each scheduled repayment date for the previous 12 months or there have been no drawdowns over the previous 12 months. All exposures that are not QRRE transactors are QRRE revolvers. 3.8

- **Residential Real Estate and Commercial Real Estate Exposures**
  More risk-sensitive approaches have been developed. Variable risk weights, based on mortgages' LTV ratios, will replace the previous flat risk weights of 35% and 100% for RRE and CRE respectively. New treatment for ADC financing, a subcategory of the real estate exposure class. 3.9 3.10

- **Exposures to Subordinated Debts and Equity**
  A more granular risk weight treatment applies relative to the current flat risk weight. 3.13

- **Exposures to Off-Balance Sheet Items**
  CCFs have been made more risk-sensitive such as introducing positive CCFs for UCCs. 3.14

- **Exposure to Covered Bonds**
  Rated covered bonds will be risk weighted based on issue specific rating while risk weights for unrated covered bonds will be inferred from the issuer's ECRA or SCRA risk weights.

- **Exposure to Project Finance, Object and Commodities Finance**
  A new standalone treatment for specialised lending, a subcategory of the corporate exposure class.

2.8 Internal Ratings-Based Approaches

As noted above, the financial crisis highlighted a number of shortcomings related to the use of internally modelled approaches for regulatory capital, including the IRB approaches to credit risk. These shortcomings include the excessive complexity of the IRB approaches, the lack of comparability in banks' internally modelled IRB capital requirements and the lack of robustness in modelling certain asset classes. (*Further Enhancements of the Basel Framework*)

To address these shortcomings, the Committee has made the following revisions to the IRB approaches:

1. removed the option to use the A-IRB Approach for certain asset classes; 3.11

2. adopted Input Floors (for metrics such as PD and LGD) to ensure a minimum level of conservativism in model parameters for asset classes where the IRB approaches remain available; 3.12

3. provided greater specification of parameter estimation practices to reduce RWA variability.

The use of the A-IRB Approach[7] for asset classes that cannot be modelled in a robust and prudent manner. These include exposures to large and mid-sized corporates, and exposures to banks and other financial institutions. As a result, banks with supervisory approval will use the F-IRB Approach, which removes the two important sources of RWA [8] variability as it applies fixed values to the LGD and EAD parameters. In addition, all IRB Approaches are being removed for exposures to equities, which are typically a small component of the Credit Risk of banks.

[7] which allows banks to estimate the PD, LGD, EAD and maturity of an exposure

[8] The 1.06 scaling factor, currently applied to RWAs determined by the IRB approach to credit risk, has been removed

Chapter 3

IFRS

3.1 IFRS 9 and Credit Risk Models

IFRS 9 is an International Financial Reporting Standard published by the IASB. It addresses the accounting for financial instruments. All financial instruments are initially measured at fair value plus or minus, in the case of a financial asset or financial liability not at fair value through profit or loss, transaction costs. IFRS contains three main topics:

1. Classification and Measurement of Financial Instruments
2. Impairment of Financial Assets
3. Hedge Accounting

IFRS 9 replaces the IAS 39 framework ("Financial Instruments: Recognition and Measurement"). It fundamentally changes the classification and measurement of financial instruments. Under IAS 39, a financial institution was allowed to recognise a credit loss on a financial asset, only once there was objective evidence that an impaired event had occurred. This method underestimates the required provisioning levels of banks, since it delays the recognition of credit losses. Arguably, this was one of the contributing factors of the credit crisis. The purpose of IFRS9 is to increase financial instability by introducing a forward looking expected loss impairment model which allows banks to provision when a financial asset is recognised.

IFRS 9 has a significant impact on the risk modelling landscape of banks. Banks that are already A-IRB compliant will have an easier task at hand. However, IFRS 9 requirements and definitions differ significantly and a considerable effort is required. Likewise, for banks that are not yet A-IRB compliant, implementing IFRS 9 could be a springboard to A-IRB compliance.

Main features of the IFRS 9 are:

- enables banks to provision based on the expected loss concept
- requires models for the calculation of 12 months Expected Credit Risk Losses and Life Time Expected Losses.
- There is considerable amount of synergy between IFRS 9 and A-IRB. Although the roadmap may differ, the end stage for both standardized banks and A-IRB banks may look similar
- There are differences in concepts and definitions that may require adjustments to the use of PD and LGD estimates.

- Since limited implementation guidance is provided, it is important to involve all stakeholders, including CFO, supervisors, model validators and auditors at an early stage of the process
- The bank has to convince external auditors and most likely regulators of the IFRS 9 methodology it adopts
- There are substantial benefits to opt for AIRB compliancy. Due to synergies, once IFRS 9 compliancy has been achieved, the additional effort needed for AIRB compliancy will be limited.

3.1.1 Provisioning under IFRS 9

An important difference between IAS 39 and IFRS 9 relates to provisioning. Under the IAS 39 framework, banks were only allowed to provision loans for incurred losses, i.e. only when there was objective evidence that an impairment event had already occurred. Under the IFRS 9 framework, a bank is required to develop models to estimate expected losses. The so-called Expected Credit Loss (ECL) models enable banks to trace financial assets after initial recognition until their final maturity. Three different stages are recognized:

- **Stage 1:** Starting from the initial recognition of the asset; a provisioning level is measured or estimated as the ECL using a 12-month horizon;
- **Stage 2:** This stage includes financial instruments which have had a significant increase of credit risk since initial recognition. For these assets, the life time expected credit losses are estimated;
- **Stage 3:** Financial assets in this stage have objective evidence of impairment, i.e. classified as doubtful or default, at the reporting date and life time expected credit losses are estimated.

	Stage 1	Stage 2	Stage 3
Loss Allowance	Expected Credit Loss (12 months)	Life Time Expected Loss	Life Time Expected Loss
Effective Interest Rate Applicable to	Gross carrying amount	Gross carrying amount	Net carrying amount

FIGURE 3.1: General approach for recognising Expected Credit losses in the 3 different stages

As the table indicates, the provision calculation differs per stage. In Stage 1, the expected credit loss is calculated over a period of 12 months while in Stage 2 and 3, the expected loss is based on the estimated life time. Moreover, in Stage 1 and 2 banks are allowed to include future interest income in their calculations while in Stage 3 this is prohibited. (*IFRS 9*)

3.1.2 Credit Risk

The impairment model in IFRS 9 is based on the premise of providing for expected losses. IFRS 9 requires that the same impairment model apply to all of the following[1]:

- Financial assets measured at amortised cost [2]
- Financial assets mandatorily measured at FVTOCI
- Loan commitments when there is a present obligation to extend credit (except where these are measured at FVTPL)
  - Financial guarantee contracts to which IFRS 9 is applied (except those measured at FVTPL)
  - Lease receivables within the scope of IAS 17 Leases
  - Contract assets within the scope of IFRS 15 Revenue from Contracts with Customers (i.e. rights to consideration following transfer of goods or services).

With the exception of purchased or originated credit impaired financial assets (see below), expected credit losses are required to be measured through a loss allowance at an amount equal to:

- the 12-month expected credit losses (expected credit losses that result from those default events on the financial instrument that are possible within 12 months after the reporting date); or
- full lifetime expected credit losses (expected credit losses that result from all possible default events over the life of the financial instrument) [3].

A loss allowance for full lifetime expected credit losses is required for a financial instrument if the credit risk of that financial instrument has increased significantly since initial recognition, as well as to contract assets or trade receivables that do not constitute a financing transaction in accordance with IFRS 15. [4]

Additionally, entities can elect an accounting policy to recognise full lifetime expected losses for all contract assets and/or all trade receivables that do constitute a financing transaction in accordance with IFRS 15. The same election is also separately permitted for lease receivables. [5] For all other financial instruments, expected credit losses are measured at an amount equal to the 12-month expected credit losses. (*IFRS9 Official Document*)

Significant increase in credit risk

[1] IFRS 9 paragraph 5.5.1

[2] a financial asset is measured at amortised cost if both of the following conditions are met:

- the asset is held within a business model whose objective is to hold assets in order to collect contractual cash flows; and
- the contractual terms of the financial asset give rise on specified dates to cash flows that are solely payments of principal and interest on the principal amount outstanding.

[3] IFRS 9 paragraphs 5.5.3 and 5.5.5

[4] IFRS 9 paragraphs 5.5.3 and 5.5.15

[5] IFRS 9 paragraph 5.5.16

With the exception of purchased or originated credit-impaired financial assets (see below), the loss allowance for financial instruments is measured at an amount equal to lifetime expected losses if the credit risk of a financial instrument has increased significantly since initial recognition, unless the credit risk of the financial instrument is low at the reporting date in which case it can be assumed that credit risk on the financial instrument has not increased significantly since initial recognition. [6]

The Standard considers credit risk low if there is a low risk of default, the borrower has a strong capacity to meet its contractual cash flow obligations in the near term and adverse changes in economic and business conditions in the longer term may, but will not necessarily, reduce the ability of the borrower to fulfil its contractual cash flow obligations. The Standard suggests that 'investment grade' rating might be an indicator for a low credit risk. (*IFRS 9*)

The assessment of whether there has been a significant increase in credit risk is based on an increase in the probability of a default occurring since initial recognition. Under the Standard, an entity may use various approaches to assess whether credit risk has increased significantly (provided that the approach is consistent with the requirements). An approach can be consistent with the requirements even if it does not include an explicit probability of default occurring as an input. The application guidance provides a list of factors that may assist an entity in making the assessment. Also, whilst in principle the assessment of whether a loss allowance should be based on lifetime expected credit losses is to be made on an individual basis, some factors or indicators might not be available at an instrument level. In this case, the entity should perform the assessment on appropriate groups or portions of a portfolio of financial instruments.

The requirements also contain a rebuttable presumption that the credit risk has increased significantly when contractual payments are more than 30 days past due. IFRS 9 also requires that (other than for purchased or originated credit impaired financial instruments) if a significant increase in credit risk that had taken place since initial recognition and has reversed by a subsequent reporting period (i.e., cumulatively credit risk is not significantly higher than at initial recognition) then the expected credit losses on the financial instrument revert to being measured based on an amount equal to the 12-month expected credit losses. [7]

Purchased or originated credit-impaired financial assets
Purchased or originated credit-impaired financial assets are treated differently because the asset is credit-impaired at initial recognition. For these assets, an entity would recognise changes in lifetime expected losses since initial recognition as a loss allowance with any changes recognised in profit or loss. Under the requirements, any favourable changes for such assets are an impairment gain even if the resulting expected cash flows of a financial asset exceed the estimated cash flows on initial recognition.

Credit-impaired financial asset
Under IFRS 9 a financial asset is credit-impaired when one or more events that have

[6] IFRS 9 paragraphs 5.5.3 and 5.5.10
[7] IFRS 9 paragraph 5.5.11

occurred and have a significant impact on the expected future cash flows of the financial asset. It includes observable data that has come to the attention of the holder of a financial asset about the following events: [8]

- significant financial difficulty of the issuer or borrower;
- a breach of contract, such as a default or past-due event;
- the lenders for economic or contractual reasons relating to the borrower's financial difficulty granted the borrower a concession that would not otherwise be considered;
- it becoming probable that the borrower will enter bankruptcy or other financial reorganisation;
- the disappearance of an active market for the financial asset because of financial difficulties; or
- the purchase or origination of a financial asset at a deep discount that reflects incurred credit losses.

3.1.3 Basis for estimating expected credit losses

Any measurement of expected credit losses under IFRS 9 shall reflect an unbiased and probability-weighted amount that is determined by evaluating the range of possible outcomes as well as incorporating the time value of money. Also, the entity should consider reasonable and supportable information about past events, current conditions and reasonable and supportable forecasts of future economic conditions when measuring expected credit losses. [9]

The Standard defines expected credit losses as the weighted average of credit losses with the respective risks of a default occurring as the weightings. [IFRS 9 Appendix A] Whilst an entity does not need to consider every possible scenario, it must consider the risk or probability that a credit loss occurs by considering the possibility that a credit loss occurs and the possibility that no credit loss occurs, even if the probability of a credit loss occurring is low. [10]

In particular, for lifetime expected losses, an entity is required to estimate the risk of a default occurring on the financial instrument during its expected life. 12-month expected credit losses represent the lifetime cash shortfalls that will result if a default occurs in the 12 months after the reporting date, weighted by the probability of that default occurring.

An entity is required to incorporate reasonable and supportable information (i.e., that which is reasonably available at the reporting date). Information is reasonably available if obtaining it does not involve undue cost or effort (with information available for financial reporting purposes qualifying as such).

For applying the model to a loan commitment an entity will consider the risk of a default occurring under the loan to be advanced, whilst application of the model

[8] IFRS 9 Appendix A
[9] IFRS 9 paragraph 5.5.17
[10] IFRS 9 paragraph 5.5.18

for financial guarantee contracts an entity considers the risk of a default occurring of the specified debtor. [11]

An entity may use practical expedients when estimating expected credit losses if they are consistent with the principles in the Standard (for example, expected credit losses on trade receivables may be calculated using a provision matrix where a fixed provision rate applies depending on the number of days that a trade receivable is outstanding). [12]

To reflect time value, expected losses should be discounted to the reporting date using the effective interest rate of the asset (or an approximation thereof) that was determined at initial recognition. A "credit-adjusted effective interest" rate should be used for expected credit losses of purchased or originated credit-impaired financial assets. In contrast to the "effective interest rate" (calculated using expected cash flows that ignore expected credit losses), the credit-adjusted effective interest rate reflects expected credit losses of the financial asset. [13]

Expected credit losses of undrawn loan commitments should be discounted by using the effective interest rate (or an approximation thereof) that will be applied when recognising the financial asset resulting from the commitment. If the effective interest rate of a loan commitment cannot be determined, the discount rate should reflect the current market assessment of time value of money and the risks that are specific to the cash flows but only if, and to the extent that, such risks are not taken into account by adjusting the discount rate. This approach shall also be used to discount expected credit losses of financial guarantee contracts. [14]

[11] IFRS 9 paragraphs B5.5.31 and B5.5.32
[12] IFRS 9 paragraph B5.5.35
[13] IFRS 9 paragraphs B5.5.44-45
[14] IFRS 9 paragraphs B5.5.47

Appendix

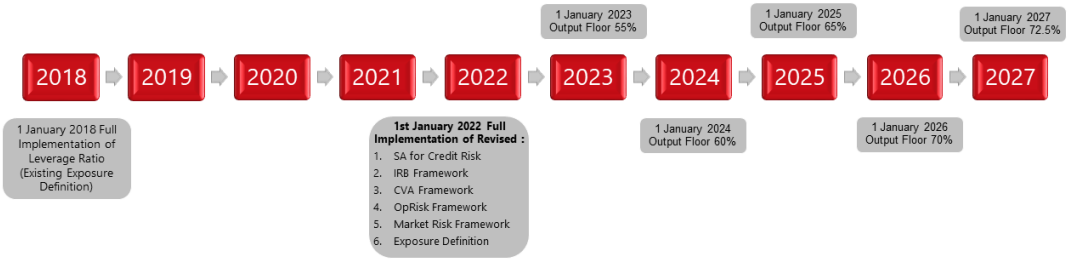


FIGURE 3.2: Implementation Timeline; Focus on Capital Definitions, Capital Buffers and Liquidity Requirements

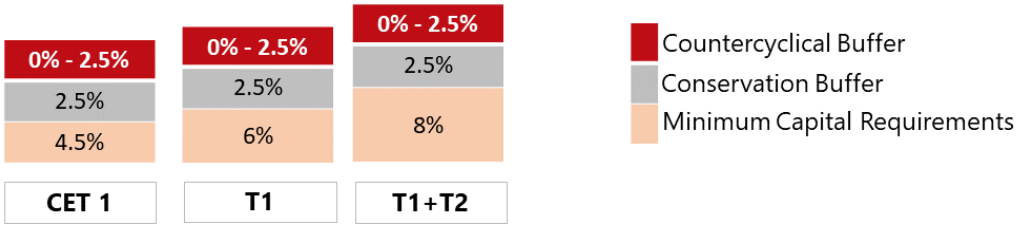


FIGURE 3.3: Capital Ratios

Secured Exposures	Unsecured Exposures
Non-financial collateral: LGD reduced and haircuts increased	Non-financial collateral: LGD reduced to 40%
Financial Collateral: Haircuts revised to be more granular	Banks, Securities Firms and Other Financial Institutions: LGD retained at 45%

FIGURE 3.4: Supervisory Specified Parameters in the F-IRB

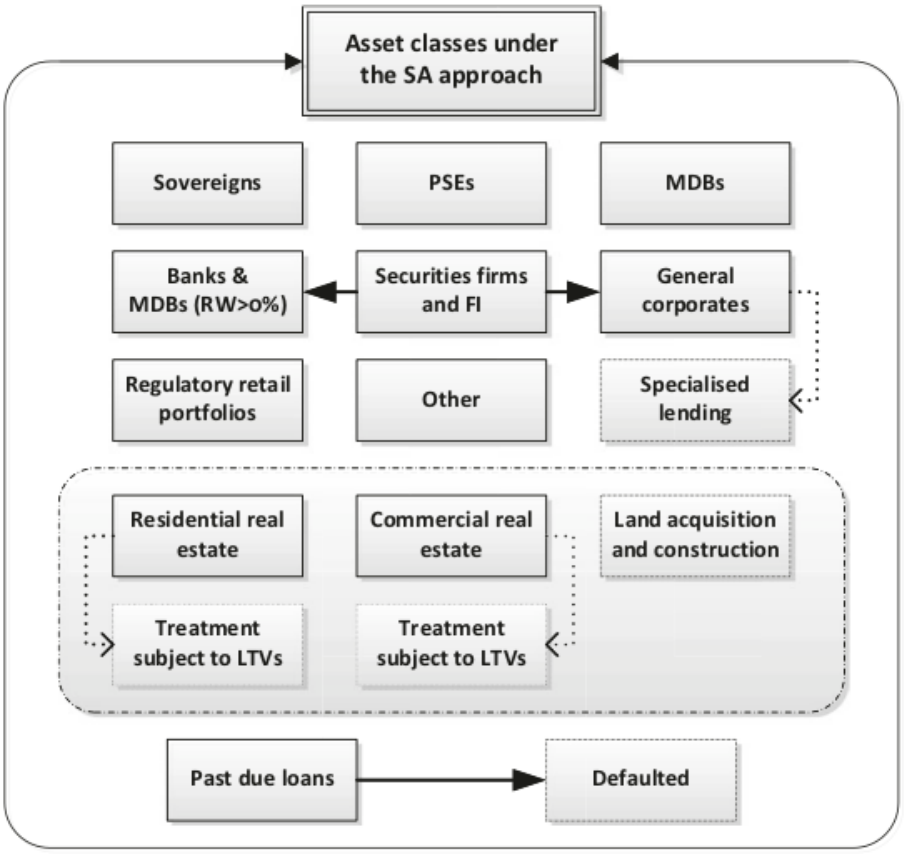


FIGURE 3.5: Asset Classes Under Standardized Approach

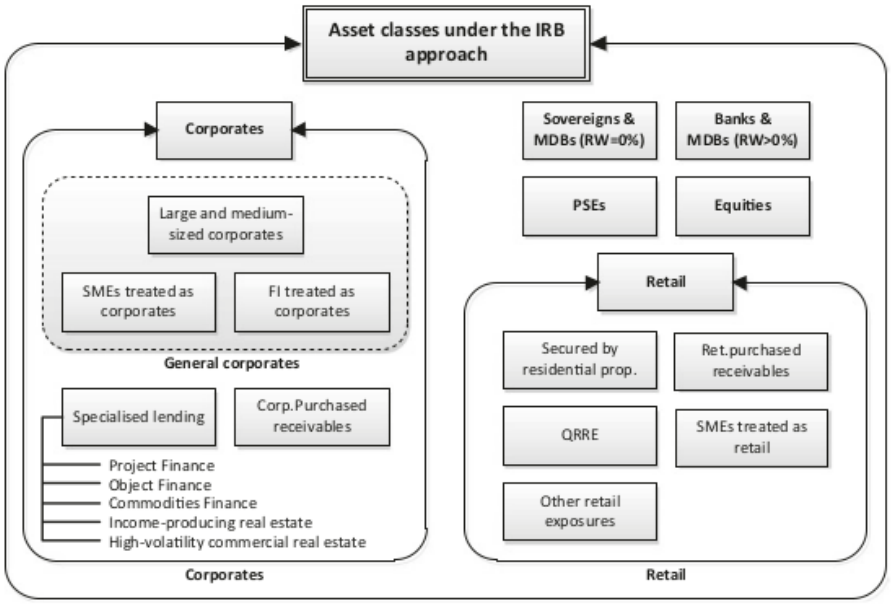


FIGURE 3.6: Asset Classes Under IRB Approach

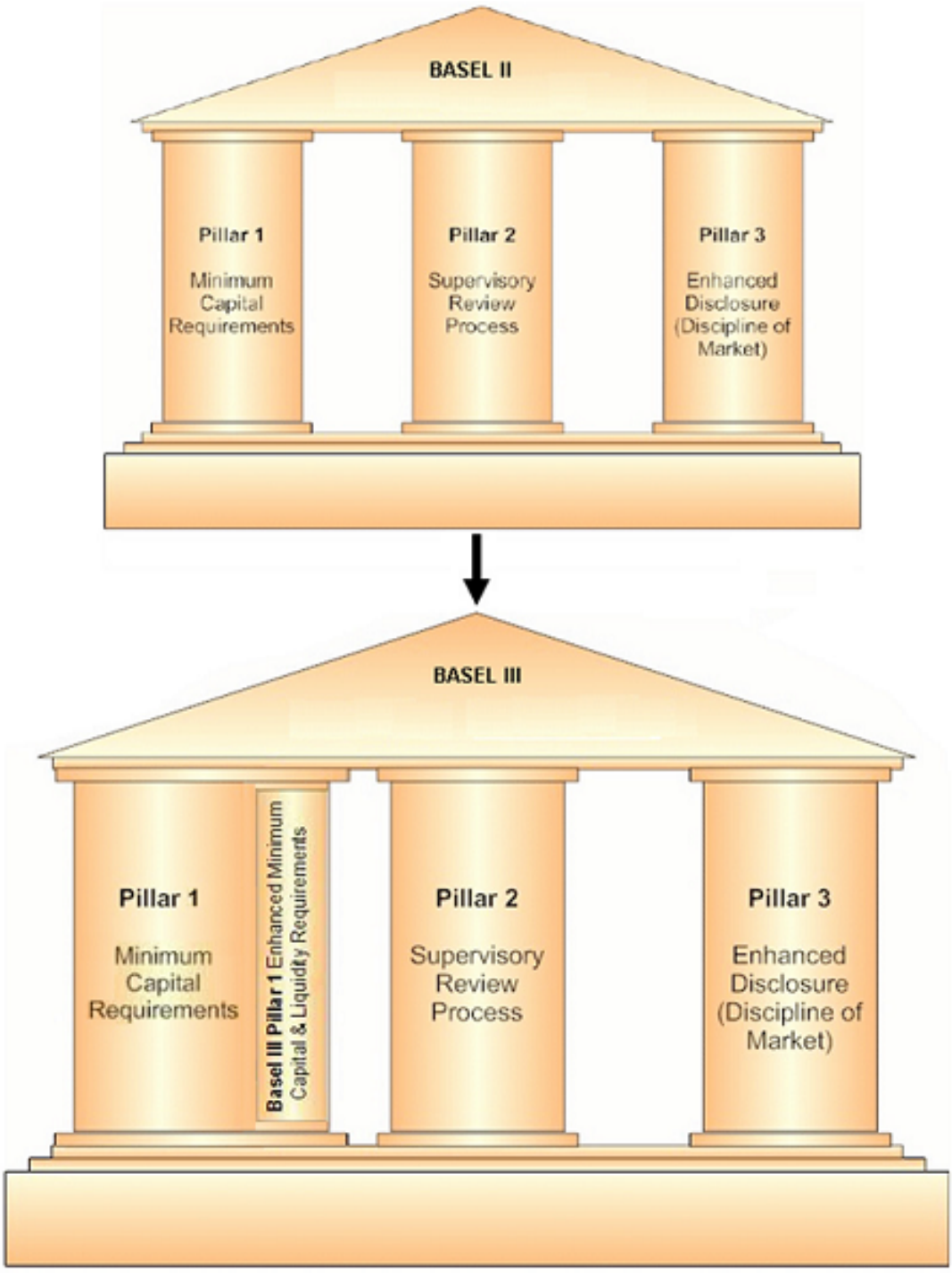


FIGURE 3.7: Basel III strengthens the three Basel II pillars, especially Pillar 1 with enhanced minimum capital and liquidity requirements.

Retail Exposure Excluding Real Estate				
	Regulatory Retail (non-revolving)	Regulatory Retail (revolving)		Other Retail
		Transactors	Revolvers	
Risk Weight	75%	45%	75%	100%

FIGURE 3.8: Retail Exposures Excluding Real Estate

Residential Real Estate Exposure								
LTV Bands	Bellow 50%	50% to 60%	60% to 70%	70% to 80%	80% to 90%	90% to 100%	above 100%	Criteria not met
General RRE								
Whole loan Approach RW	20%	25%	30%		40%	50%	70%	RW of Counterparty
Loan-splitting Approach RW	20%		RW of Counterparty					RW of Counterparty
Income-Producing Residential Real Estate (IPRRE)								
Whole loan Approach RW	30%	35%	45%		60%	75%	105%	150%

FIGURE 3.9: RRE Exposures

Commercial Real Estate (CRE) Exposures				
General CRE				
Whole Loan Approach	LTV ≤ 60%	LTV > 60%	Criteria not met	
	Min (60% RW of Counterparty)	RW of Counterparty	RW of Counterparty	
Loan-Splitting Approach	LTV ≤ 55%	LTV > 55%	Criteria not met	
	Min(60% RW of Counterparty)	RW of Counterparty	RW of Counterparty	
Income-Producing Commercial Real Estate (IPCRE)				
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%			

FIGURE 3.10: CRE Exposures with New treatment for ADC financing

Exposure	Basel II	Basel III: Post Crisis Reforms
Large & Mid-Sized Corporates (Consolidated revenues > €500m)	• A-IRB • F-IRB • SA	• F-IRB • SA
Banks & Other Financial Institutions	• A-IRB • F-IRB • SA	• F-IRB • SA
Equities	• Various IRB Approaches	• SA

FIGURE 3.11: Revision in the Scope IRB Approaches

Exposure		PD	LGD		EAD
			Unsecured	Secured	
Corporate		5 bps	25%	By Collateral type: • 0% financial • 10% receivables • 10% CRE/RRE • 15% other physical	Sum of : (i) On balacne sheet exposures (ii) 50% of off-balance sheet exposure using applicable CCFs in SA
Retail	Mortgages	5 bps	N/A	5%	
	QRRE Transactors	5 bps	50%	N/A	
	QRRE Revolvers	10 bps	50%	N/A	
	Other Retail	5 bps	30%	By Collateral type: • 0% financial • 10% receivables • 10% CRE/RRE • 15% other physical	

FIGURE 3.12: Specification of Input Floors

Subordinated debt and equity (excluding amounts deducted)				
	Subordinated debt and capital other than equities	Equity exposures to certain legislated programmes	"Speculative unlisted equity"	All other equity exposures
Risk Weight	150%	100%	400%	250%

FIGURE 3.13: Exposures to Subordinated Debts and Equity

Credit Conversion Factors for off-balance sheet Exposures					
	UCCs	Commitments, except UCCs	NIFs and RUFs, and certain transaction - related contingent items	ST self-liquidating trade letters of credit arising from the movement of goods	Direct credit substitutes and other off balance sheet exposures
CCF	10%	40%	50%	20%	100%

FIGURE 3.14: Off Balance Sheet Exposures

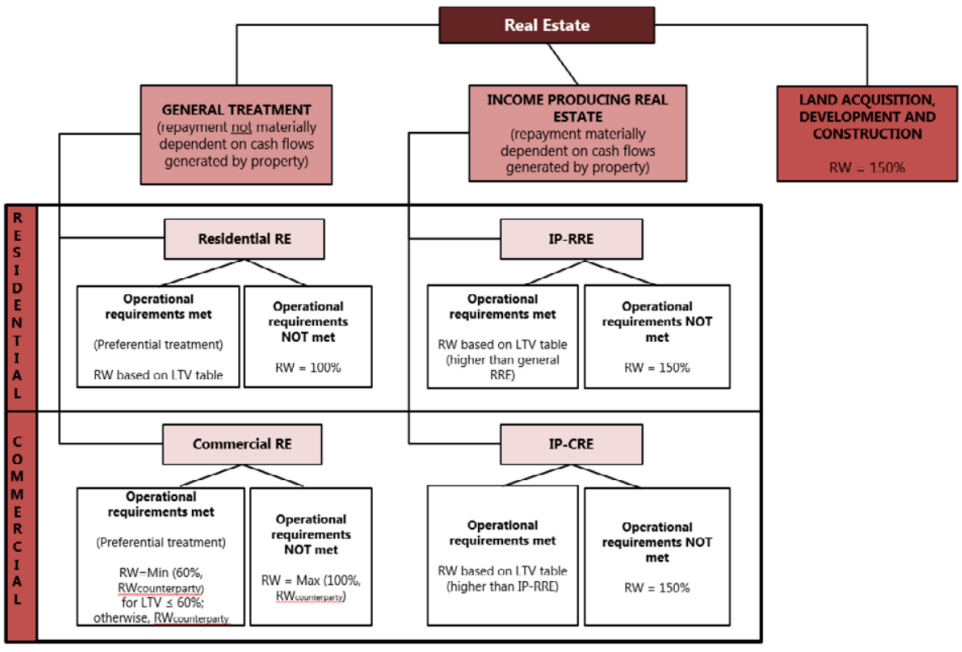
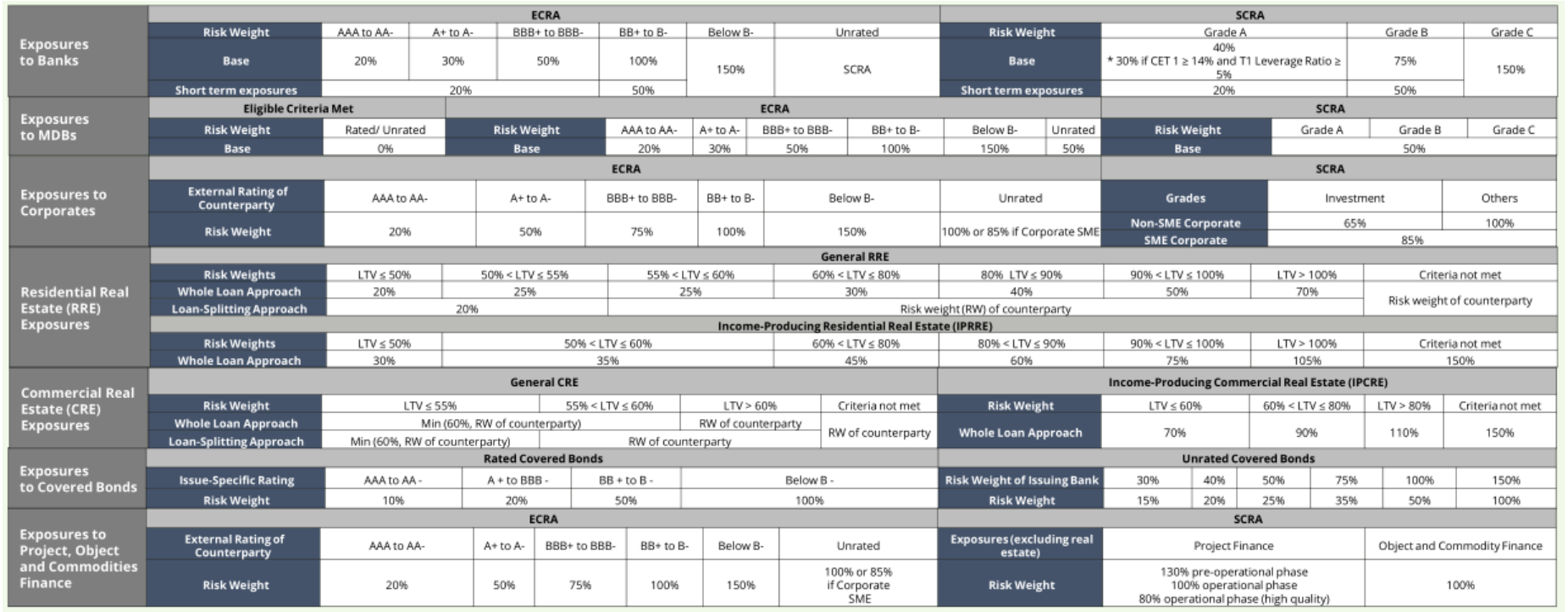


FIGURE 3.15: Revised proposals for the Real Estate Exposure Class



Exposures to Banks	**ECRA**							**SCRA**						
	Risk Weight	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated	**Risk Weight**	Grade A			Grade B	Grade C	
	Base	20%	30%	50%	100%	150%	SCRA	**Base**	40% * 30% if CET 1 ≥ 14% and T1 Leverage Ratio ≥ 5%			75%	150%	
	Short term exposures	20%			50%			**Short term exposures**	20%			50%		
Exposures to MDBs	**Eligible Criteria Met**				**ECRA**						**SCRA**			
	Risk Weight	Rated/ Unrated		**Risk Weight**	AAA to AA-	A+ to A-	BBB+ to BBB-	BB+ to B-	Below B-	Unrated	**Risk Weight**	Grade A	Grade B	Grade C
	Base	0%		**Base**	20%	30%	50%	100%	150%	50%	**Base**	50%		
Exposures to Corporates	**ECRA**										**SCRA**			
	External Rating of Counterparty	AAA to AA-		A+ to A-		BBB+ to BBB-	BB+ to B-	Below B-		Unrated	**Grades**	Investment		Others
	Risk Weight	20%		50%		75%	100%	150%		100% or 85% if Corporate SME	**Non-SME Corporate**	65%		100%
											SME Corporate	85%		
Residential Real Estate (RRE) Exposures	**General RRE**													
	Risk Weights	LTV ≤ 50%		50% < LTV ≤ 55%		55% < LTV ≤ 60%		60% < LTV ≤ 80%		80% LTV ≤ 90%	90% < LTV ≤ 100%		LTV > 100%	Criteria not met
	Whole Loan Approach	20%		25%		25%		30%		40%	50%		70%	Risk weight of counterparty
	Loan-Splitting Approach	20%				Risk weight (RW) of counterparty								
	Income-Producing Residential Real Estate (IPRRE)													
	Risk Weights	LTV ≤ 50%		50% < LTV ≤ 60%				60% < LTV ≤ 80%		80% < LTV ≤ 90%	90% < LTV ≤ 100%		LTV > 100%	Criteria not met
	Whole Loan Approach	30%		35%				45%		60%	75%		105%	150%
Commercial Real Estate (CRE) Exposures	**General CRE**									**Income-Producing Commercial Real Estate (IPCRE)**				
	Risk Weight	LTV ≤ 55%		55% < LTV ≤ 60%		LTV > 60%		Criteria not met		**Risk Weight**	LTV ≤ 60%		60% < LTV ≤ 80%	LTV > 80%	Criteria not met
	Whole Loan Approach	Min (60%, RW of counterparty)				RW of counterparty		RW of counterparty		**Whole Loan Approach**	70%		90%	110%	150%
	Loan-Splitting Approach	Min (60%, RW of counterparty)		RW of counterparty										
Exposures to Covered Bonds	**Rated Covered Bonds**									**Unrated Covered Bonds**					
	Issue-Specific Rating	AAA to AA -		A + to BBB -		BB + to B -		Below B -		**Risk Weight of Issuing Bank**	30%	40%	50%	75%	100%	150%
	Risk Weight	10%		20%		50%		100%		**Risk Weight**	15%	20%	25%	35%	50%	100%
Exposures to Project, Object and Commodities Finance	**ECRA**									**SCRA**						
	External Rating of Counterparty	AAA to AA-		A+ to A-		BBB+ to BBB-		BB+ to B-	Below B-	Unrated	**Exposures (excluding real estate)**	Project Finance				Object and Commodity Finance
	Risk Weight	20%		50%		75%		100%	150%	100% or 85% if Corporate SME	**Risk Weight**	130% pre-operational phase 100% operational phase 80% operational phase (high quality)				100%

FIGURE 3.16: SA Credit Risk

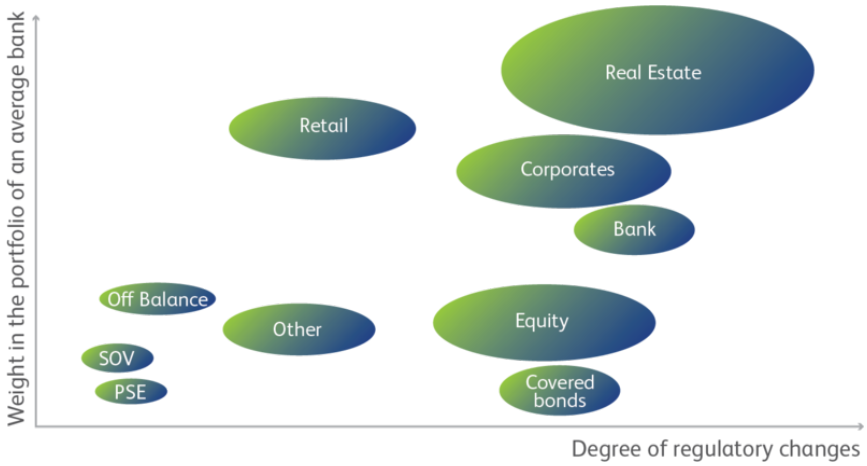


FIGURE 3.17: RWAs Impact

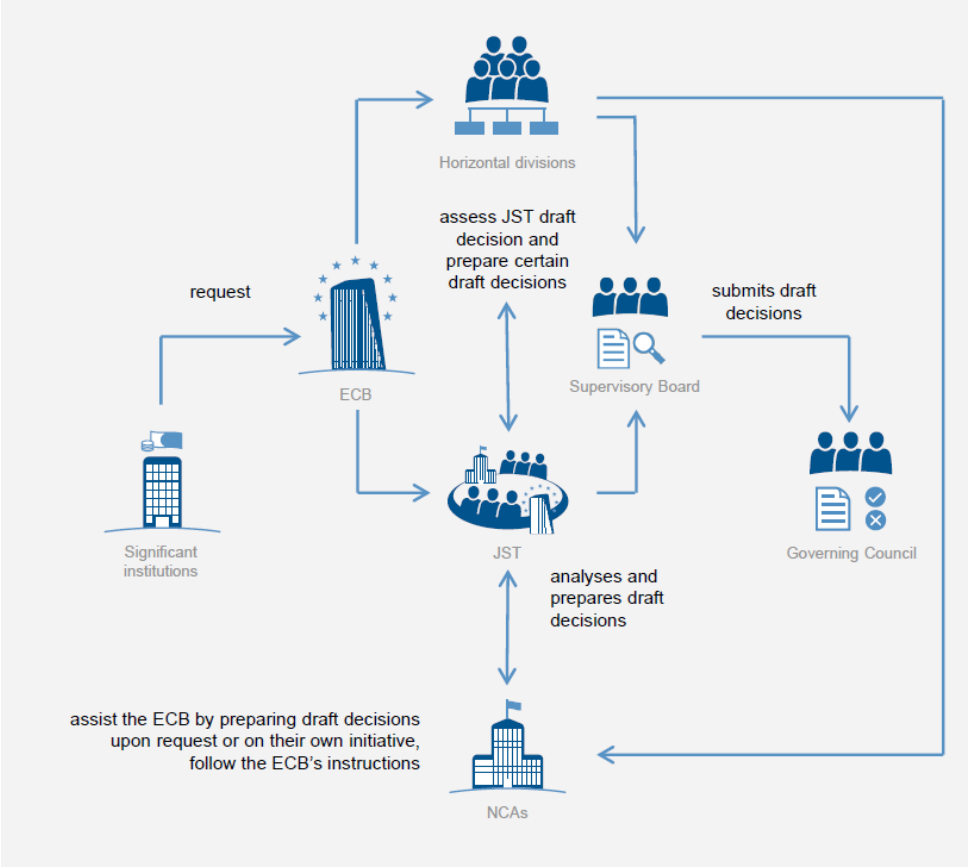


FIGURE 3.18: General process for requests, notifications and applications

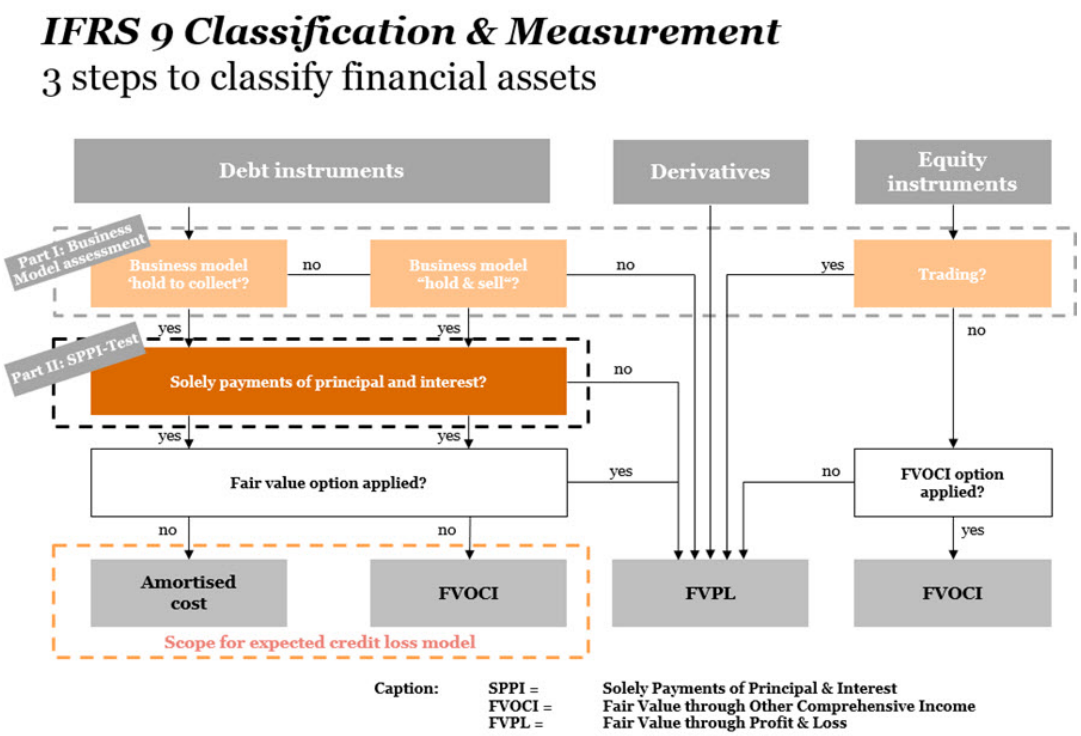


FIGURE 3.19: IFRS 9: Financial Assets

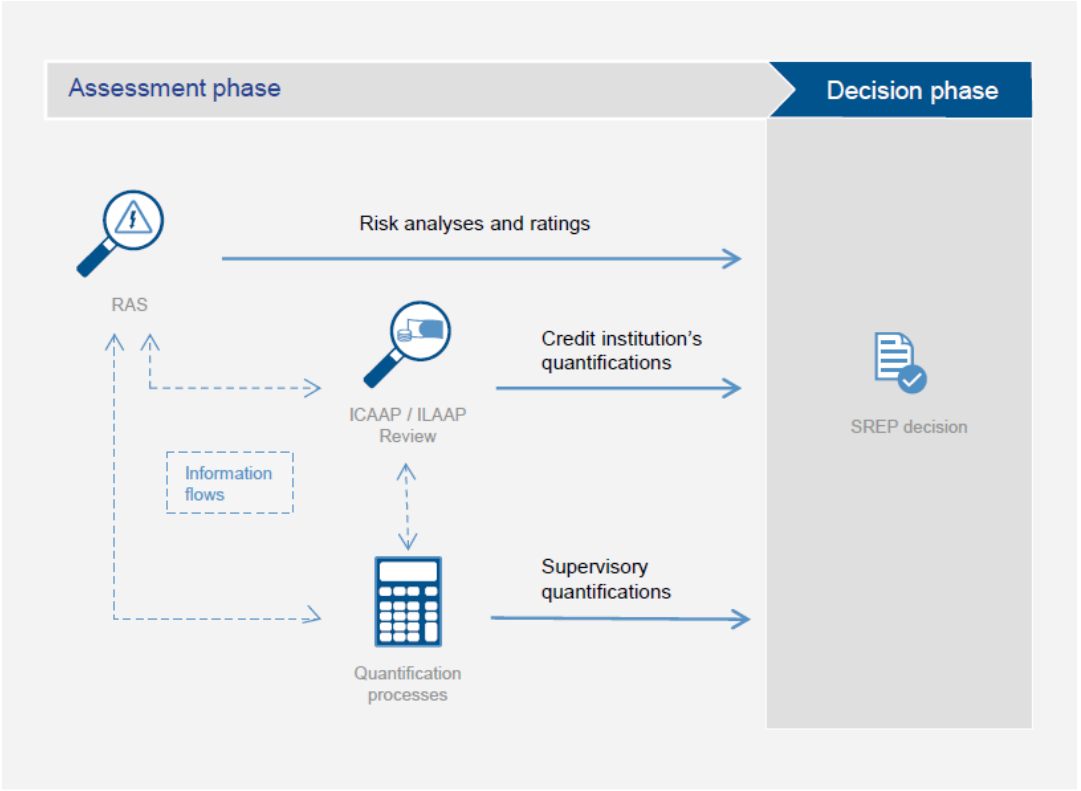


FIGURE 3.20: SREP

Conclusions

In conclusion, according to latest Basel reforms financial institutes, in order calculate their Unexpected Credit Risk are obligated to adapt either the Standardized Approach (SA), either the Foundation Internal Rating Based Approach (F-IRB). The Advance Internal Rating Based Approach (A-IRB) is not applicable any more and there have to choose between SA and F-IRB.

Supervisors have increased the control in the banking system, in order not fail again. The last financial crisis made the global banking system to collapse, because there did not have enough controls for their big risk exposure. The new strict measures are going to develop a sounder financial system and risk awareness. Policies, Procedures, Committees, Governance, Guidelines and Risk Assessments boosts the Global Risk Culture. Risk Coordinators create values and risk thinking. They behave more responsible against credit risk and can observe the "Unseen" and "Hidden" Risks and bring them to Surface.

FIGURE 3.21: Credit Risk Iceberg

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