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## Professional Master Thesis

### Banking Risk Management

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# Chapter 1

## Introduction

In today's rapidly evolving and uncertain environment, traditional and static approaches to risk management are increasingly inadequate. Banks and financial institutions face complex threats from multiple sources—ranging from internal risks such as unethical or illegal employee behaviors to external dangers like cybercrime, geopolitical tensions, and climate change. These challenges are unlikely to diminish in the foreseeable future. As a consequence, risk management functions must become more agile and adaptive, guiding organizations through a complex and ever-changing landscape of risks and opportunities. This requires meeting the diverse and evolving expectations of key stakeholders: regulators, legislators, shareholders, customers, and the broader community, while ensuring resilience and sustainable growth.

Through academic research and practical knowledge gained at PwC, I will present a real-practice understanding of the risk management framework within the banking environment.

In the presentation section, I will walk you through my internship at PwC, examining what I did there, what I learned, what challenges I faced, and how this experience has helped defined my future career plans. On the other hand, in the section dedicated to the academic research, I will integrate formally the most common features of the typical banking risk, especially focusing on the impact of regulatory requirements and risk management practices.

# Chapter 2

## Presentation of the Internship

Since 3 March 2025, I have been an intern at PricewaterhouseCoopers Tax and Advisory, Société coopérative (PwC Luxembourg). The internship lasted six months, ending on 31 August. It was an exciting experience since the very beginning, joining such a large firm and working closely with senior professionals from the start. The opportunity to observe how they face challenges and solve problems was truly inspiring. My team, the Banking Risk Management team, belongs to the Advisory line of service, specifically within the Regulatory, Risk & Compliance department and it counted two partners, two directors, two senior managers, one manager, five senior associates and two associates. My supervisor was a senior manager and my buddy (a slightly more senior peer whose role was to help ease my integration in the team) is a senior associate.

### 2.1 Overview of PwC Luxembourg

With offices in 149 countries and more than 370,000 people, PwC is among the leading professional services networks in the world. PwC helps organizations and individuals create the value they are looking for by delivering quality in Assurance, Tax, and Advisory services. The firm's purpose is clear: to build trust in society and solve important problems. Across its global network, PwC serves more than 180,000 clients and reported US\$55.4 billion in revenues for the fiscal year ended 30 June 2024. In working alongside clients and colleagues to turn purpose into action PwC is guided by a set of core values that shape its culture and actions: Act with integrity, Make a difference, Care, Work together, and Reimagine the possible. These principles underpin every engagement and reflect the firm's commitment to lasting trust and meaningful results. pwc (b) pwc (a)

#### 2.1.1 The company

As a member of this network, PwC Luxembourg is the largest professional services firm in Luxembourg with over 3,800 employees from 90 different countries. PwC Luxembourg provides audit, tax, and advisory services including management consulting, transaction, financing, and regulatory advice. The firm offers advice to a wide variety of clients, from local and middle-market entrepreneurs to large multinational companies operating from Luxembourg and the Greater Region.

In this context, it's worth noting that PwC Luxembourg holds a standout position within

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the market. As a member of the “Big Four” — the global quartet of premier professional services firms; in Luxembourg it is the largest among them in terms of revenue and scale. In terms of financial performance in-fact, PwC Luxembourg reported a turnover of €707.3 million and a net revenue of €633.7 million for the fiscal year ending 30 June 2024. This represents an impressive growth of 11.4% compared to the previous year, despite a challenging macroeconomic context in Europe. The firm’s solid performance reflects its strategic investments in innovation, technological capabilities, and the expansion of key service lines such as Managed Services and Sustainability. PwC Luxembourg also launched a new GenAI Business Center in 2024, further strengthening its position as a leading provider of innovative and efficient business solutions. PwC (2020) Insights (2017) pwc (c)

### 2.1.2 My department

The Regulatory, Risk & Compliance (RRC) department is dedicated to helping clients understand regulatory impact and implement solutions. The team advises all entities regulated by the Luxembourg Commission de Surveillance du Secteur Financier (CSSF) and MDBs: banks, PSFs, investment funds, management companies, e-money institutions, payment institutions, and other financial service providers.

The major services of the department are:

- Regulatory support in Fund, ManCos, AIFM, Banks and PSF set-up
- Regulatory Watch Services (3W)
- Corporate Secretary Services
- IT Regulatory support (Outsourcing, Due Diligence, IT risk)
- Due Diligence Services on delegates
- Support to compliance function
- Fit and Proper assessment for Management Bodies
- Risk management for asset management and banking
- ESG / Sustainability
- Regulatory support to depositary function
- Regulatory reporting (PRIIPs, KID, CSSF reporting, AIFMD, Risk)
- Fund investment compliance
- Risk modelling
- Preparing for on-site inspection

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## 2.2 Work and Responsibilities

### 2.2.1 Project Origination and Workflow in the Advisory Line of Service

In the Advisory line of service, projects typically originate through one of two main channels. A frequent scenario involves a returning client—often one with whom PwC Luxembourg has previously collaborated—facing a new challenge and seeking expert support to address it. These challenges can vary widely in scope and complexity.

In the Projects section of this report, I will detail the specific cases in which I was directly involved. The services provided by our team are designed to deliver both strategic and operational solutions, helping clients align with market best practices while also offering economic efficiency. By engaging consultants on a project basis, clients can avoid the costs associated with hiring permanent staff, providing continuous training, and maintaining additional full-time equivalent (FTE) resources.

The second channel stems from formal tenders. Large organizations—particularly European institutions—frequently publish calls for projects on dedicated portals. PwC responds to these Requests for Proposals (RFPs) by submitting a structured offer, typically including a written document or a slide presentation. These proposals outline our understanding of the client’s needs, our proposed methodology and timeline, the rationale behind our approach, and the qualifications of the suggested team. The alignment between the client’s expectations and the team’s expertise is often a decisive factor in winning the project. The financial aspect of the proposal is also crucial and is usually defined by the director, with final approval from the partner.

### 2.2.2 The Role of the Banking Risk Management Team

Within the Advisory practice, I was integrated into the Banking Risk Management team, which primarily serves financial institutions. Our clients include commercial banks, custodians, investment banks, and European financial institutions—many of which are headquartered in Luxembourg but operate internationally across Europe, Africa, and the Americas. Client needs in this domain typically fall into two categories:

- Regulatory and compliance-related challenges, including issues such as regulatory reporting, risk governance, and supervisory reviews (e.g., SREP, ICAAP, ILAAP);
- Quantitative and process optimization needs, which involve enhancing the calculation of risk metrics, validating models, and improving internal processes in line with both regulatory expectations and industry best practices.

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### 2.2.3 My Role and Involvement in the Project Lifecycle

As an intern, I was initially assigned to support the team during the proposal phase. This involved analyzing the client's RFP or request, identifying their explicit and implicit needs, and conducting research on the theoretical and technical background relevant to the problem. Developing a clear understanding of the client's context was just as important as acquiring in-depth knowledge of the subject matter. Once the proposal was drafted, it was reviewed by the manager and the director. If approved, it was signed by the partner and officially submitted. Upon client acceptance, the contract was formalised, and the project moved into the initiation phase, typically starting with a series of kick-off meetings. These meetings were critical for refining the project scope, aligning expectations, and establishing direct communication channels. For more complex projects, especially those involving larger institutions, it is common to conduct on-site visits (personally, I've never done it during my internship because the team prefer to make the senior colleagues go there) to gain a better understanding of the client's operational environment and organizational structure.

Following the initiation phase, the project entered the execution stage, where the identified problem was addressed through a structured approach. My responsibilities included supporting the team with research and analysis, participating in internal discussions, identifying relevant regulatory and technical sources, and contributing to the preparation of deliverables. I was also involved in maintaining ongoing communication with the client to ensure alignment and provide updates, through mails and video-calls. Client interaction during this phase was frequent and collaborative. At the conclusion of the project, the proposed solutions were formally implemented within the client's processes and operations. The duration and nature of these projects varied significantly—some were completed within a few weeks, while others extended over one or two years, depending on the complexity and objectives.

Another aspect that I truly appreciated during my traineeship was the way my team valued my ideas and my willingness to speak up. I always felt encouraged to contribute, not only in day-to-day tasks but also in more visible settings. A moment that I particularly treasure was when I was given the opportunity to present an overview of the derivatives market in Luxembourg during one of our internal technical meetings. These meetings are designed for team members to share knowledge on a topic of their choice, often drawing from past project experience, in order to broaden the expertise of the group. Preparing and delivering this presentation allowed me to consolidate what I had learned, while also building the confidence to explain complex concepts in front of experienced colleagues. For me, it was more than just a technical exercise—it was a recognition that my contributions were valued and that my personal perspective could enrich the team's collective knowledge. In the next section will be explored the project I was most involved in.

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## 2.3 Project 1: Assessment of the Risk Management Function of a Financial Institution

The main project I was assigned to during my internship was the assessment of the Risk Management function of a Luxembourg-based captive bank belonging to a multinational industrial group. The institution specializes in providing financing solutions for the acquisition of agricultural machinery and equipment. The request came directly from the institution's top management, with the aim of gaining a comprehensive understanding of the current state of the risk function. Specifically, the objectives of the assessment were to map the key responsibilities of the department, identify potential overlaps or inefficiencies, evaluate resource allocation, and benchmark the function against market best practices. Our approach began with the collection and review of internal documentation provided by the client, including process descriptions, organizational charts, and regulatory reports. Based on this material, I proposed a structured mapping of all activities falling under the responsibility of the Risk Management department. These activities were classified into regulatory-required tasks, internal risk governance processes, and operational risk-related procedures—ranging from routine monitoring to more complex strategic risk assessments. Once the activity mapping was completed, I conducted interviews with the Chief Risk Officer (CRO) to estimate the average time required to complete each task and to assign responsibilities using the RACI matrix (Responsible, Accountable, Consulted, Informed). This framework was particularly useful to understand who within the team was responsible for each activity and where potential inefficiencies or misalignments could arise. After receiving the RACI classification and time estimates, my team and I performed a benchmarking exercise by comparing the client's setup with that of a similar-sized institution in the same industry. This allowed us to validate the resource allocation and time commitment estimates.

Through this analysis, we identified that certain team members were heavily involved in tasks for which they were not primarily responsible or accountable, leading to inefficiencies and a misalignment of efforts. Some of these activities should have been carried out by other departments or support functions, resulting in unnecessary workload and operational friction within the Risk team.

In conclusion, we presented a proposal to restructure the Risk Management function. Our recommendations focused on improving task allocation, reducing redundancy, and aligning responsibilities with individuals' actual roles. This restructuring was designed to enhance operational efficiency, reduce costs, and bring the function in line with best-in-class standards in the financial industry.

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## 2.4 Project 2: Development of a Risk Appetite Statement for a Multilateral Development Bank

The second project I contributed to is still ongoing and involves the creation of a Risk Appetite Statement (RAS) for a major Multilateral Development Bank (MDB). A RAS is a fundamental document that defines the level and types of risk an organization is willing to accept in pursuit of its strategic objectives, both under normal and stressed conditions. It plays a key role in risk governance by aligning risk-taking with corporate strategy and ensuring that the institution remains within acceptable risk boundaries.

The first step in the project was to conduct a preliminary analysis to understand the client's risk philosophy and tolerance. I carefully reviewed all the documents provided, gaining a clear understanding of the institution's position both in terms of its risk management framework (how risks are intended to be handled within the system) and its current status regarding disclosure practices and documentation. This included meetings with key stakeholders to determine qualitative aspects—such as strategic priorities, governance expectations, and cultural factors—as well as the quantitative limits that could be applied to specific risk types (e.g., credit risk, market risk, operational risk).

One of the foundational tasks I was responsible for was the development of the risk taxonomy. A risk taxonomy is a structured classification of all potential risks to which an institution may be exposed. It is essential for ensuring a common language around risk across the organization and serves as the backbone for building both qualitative narratives and quantitative metrics within the RAS. The taxonomy was built through a combination of regulatory references, internal policies, and industry benchmarks, ensuring both completeness and relevance to the MDB's specific business model.

Once the risk taxonomy was validated by the client, the next phase involved drafting the qualitative section of the RAS. This includes defining high-level statements on the institution's overall risk appetite, per risk category, and setting out escalation protocols and governance mechanisms.

The final stage, which is currently in progress, will be the development of the quantitative part of the RAS. This involves setting thresholds, limits, and key risk indicators (KRIs) for each material risk. These limits will be defined in line with the Basel regulatory framework and will be tailored to the client's risk profile, ensuring alignment with industry best practices and internal strategic objectives. This process will be supported by data provided by the client and will require analytical validation to ensure consistency and accuracy.

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## 2.5 Miscellaneous Projects

In addition to the two main projects I was directly involved in, I also had the opportunity to contribute to several other important initiatives led by my team. While my involvement in these projects was more limited and supportive in nature, they provided me with valuable exposure to complex regulatory and strategic transformation engagements within the financial services sector.

At the time of my arrival, the team was already working on two large-scale, high-impact projects for two different financial institutions in Luxembourg. The first engagement involved supporting a third-country credit institution in the process of establishing a new branch in Luxembourg. The second project focused on assisting a payment institution that aimed to transition into a fully licensed credit institution by applying for a banking license from the CSSF. The CSSF supervises and enforces compliance with financial regulations, ensures financial stability, and grants licenses to financial entities operating within the country. Both projects required deep regulatory knowledge, close collaboration with several different teams, and strong project management capabilities to support the clients in preparing application files, defining target operating models, and aligning with local and European regulatory standards.

Another technically complex and intellectually stimulating initiative I supported was the statistical modelling of operational deposits for a global custodian bank. Operational deposits refer to client funds that are held for transaction-related purposes and are considered more stable from a liquidity risk perspective. The aim of the project was to distinguish operational from non-operational deposits using statistical techniques and models, in line with the methodology recommended by the European Banking Authority (EBA). As part of the work, the team applied data-driven analyses and classification models to demonstrate compliance and optimize liquidity metrics. A custodian bank typically holds financial assets on behalf of institutional clients and offers related services such as settlement, safekeeping, and reporting. The differentiation of deposit types is crucial for regulatory liquidity ratios and strategic balance sheet management. My personal contribution was primarily focused on data cleaning and validation. I started by carefully reviewing the datasets to identify redundancies, inconsistencies, or temporal overlaps, ensuring that the information we used was accurate and reliable. Beyond this initial cleaning, I actively worked on clustering the data, identifying patterns and natural groupings within client portfolios. This allowed me to observe the evolution of portfolios over time, highlighting trends and structural changes that could impact liquidity metrics. By connecting these analytical steps with the broader regulatory and strategic objectives, I was able to provide insights that were both actionable and aligned with the team's goals. This experience strengthened my understanding of how raw data transforms into meaningful information that drives key decisions in risk and balance sheet management.

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Lastly, I also contributed to the update of a Group Recovery Plan for a banking group. A Group Recovery Plan is a regulatory document required by financial authorities to ensure that a bank is adequately prepared to respond to periods of severe financial distress without requiring public intervention. It outlines governance mechanisms, recovery indicators, recovery options, and communication strategies. In this specific project, the team was tasked with updating the plan based on newly available financial and risk data, as well as incorporating feedback received from the CSSF. My contribution focused on supporting data consistency checks and improving the clarity and structure of the revised documentation.

These experiences allowed me to broaden my understanding of the banking regulatory landscape, and to support senior consultants in the execution of technically demanding and strategically critical projects.

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## 2.6 Lessons Learned from the Internship Experience

The traineeship experience has been fundamental for my development as a professional. I came into consulting expecting to find experts who always had clear answers ready for every problem. Instead, I realized that even the most experienced consultants don't always know immediately what to do. What they truly master is the ability to adapt—to take a structured approach and reshape it completely when facing a new client or an unfamiliar situation. For me, this was eye-opening: I understood that not knowing everything from the start is not a weakness but a natural part of the process.

There were moments of frustration. Sometimes I felt that my ideas had to be set aside because the senior consultant's direction prevailed. At first, this was difficult to accept, because I wanted to prove myself and show initiative. Over time, though, I learned to see it differently: those decisions weren't about undermining me, but about leveraging experience and client knowledge that I didn't yet have. What made a real difference is that my team never silenced me—they always asked for my opinion before deciding. This taught me humility, but also gave me confidence: my contribution mattered, even if it wasn't always the one that guided the final choice.

On a personal level, I discovered areas where I need to improve. I realized I have to work on my communication—speaking with fewer words but more precision. I had to train my patience, because consulting is not about rushing to the answer but about reasoning carefully and timing your interventions. I also noticed how important time management and focus are when you constantly juggle tasks. I even caught myself being too eager at times, speaking too quickly or sounding too sure about things I wasn't 100% confident about. That taught me to slow down, to think twice before speaking, and to embrace the fact that it's okay to admit when you don't know something. Looking back, the biggest lesson I take with me is that consulting is not just about solving problems—it's about shaping yourself in the process. Every client, every project, and even every small mistake forces you to grow. For me, this experience was not only about learning frameworks and methodologies, but about learning who I am when faced with pressure, uncertainty, and responsibility. I now know that adaptability, patience, and honesty with myself and others will be just as important in my career as any technical skill I've gained.

Ultimately, I also realized that adapting does not mean erasing your own personality. It means learning how to fit it into the process you are part of. Consulting requires flexibility, but it is fundamental to never lose what makes you unique. My team always valued the distinctive traits of my personality, and I learned how to bring them into my work—by sharing ideas, making proposals, and offering alternative ways to approach specific tasks or problems. This balance between adapting and staying true to myself has been one of the most meaningful lessons of my traineeship, and it is something I will carry with me in every future professional challenge.

# Chapter 3

## Academic Research

### 3.1 Research Question and Literature Review

Before the mid-1970s, the concept of "risk management" in the banking sector did not exist in the structured, formalised way we understand it today. Instead, managing risk was seen as an implicit, embedded part of traditional banking practice—something that developed organically over time, guided mostly by institutional experience and a conservative banking culture.

Commercial banks in particular were always exposed to a wide range of risks, such as credit risk (the chance that borrowers might default), liquidity risk (the inability to meet short-term financial obligations), interest rate risk, and operational risk. However, the tools and strategies used to deal with these risks were generally informal and reactive, not proactive. Decisions were largely based on the judgement of senior management, internal customs, and long-standing relationships with central banks and national regulators.

At that time, regulatory oversight was entirely the responsibility of national authorities, most commonly central banks like the Federal Reserve in the U.S. These institutions acted as both lenders of last resort and guardians of financial stability, but they did so without imposing detailed, quantitative, or standardised requirements on banks' day-to-day risk-taking. Regulatory supervision tended to rely on "moral suasion" and administrative discretion rather than binding rules or capital requirements. There was also no meaningful international coordination in regulatory matters. Each country operated its own supervisory framework, shaped by local legal systems, market structures, and institutional histories.

Rasmussen (1997) This fragmented regulatory landscape created serious challenges, especially as the global financial environment evolved after World War II. The collapse of the Bretton Woods fixed exchange rate system in the early 1970s, together with increasing capital mobility and a surge in international banking activity, introduced new kinds of financial risk—particularly in the areas of foreign exchange and interbank settlements. Yet at that time, no institutional framework existed to monitor, manage, or contain systemic risks that could spread beyond national borders.

The weaknesses of the existing system were brought into sharp focus in June 1974, when Bankhaus I.D. Herstatt, a mid-sized private bank based in Cologne, Germany, failed due to major losses from speculative foreign exchange trading. The bank had bet heavily on a depreciation of the U.S. dollar. However, coordinated central bank interventions led to

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a sharp appreciation of the dollar, and Herstatt was unable to meet its financial obligations.

What made the failure of Herstatt especially alarming was not just its scale, but the timing and structure of its default. German regulators revoked the bank's licence during European business hours. But due to time zone differences, some of Herstatt's counterparties in New York had already completed their side of currency transactions—transferring Deutsche Marks—while Herstatt had not yet sent the corresponding U.S. dollars. This mismatch in settlement timing caused serious losses and operational disruption across multiple countries.

This phenomenon, later referred to as "Herstatt risk", revealed the dangers of relying solely on national supervisory systems in an increasingly interconnected financial world. It showed that a bank failure in one country could trigger knock-on effects across the global financial system, and that cross-border settlement risk posed a critical vulnerability that lacked any formal regulatory safeguards. Around the same time, other bank failures—such as that of the Franklin National Bank in the United States—reinforced the growing concerns about the fragility of international banking oversight.

In response to these events, the central bank governors of the Group of Ten (G10) countries took the decision to create a more formal framework for cooperation among international banking supervisors. This led, in December 1974, to the establishment of the Basel Committee on Banking Supervision (BCBS), which was placed under the institutional umbrella of the Bank for International Settlements (BIS). The Committee held its first meeting in February 1975 and has met regularly three or four times a year ever since. Over time, its membership expanded from the original G10 group to include 45 supervisory authorities from 28 different jurisdictions.

The BIS, headquartered in Basel, Switzerland, had originally been founded in 1930 to manage German reparation payments following World War I. As that original mandate faded, the BIS gradually evolved into a neutral and permanent forum for monetary and financial cooperation among central banks. Over the years, it assumed a unique role within the global financial system: not as a regulator, but as a facilitator of dialogue, technical coordination, and policy analysis across borders. The BIS is an institutional—not commercial—entity: it does not lend to governments or private actors. Instead, it operates as a "bank for central banks", providing a discreet space for information-sharing, joint policy work, and systemic reflection.

By the early 1970s, the BIS had already become a key hub for addressing the rising complexity of global financial interdependence. In the post-Bretton Woods era—characterised by floating exchange rates and expanding capital markets—it was clear that stronger, more coordinated oversight was needed. The BIS was therefore well positioned to host new international standard-setting bodies like the BCBS. In the years that followed, it would go on to support several such groups, including the Committee on the Global Financial

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System (CGFS), the Committee on Payments and Market Infrastructures (CPMI), and the Financial Stability Institute (FSI), thereby strengthening its institutional role in the governance of international finance.

When it was first created, the Basel Committee had no legal authority or supranational enforcement powers. Its role was purely consultative: to offer a forum for supervisory discussion, foster mutual understanding, and help develop non-binding international standards. Nonetheless, its creation marked a turning point in the history of banking regulation. It laid the groundwork for a global, structured, and principles-based approach to banking supervision—leading eventually to the development of harmonised capital standards, the concept of risk-weighted assets (RWAs), and the formulation of the Basel Accords.

It is important to emphasise that the Basel Committee does not have the power to enforce its recommendations. Instead, most member countries—along with some non-members—tend to implement the Committee’s guidelines through their own national laws or regional frameworks, such as European Union regulations. This means that there can be a time lag between the agreement on international minimum standards and their actual implementation at the national level. In some cases, countries may even introduce unilateral changes. As mentioned, the regulatory standards published by the Committee are commonly known as the Basel Accords. Hopkin (2018)

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## 3.2 Basel accords

### 3.2.1 Basel I: the Basel Capital Accord

Once the foundations for supervising internationally active banks were established, the Basel Committee focused on an important question: how much capital banks should hold to protect themselves against risks.

In the early 1980s, the Latin American debt crisis raised concerns that many large international banks were operating with lower levels of capital, at a time when financial risks were growing. With the support of the central bank governors of the G10 countries, the Committee decided to stop this decline and to work on a common approach for measuring the minimum capital banks would need.

The solution was to introduce a system based on risk-weighted assets. This meant that not all bank assets were treated equally: safer assets, such as government bonds, were given a lower weight, while riskier assets, such as unsecured loans, received a higher weight. The total amount of capital required was then calculated using these weights.

There was also a clear understanding that an international agreement was needed. Having very different national rules created unfair competition and made the global banking system more fragile. After publishing a consultative paper in December 1987, the final version of the agreement, called the Basel Capital Accord or Basel I, was approved in July 1988. The Accord set a minimum requirement: by the end of 1992, banks had to hold capital equal to at least 8% of their risk-weighted assets. This rule was applied not only in G10 countries but also in almost all other countries with internationally active banks. By 1993, the Basel Committee confirmed that banks with significant international business were meeting this target.

Although Basel I mainly focused on credit risk (the risk that borrowers would not repay), the framework was always meant to evolve. During the 1990s, the Committee introduced updates to clarify which loan loss reserves could be counted as capital and to improve how credit risk from derivatives was calculated, especially when banks used netting agreements to reduce exposures.

A major step came in 1996 with the Market Risk Amendment. This change added a capital requirement for market risks, such as changes in interest rates, exchange rates, stock prices, and commodity prices. For the first time, banks were allowed to use their own internal models, like value-at-risk models, to measure these risks. However, these models had to follow strict rules and were supervised carefully. Much of the work on this part was done together with securities regulators.

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### 3.2.2 Basel II: the new capital framework

In June 1999, the Basel Committee published a proposal to replace the 1988 Accord with a more updated and flexible system. After several years of consultation and revision, the new framework was officially released in June 2004 and became known as Basel II.

Basel II was built around three main pillars:

- Minimum capital requirements, which aimed to improve and expand the existing rules from the 1988 Accord;
- Supervisory review, focusing on how supervisors evaluate a bank's capital and risk management process;
- Market discipline, which relied on transparency and public disclosure to promote good banking practices.

The goal of Basel II was to make capital requirements more sensitive to the actual risks taken by banks and to better reflect the financial innovations that had developed in recent years. The framework encouraged banks to improve their internal systems for measuring and managing risk, offering more flexibility but also requiring more responsibility.

The publication of Basel II followed almost six years of intensive work. During this time, the Committee worked closely with banks, supervisors, central banks, and other experts to design a framework that better adapted to the complexity of modern banking.

After the release in 2004, which focused mainly on the banking book (the part of a bank's activities related to traditional lending), the Committee also addressed the trading book (activities involving market instruments like securities and derivatives). In July 2005, in cooperation with the International Organization of Securities Commissions (IOSCO), the Committee published new rules for the trading book. These were later combined with the original Basel II text in a single comprehensive document released in June 2006.

Many countries, including both members and non-members of the Committee, decided to adopt Basel II, although not all followed the same timeline. One challenge under the new rules was that banks using advanced methods for measuring risk needed approval from supervisors in multiple countries. This issue already existed with the 1996 Market Risk Amendment, but Basel II made cross-border cooperation even more important.

To help supervisors coordinate more effectively, the Committee published guidance in 2006 about how to share information and cooperate when reviewing banks that use advanced approaches, especially for operational risk. Kanchu and Kumar (2013) Tursoy (2018)

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### 3.2.3 Basel III: responding to the 2007–2009 financial crisis

Even before the collapse of Lehman Brothers in September 2008, it had become clear that the Basel II framework needed significant improvements. The global financial crisis revealed that many banks had taken on too much debt (leverage) and did not hold enough liquid assets to face periods of stress. These weaknesses were made worse by poor risk management, weak governance, and incentive structures that encouraged excessive risk-taking. As a result, many risks—especially credit and liquidity risks—were seriously underestimated, and credit grew too quickly in some sectors.

In response to these problems, the Basel Committee published new principles for sound liquidity risk management in September 2008, the same month Lehman Brothers failed. In July 2009, the Committee proposed changes to strengthen Basel II, especially regarding complex financial products like securitisations, off-balance sheet exposures, and positions held in the trading book. These were early steps in a broader reform process.

In September 2010, the Group of Governors and Heads of Supervision announced new, stricter global capital rules for banks. This reform package, known as Basel III, had been developed over the previous months and was officially endorsed at the G20 Leaders' Summit in Seoul in November 2010. The new standards were formally published in December 2010 in two documents: *Basel III: A global regulatory framework for more resilient banks and banking systems* and *Basel III: International framework for liquidity risk measurement, standards and monitoring*.

Basel III built on the structure of Basel II but introduced major changes. The main reforms, gradually introduced between 2013 and 2019, included:

- Higher requirements for both the quality and quantity of capital, especially focusing on common equity as the most reliable form of capital.
- A capital conservation buffer, made up of common equity, to absorb losses during times of stress. If a bank falls below this buffer, it must limit dividends, bonuses, and other payouts.
- A countercyclical capital buffer, designed to increase capital requirements in periods of excessive credit growth and reduce them in downturns.
- A leverage ratio, which sets a minimum level of capital based on total assets and exposures, without adjusting for risk weights.
- Two liquidity standards: the Liquidity Coverage Ratio (LCR), which ensures banks hold enough liquid assets to survive a 30-day stress scenario; and the Net Stable Funding Ratio (NSFR), which promotes more stable, long-term funding.
- Additional requirements for systemically important banks, including extra capital and stronger international supervision and resolution planning.

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From 2011 onwards, the Committee focused on improving how banks calculate their capital needs. The reforms included:

- In 2012, new rules for exposures to central counterparties (later updated in 2014).
- In 2013, margin requirements for derivatives that are not centrally cleared, and capital requirements for banks' investments in funds.
- In 2014, a new standardised method for measuring counterparty credit risk from derivatives.
- Also in 2014, updated capital rules for securitisations and limits on large exposures to reduce concentration risk.
- In 2016, a revised market risk framework, after a full review of how banks measure risks in their trading books.
- A unified and improved system for public disclosures, to reflect the full Basel III package.

The final phase of the Basel III reforms was completed in December 2017. These included updated standards for measuring credit risk, operational risk, and credit valuation adjustment (CVA) risk. The package also introduced a revised leverage ratio, a leverage buffer for global systemically important banks, and an “output floor”, which limits how much a bank can reduce its capital requirements using internal models compared to standardised approaches.

One of the main goals of these reforms was to reduce the excessive differences in how banks calculated risk-weighted assets. During the crisis, many stakeholders lost trust in the reported capital ratios, as different banks showed very different results for similar risks. The Basel Committee's own studies confirmed this inconsistency. The new rules aim to restore confidence by strengthening standardised approaches, limiting the use of internal models, and adding a floor and leverage ratio as safeguards.

### **3.2.4 Implementation**

Each member of the Basel Committee agrees to apply the Basel standards to its internationally active banks. These standards are meant to be minimum rules. Countries can choose to apply stricter rules if they wish.

In January 2012, the Group of Governors and Heads of Supervision (GHOS) approved a plan by the Committee to monitor how Basel III is put into practice. This process is called the Regulatory Consistency Assessment Programme (RCAP). It has two main goals: first, to check whether countries are adopting the Basel III rules on time; and second, to see whether the national rules are consistent with the original Basel framework,

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and to understand the impact of any differences.

As part of this programme, the Committee publishes reports every six months to show how much progress each country is making. The Committee also gives regular updates to the G20 Leaders. In addition, there is a system of peer reviews, where countries assess each other's implementation.

Between 2012 and 2016, the Committee reviewed how each member country had applied the Basel rules on risk-based capital. During this time, many countries made changes to improve how closely their national rules matched the Basel framework. Similar reviews were completed in 2017 for the Liquidity Coverage Ratio (LCR). In the future, these reviews will also cover other parts of the Basel III framework. Lee et al. (2010) Neisen and Röth (2023)

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### 3.3 From Global Standard to European Law

Although the Basel Accords—across their successive iterations (Basel I, II, and III)—form the theoretical and operational foundation of the international banking regulatory framework, they are not legally binding. As standards developed by the Basel Committee on Banking Supervision, their actual impact depends on the willingness of individual jurisdictions to transpose them into enforceable domestic legislation. Within the European Union, this process has led to the gradual transformation of global standards into a formal and binding regulatory framework, commonly referred to as the Single Rulebook.

The Single Rulebook is a comprehensive and harmonized set of rules that governs the activities of credit institutions and investment firms across the EU. Its primary aim is to ensure financial stability, enhance the resilience of the banking sector, and establish a level playing field within the internal market. Specifically, the principles laid out in Basel III were implemented through the CRR/CRD IV package, which was later revised through CRR II/CRD V, and is currently being updated with CRR III/CRD VI to incorporate the so-called final Basel III reforms published in December 2017.

The Capital Requirements Regulation (CRR) is a regulation that is directly applicable in all Member States. It sets out detailed rules on capital requirements, risk exposure, leverage, market risk, and liquidity measures such as the Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR). Its binding and uniform nature eliminates discrepancies that might otherwise arise from purely national-level implementation.

In parallel, the Capital Requirements Directive (CRD), being a directive, must be transposed into national legislation and focuses on more institutional and supervisory aspects. These include internal governance, licensing conditions, consolidated supervision, remuneration policies, and the enhancement of national supervisory authorities' powers.

The combination of these two legal instruments—regulation and directive—allows EU legislators to strike a balance between substantive harmonization and procedural flexibility. It ensures consistent application of essential prudential rules across the Union, while allowing for adjustments to the specific needs of different national contexts.

This regulatory framework has played a crucial role in the aftermath of the 2007–2008 global financial crisis. It has helped strengthen the ability of European financial institutions to absorb shocks, limit systemic risk, and maintain operational continuity under stress conditions. Moreover, the full integration of the CRR/CRD framework into the Single Supervisory Mechanism (SSM) and the broader European Banking Union marks a further step toward a centralized and coherent regulatory system for the euro area banking sector. Christoffersen (2011) Hull (1997) Hull (1997)

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### 3.3.1 Capital Requirements Regulation (CRR)

The Capital Requirements Regulation (EU) No. 575/2013 is the cornerstone of the European Union’s prudential framework for credit institutions and investment firms. Introduced alongside the Capital Requirements Directive (CRD IV), it implements the Basel III accord in the EU, aiming primarily to reduce the likelihood of bank insolvency and safeguard the stability of the financial system. In force since 1 January 2014, the CRR is part of what is commonly referred to as the CRD IV package, which replaced earlier rules found in Directives 2006/48/EC and 2006/49/EC.

As a regulation, the CRR is directly applicable across all Member States without the need for national transposition. This ensures uniform application of prudential standards throughout the Single Market and removes major sources of regulatory divergence. It provides a detailed and binding legal framework covering capital adequacy, liquidity requirements, leverage limits, and risk exposures—constituting a genuine Single Rulebook for the EU banking sector. The regulation’s prescriptive and harmonized nature improves transparency, speeds up regulatory adaptation to market developments, and supports the integrity of the internal financial market.

The CRR translates Basel III’s quantitative capital standards into EU law by laying out precise definitions and requirements for own funds, including Common Equity Tier 1 (CET1), Tier 1, and Total Capital. It sets out methodologies for computing risk-weighted assets (RWAs) across credit, market, and operational risks, while also introducing the Leverage Ratio (LR), Liquidity Coverage Ratio (LCR), and Net Stable Funding Ratio (NSFR)—key metrics designed to ensure both capital sufficiency and liquidity resilience under stress. One of the key innovations of the CRR is its comprehensive scope. While Basel III was originally intended for internationally active banks, the CRR applies to all EU credit institutions and investment firms—over 8,000 entities—reflecting the interconnectedness of the European banking market and the principle of mutual recognition enabled by the EU banking passport.

The rationale for this regulatory transformation lies in the lessons of the 2007–2008 financial crisis. Many institutions entered the crisis with insufficient capital in both quality and quantity, necessitating massive public interventions. The CRR aims to address these vulnerabilities by enhancing the loss-absorbing capacity of banks and limiting systemic risk through a stricter and more transparent regulatory architecture.

In addition to Basel III’s core pillars, the CRR introduces several EU-specific features:

- Removal of national options and discretions, reducing regulatory fragmentation.
- Permission for Member States to apply stricter requirements only if justified by national risks or institutional profiles.
- Emphasis on developing internal credit assessments to reduce reliance on external

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credit ratings, particularly in material portfolios.

The CRR complements the CRD by focusing on the technical and quantitative aspects of prudential regulation, while the directive governs qualitative and institutional elements such as governance and supervision. Together, they form a coherent legal framework that ensures both substantive harmonization and regulatory responsiveness.

The CRR II package, adopted in 2019, introduced updates such as:

- A binding minimum leverage ratio requirement;
- The introduction of the Net Stable Funding Ratio (NSFR);
- Revisions to the frameworks for market risk and counterparty credit risk.

The Capital Requirements Regulation II, introduced as Regulation (EU) 2019/876, represents a substantial amendment to the original CRR I framework and forms part of the broader EU Banking Package. It is intended to enhance the robustness and risk sensitivity of the prudential regulatory system, complete the implementation of Basel III reforms, and promote further supervisory convergence within the European Union.

Among the most significant innovations is the introduction of a binding minimum leverage ratio requirement. While CRR I only mandated reporting of the leverage ratio, CRR II establishes a binding Tier 1 leverage ratio of 3 percent for all institutions. In addition, global systemically important institutions (G-SIIs) are subject to a leverage ratio buffer equal to 50 percent of their risk-based G-SII buffer. This is aimed at containing excessive leverage in the banking system and ensuring that institutions hold a minimum amount of capital in relation to their total exposure, irrespective of internal risk models.

Another critical change is the implementation of the Net Stable Funding Ratio (NSFR) as a binding liquidity requirement. The NSFR complements the Liquidity Coverage Ratio (LCR) by ensuring a stable funding profile in relation to the composition of a bank's assets and off-balance-sheet activities. CRR II includes specific calibration adjustments to account for the characteristics of the EU financial system and provides simplified NSFR options for small and non-complex institutions, defined as those with total assets below EUR 5 billion.

CRR II also replaces the Standardised Method (SM) and Original Exposure Method (OEM) for counterparty credit risk with the Standardised Approach for Counterparty Credit Risk (SA-CCR), in line with Basel III standards. SA-CCR introduces a more risk-sensitive and consistent methodology for determining exposure values, particularly for derivatives and securities financing transactions. It reflects netting, collateral effects, and the potential future exposure based on volatility, maturity, and hedging relationships. In the area of market risk, CRR II lays the groundwork for the future implementation of the Fundamental Review of the Trading Book (FRTB). While it does not yet impose

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binding capital requirements under the FRTB, CRR II introduces reporting obligations based on the new standardised and internal models approaches, which will be subject to review and further legislative development under CRR III.

The regulation introduces the Intermediate EU Parent Undertaking (IPU) requirement, mandating that third-country banking groups with total assets in the EU exceeding EUR 40 billion and operating multiple subsidiaries must establish a single EU holding company. This measure facilitates supervisory coordination and resolution planning. It also enhances transparency by enabling consolidated supervision of EU operations of third-country groups.

The total loss-absorbing capacity (TLAC) framework is also incorporated into CRR II, aligning the EU's minimum requirement for own funds and eligible liabilities (MREL) with international TLAC standards. This ensures that G-SIIs have sufficient instruments to absorb losses and recapitalise in resolution, without the need for public intervention.

A further important revision concerns the treatment of software assets. Under CRR I, intangible assets including software were deducted in full from Common Equity Tier 1 (CET1) capital. CRR II introduces more favourable treatment for software assets, permitting partial inclusion in CET1, subject to prudential amortisation and supervisory validation. This change encourages digital investment and aligns capital rules with modern business models.

Support for small and medium-sized enterprises (SMEs) and infrastructure investments has been enhanced. CRR II raises the threshold for the SME supporting factor to EUR 2.5 million and introduces an infrastructure supporting factor, thereby reducing capital requirements for qualifying exposures that contribute to the financing of long-term economic growth.

To facilitate the clean-up of non-performing exposures (NPEs), CRR II introduces adjusted rules to mitigate the negative capital impact of NPE disposals. Institutions are permitted to derecognise certain losses on NPE disposals from their capital ratios, subject to prudential conditions and transparency requirements.

On disclosure and reporting, CRR II strengthens the Pillar 3 framework by introducing more granular and standardised disclosure templates. These aim to improve comparability, reliability, and market discipline across institutions. The regulation also mandates the development of regulatory technical standards (RTS) by the European Banking Authority (EBA) to ensure consistency in the application of disclosure obligations.

Finally, CRR II integrates proportionality as a guiding principle for the regulatory framework. Institutions classified as small and non-complex benefit from simplified disclosure, reporting, and risk measurement procedures, reducing compliance costs without undermining prudential objectives.

Regulation (EU) 2024/1623, commonly referred to as CRR III, was published in the

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Official Journal on 19 June 2024 and implements the final Basel III reforms (also known as Basel III Endgame) into EU law. It will enter into force on 9 July 2024, with most provisions becoming directly applicable from 1 January 2025. Certain amendments, such as revised definitions or mandates to the EBA, take effect immediately. Market risk binding requirements are postponed to 1 January 2026 at the latest.

CRR III introduces a fully binding output floor that limits how much internal models can reduce capital relative to standardized models. This mitigates the variability in internal model capital requirements seen under CRR II and enhances comparability and reliability across institutions.

For credit risk, CRR III revises both the standardised approach (SA-CR) and the internal ratings-based (IRB) approach. It introduces new granularity in risk-weight categories, especially for real estate exposures. Two methods—loan splitting based on exposure-to-value ratios and whole-loan approaches—determine risk weights depending on development stage, property type, and enforceability of collateral. A new exposure class, “land acquisition, development and construction (ADC),” replaces former high-risk property categories. Additional revisions include new risk-weight assignments for equity exposures (capped at 250 percent), subordinated debt, retail transactor exposures, specialised lending, and unrated institutions, further limiting external rating dependency.

On market risk, CRR III converts the Fundamental Review of the Trading Book (FRTB) into binding Pillar 1 capital requirements. Institutions must calculate market risk capital using either the alternative standardised approach (A-SA), the alternative internal models approach (A-IMA), or a simplified standardised approach, with revised rules on trading book boundaries and instrument allocation.

CRR III replaces the existing operational risk regime with a single standardised approach using the business indicator component (BIC). Capital requirement is obtained by multiplying the business indicator (BI) by regulatory coefficients. Institutions with BI EUR750million must maintain loss data and compute annual operational loss estimates for disclosure.

For Credit Valuation Adjustment (CVA) risk, CRR III defines three new approaches: a supervisory-approved standardised approach (SA-CVA) based on sensitivity calculations; a basic approach (BA-CVA) as default; and a simplified approach for smaller institutions with limited derivatives exposure.

CRR III introduces new ESG-related requirements. Institutions must identify, disclose and manage ESG risks within Pillar 1 and Pillar 3. ESG risk governance is now embedded into capital planning and supervisory review, complemented by climate systemic buffers under CRD VI.

Reporting and disclosure frameworks are upgraded via a Pillar 3 data hub, where most institutions must submit harmonised data to the EBA each reporting period. Small and non-complex institutions may rely on aggregated COREP/FINREP, while others publish

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granular data publicly via the EBA hub. Supervisory reporting templates are updated to reflect new requirements on output floor, credit risk, market risk, CVA, operational risk and transitional crypto-asset exposures.

Finally, CRR III strengthens supervisory and enforcement tools by clarifying model risk governance, mandating EBA engagement on credit risk modelling changes, and requiring institutions to submit implementation plans for IRB models. It also mandates a holistic review of the banking framework by 31 December 2028 with proposals due by January 2028, if needed.

In summary, CRR III builds on CRR II by introducing binding statutory requirements for output floors, credit risk treatment, market risk, operational risk, CVA, ESG integration and reporting. It enhances capital comparability, reinforces model risk governance, and embeds sustainability considerations, marking a further step toward a resilient and transparent EU Single Rulebook. Alexander (2005)

### **3.4 Capital Requirements Directives CRD**

The Capital Requirements Directive (CRD), together with its accompanying regulation (CRR), has undergone multiple revisions over the past two decades in an effort to transpose evolving Basel standards into the European legislative framework and to adapt to the changing structure of international banking. While CRD IV marked a turning point by embedding the initial Basel III principles into Union law and laying the foundation for the Single Rulebook, subsequent revisions—namely CRD V and the recently adopted CRD VI—have introduced a more granular and institutionally sophisticated regulatory architecture, particularly with regard to third-country entities and cross-border supervision.

CRD V, adopted in 2019, was primarily aimed at closing regulatory gaps left by the CRD IV framework and responding to the increasing complexity of cross-border banking operations. One of its most significant innovations was the introduction of the so-called Intermediate EU Parent Undertaking (IPU) requirement. Under this provision, third-country groups operating two or more institutions within the Union and exceeding a consolidated asset threshold of EUR 40 billion are required to establish a single intermediate holding company within the EU. This measure was conceived to enhance supervisory effectiveness by centralizing oversight of third-country banking groups and improving resolvability, thereby addressing supervisory fragmentation that had persisted under CRD IV. Additionally, CRD V conferred new supervisory powers over financial holding companies and mixed financial holding companies, requiring their formal approval and making them directly subject to consolidated supervision—an area that had been only partially addressed under previous directives.

Another crucial step introduced by CRD V was the formalisation of reporting obligations

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for third-country branches (TCBs). While CRD IV had largely left the supervision and information collection of TCBs to the discretion of national competent authorities, leading to divergent practices and potential regulatory arbitrage, CRD V introduced a more harmonised reporting regime. TCBs are now subject to periodic information requirements concerning their financial soundness, capital adequacy, governance structures, and recovery planning, among other elements. This represents an initial, but foundational, shift toward greater regulatory convergence in the treatment of third-country institutions.

However, it is CRD VI—adopted in 2024 and currently in the early stages of transposition by Member States—that constitutes the most transformative step in the Union’s approach to third-country access. With an eye toward systemic risk containment and consistent supervisory standards, CRD VI introduces a comprehensive and harmonised authorisation regime for third-country branches. Starting from January 2027, third-country institutions will no longer be permitted to provide core banking services such as lending, deposit-taking, and guarantees into the Union without establishing an authorised branch in the respective Member State. This development marks a substantial departure from the CRD IV framework, under which cross-border services could be provided from third countries without physical presence, subject to national discretion. The new regime essentially brings an end to such exemptions, reinforcing the principle of local supervision and on-the-ground regulatory accountability.

Moreover, CRD VI introduces a two-tier classification system for TCBs based on their systemic relevance. Class 1 branches, typically characterised by a high volume of EU assets (above EUR 5 billion), engagement with retail clients, or operation under non-equivalent regulatory regimes, are subject to enhanced supervisory scrutiny. This includes more stringent internal governance requirements, reporting obligations, and the establishment of supervisory colleges to facilitate cross-jurisdictional coordination. Class 2 branches, by contrast, are subject to baseline requirements reflective of their more limited risk profile. Such a classification mechanism was absent in CRD IV and represents a shift toward risk-based differentiation in supervisory intensity.

In parallel, CRD VI empowers national authorities with subsidiarisation tools, allowing them to require the transformation of significant TCBs into fully capitalised subsidiaries under Union law in cases where systemic risk is identified, or where cooperation with third-country supervisors is deemed insufficient. This tool offers a powerful new mechanism for supervisory containment of cross-border risk, previously unavailable under CRD IV or V.

Further reforms introduced by CRD VI include the harmonisation of prudential requirements applicable to TCBs. These cover minimum capital endowment, liquidity risk management, internal governance structures, local booking models, outsourcing arrangements, and enhanced disclosure. The aim is to eliminate the heterogeneity of national regimes that had developed in the absence of common standards, thus reducing regulatory arbi-

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trage and reinforcing the Union’s financial stability.

In sum, while CRD IV was essential in embedding the Basel III principles into EU law, CRD V and CRD VI signify a strategic deepening of supervisory control and institutional convergence within the Union. CRD V laid the groundwork by formalising group structures and enhancing the oversight of holding companies and branches, while CRD VI completes the architecture by establishing a harmonised, risk-sensitive, and enforceable regime for third-country access to the EU financial market. Taken together, these revisions reflect not only the evolution of the Union’s prudential framework in response to global standards and financial innovation but also the political imperative of financial sovereignty and systemic risk mitigation within an increasingly interconnected global banking system.

### **Critical Assessment**

Despite its regulatory ambition, the CRD framework has attracted criticism. Some policy analysts, such as those from the World Pensions Council, argue that the EU’s hasty adoption of the Basel II and III frameworks—under pressure from major Member States like France and Germany—led to an overreliance on external credit ratings. This, in turn, entrenched the dominance of major U.S. credit rating agencies, such as Moody’s and Standard & Poor’s, within the European supervisory apparatus. Critics contend that this reliance diminished public oversight and regulatory sovereignty, essentially outsourcing critical risk assessments to private entities with inherent conflicts of interest.

Nonetheless, the CRD remains a pivotal element in the EU’s regulatory architecture. It provides the legal scaffolding for effective banking supervision, aligning national supervisory practices with international standards while embedding EU-specific safeguards to ensure transparency, accountability, and resilience.

In conclusion, the CRD ensures that institutions operating within the EU not only meet global prudential standards, but also respect the Union’s broader goals of financial stability, market integrity, and responsible governance. When combined with the CRR, the directive forms an integrated framework that governs both the quantitative and qualitative dimensions of prudential regulation in Europe.

# Chapter 4

## Conclusion

The Double Degree program between Ca' Foscari University and Paris Dauphine has been, without any doubt, the most important investment of my life. It has been a truly enriching and transformative experience, crowned by a final traineeship in a third country that pushed me to fully expose myself to a new professional and cultural context.

This program not only provided me with a solid and advanced academic foundation in my field, but also allowed me to meet extraordinary individuals—professors, professionals, and friends. Looking back on this journey, I am even more convinced that what truly makes a difference in any academic or professional path are the experiences you live and, inevitably, the people with whom you share them.

I have realized how powerful it is to be in the right place at the right time, how certain contexts and environments can bring out the best in a person, and how far a group can go when its potential is fully unleashed. Everyone is different, and it is exactly these differences—this uniqueness—that often make the difference. The “rough edges” of a person’s character are not flaws to be hidden, but rather strengths to be refined. When sharpened, they can challenge others, bring new perspectives, and contribute real value. At the same time, alongside these edges, there is the softer side: the capacity to adapt. Through experience, exposure, and human connection, we slowly learn to understand others, to share, and to develop the kind of empathy that, now more than ever, is essential in today’s world.

Empathy, adaptability, uniqueness, and sharing—these are the four pillars that I carry with me. Thanks to this journey, I now feel like I have a suitcase packed and ready to go anywhere, with no fear of the unknown.

# Chapter A

## Appendices

### A.1 Supervisor Evaluation

Trainee / Intern **FRANCESCO LASALVIA**, Student's id number / matricola **900658**

Feedback:  
Francesco demonstrated a strong ability to analyse large volumes of information, synthesise key insights and integrate them into his work. Happy with his progress and great contributions.

Total amount of working HOURS performed by the trainee/intern: 864

From 14/03/25 (first day of training / internship)

To 31/08/2025 (last day of training / internship)

Place and date  
Luxembourg, 29/08/2025

Tutor / Supervisor's signature E. Keef

Figure A.1: Feedback

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