

Louvain School of Management

How is climate risk considered in the current banking regulation for regulatory capital and what are the possibilities for the future?

How is climate risk integrated into the risk taxonomy of some Belgian banking institutions?

Authors: Randall Colin & Jean Herrier
Supervisor: Ruben Olieslagers
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Section I: Introduction

Climate change has received increasing attention in recent years for several reasons. The scientific evidence is becoming increasingly accurate, with intergovernmental expert groups such as the Intergovernmental Panel on Climate Change (IPCC) providing precise forecasts of, for example, temperature increases and sea level rises.

The impact of climate change is increasingly felt in everyday life. In Belgium alone, unprecedented floods have been reported in 2021. This is raising the awareness of everyone, including world leaders. International agreements such as the Paris Climate Agreement have been adopted to limit global warming to well below 2°C above pre-industrial levels (IPCC, 2018). International climate summits and conferences are also putting climate change at the top of the global political agenda. In June 2021, the European Council adopted a European Union (EU) climate law that aims to legally bind countries to meet 2030 and 2050 climate targets. The European Council wants a long-term vision for the EU to become more resilient to climate change and adapted to its unavoidable effects by 2050.

All this shows that climate change is already having a significant impact on the global economy. Consequently, this phenomenon also impacts the banking institutions, who are amongst the most important stakeholders in the economy.

This thesis aims to review the regulations related to climate risk and particularly those related to regulatory capital. It will be contrived of four parts, the present introduction, the literature review, the empirical approach, and the conclusion.

The thesis will begin by looking at what constitutes climate risk and the impact it can have on banks. Then, a summary and description of the different Basel constituents will be done to ensure a full understanding of the analysis. Focus will then turn to the regulatory institutions to observe the policies they took or are planning to take and assess how these institutions view the climate crisis and the measures they are putting forward in order to best prepare banks for this challenge.

In the empirical approach, a comparison of the different climate-related reports will be done for three Belgian banks. The aim is to identify the similarities and differences of the

reports and understand the current methodology of climate risk mitigation. An assessment of several methodologies for the integration of climate risk within regulatory capitals will be performed and compared to what the banks and regulators are recommending. The purpose of this approach is to summarize the different possibilities of climate risk integration within regulatory capital and the feasibility of creating such a model.

Section II: Literature review

1. How to define climate risk

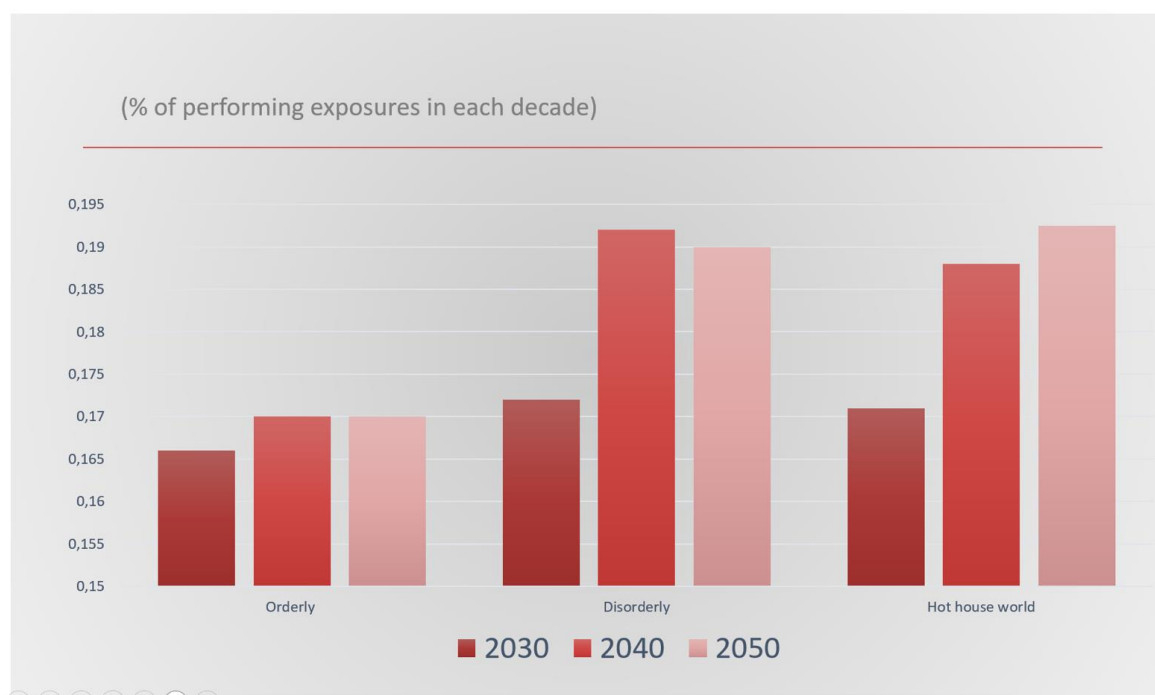
1.1 Climate risk

In recent years, the emergence of Environmental, Social and Governance (ESG) factors has completely changed the face of the business sector. Indeed, whether it is on the social, environmental or governance policies, the whole business world had to adapt and take responsibility for the non-financial aspects of their entities. The main subject of interest when talking about ESG is the environment as no response to this threat could have tremendous impact on our daily life.

Consequently, this phenomenon would also impact the financial sector as shown by the Network for Greening the Financial System, hereafter NGFS. The NGFS has set up three long-term transition risk scenarios: the orderly scenario, the disorderly scenario and the hot house world scenario.

- The first, the orderly scenario, assumes that strict decisions will be taken to limit global warming to 1.5°C. To achieve this scenario, very strong policies would need to be undertaken.
- The second, disordered scenario assumes delays in implementing new climate policies. Strong actions will therefore have to be taken to avoid exceeding the 2°C warming.
- The third scenario, the hot house world scenario, assumes that nothing is done to counteract climate change. This scenario would cause a warming of about 3°C.

According to bank statements for the 22 highest emitting sectors, the European Central Bank (hereafter ECB)'s climate risk stress test revealed that expected losses will be lower in an orderly transition scenario.



Graph n°1: Projected loan losses per decade in the long-term scenarios

The banking institutions are not different to the others regarding the ESG. Indeed, banks are managing a whole lot of different capitals, either in portfolios, assets or deposits. They are facing a lot of different risks that they need to manage in order to have a functioning business. Though the financial risks are already quite consequent, banks need to manage non-financial aspects within their activities as they have a direct impact on their financial results. When focusing on climate risk, we can determine that banks identify two types of distinct climate risk that they consider within their risk taxonomy. To help further identify the risks within the taxonomy, the risks are segregated into risk drivers that relate to the nature of the loss that the banks can endure.

1.1.1 Physical risk

These are the risks associated with the physical impacts of climate change. A bank that has a large portfolio of loans to coastal property developers may face significant risks from sea-level rise and storm surges. Hence, the climate risk takes a physical form as it can influence direct assets from the banks or assets from the bank's clients. The threat is very tangible, the loss of an asset would directly impact the bank's results as it would simply shut down the source of revenue. The gross loss from natural disasters were in 2021 and 2022 estimated to 320 million USD and 270 million USD respectively. According to Munich RE (2020) the loss figures inclined to trend upwards in the coming years.

The Basel Committee on Banking Supervision, hereafter named BCBS, identifies two risks drivers within the physical risks: The acute physical risk drivers and the chronic physical risk drivers (Basel Committee on Banking Supervision, 2021).

- The acute physical risk relates to the extraordinary events resulting from the climate crisis such as floods, heatwaves, wildfire, severe periods of droughts, etc. These types of events are more unpredictable than others and can create periods of extreme conditions for the affected area. If those events are to keep on recurring more and more, the subsequent financial loss of these events might become overwhelming for the banking institutions.
- The chronic physical risk, as its name indicates, relates to the damage that will result from the passing of time, such as the rise of the sea levels and the access to clean water. The World Bank estimated in 2018 that by 2050 about 140 million people will have to be relocated due to the rise in sea levels or the scarcity of access to clean water. Resulting in a diminution of the agricultural capacity of the affected regions altogether, which would make access to food more complicated. Furthermore, the rising global temperatures might cause recurring deadly heatwaves in less than a decade. As studies from the McKinsey global Institutes demonstrated in 2020, *between 160 million and 200 million people could live in regions with a five percent average annual probability of experiencing a heat wave that exceeds the survivability threshold for a healthy human being, absent an adaptation response* (World Bank Group, 2018).

1.1.2 Transition risk

These are the risks associated with the transition to a low-carbon economy, such as policy and regulatory changes. Banks may be exposed to transition risks through their exposure to sectors with high carbon emission, such as fossil fuel industries, which may become less profitable or even obsolete in the future. For example, a bank that has a large portfolio of loans to coal mining companies may face significant risks as demand for coal decreases and regulations on greenhouse gas emissions tighten. This is especially true given that more than 60% of the total revenues of non-financial corporations are linked to the 22 most Green House Gas (GHG) emitting industries (European Central Bank, 2022a). The regulation changes might force the banking institutions to decrease their assets within the most polluting sectors.

For the transition risk, the BCBS identifies four risk drivers: the climate policies, technology, investor sentiment and consumer sentiment.

➤ Climate policies

Climate policies relate to the many different pledges, the major example being the Paris agreement, that the different parties, either countries, organizations, or authorities take to curb the GHG emissions. A plethora of policy initiatives exists in order to diminish GHG emissions, full comprehension and assurance of these is quite a heavy task and a non-compliance with it might result in fines or maluses from the authorities.

➤ Technology

Nearly all the existing corporate businesses are based on technologies regarding GHG emissions, that are nearly obsolete or not adequate to the regulations that are put in place. Hence, they will need major investment to adapt to a greener use, or consumption of energy to stay competitive and not be at a disadvantage against businesses that will not suffer from the regulations.

➤ Investor sentiment & consumer sentiment

The human factor, whether from the investor or the consumer side, has a huge impact, if not the most, on the transition risk. Indeed, the reputation and trust that clients put into banks is important for their activity as the less people go to a bank, the less the bank in question can offer to the other clients. Hence, a shift in behavior, either from investors or consumers, can create this effect if the banking institution does not follow this shifting behavior. For instance, in the past few years, the incentive from the public is trending towards an eco-friendlier behavior, especially from big multi-nationals' companies (PwC Luxembourg, n.d.). Since most of the banks are international companies and most of their biggest clientele are also, the need to listen to this changing behavior is fundamental even from the investors' perspective.

ESG investment has the wind in its sails during these last years. Indeed, in Europe, from 2013 to 2019 an increase of more than 12% of total net inflow of assets were invested in ESG based funds. In 2020, PwC estimated that by 2025, 50% of the total inflow of assets would be toward ESG based funds.

The two main risks, physical risk and transition risk, can affect the value of assets and the solvency of borrowers. These two risks are mainly present in the different scenarios of the NGFS and prove to be interdependent events. For instance, in the orderly scenario, a lot of different restrictions would be taken to diminish the rise of global temperatures, meaning that while diminishing the risk of physical climate risk, it will increase as equally the transitions risks. Which is logical since, on the one hand, the more restrictions there are on highly producing GHG sectors, the more the banks will have to find other ways to use their capital in order to have equally profitable investments. On the other hand, if only a few to no restrictions are put in place for the most GHG emitting sectors, banks will not suffer from new regulations, but the physical risk will become a major risk for the banking institutions and their assets.

1.2 Climate-related litigation

Nowadays, climate-related legal procedures are mainly carried out outside the financial sector (European Central Bank, 2022c). To illustrate this, we can use the example of Shell, which has been ordered to reduce its CO₂ emissions by 45% by 2030 (Dolmans & Preston, n.d.).

Banks are exposed at risk of potential legal action due to their involvement in financing activities that contribute to climate change. As climate change continues to have significant impacts on the environment, business and communities, the potential liability of banks is increasingly being highlighted. In a November 2021 report the NGFS discloses the results of a survey which shows that 58% of respondents (NGFS members) expect a general increase in climate-related litigation in the future (Network for Greening the Financial System, 2021). Concrete cases of legal proceedings have already taken place, such as in 2021, the Non-Governmental Organization (NGO) ClientEarth started legal proceedings against the National Bank of Belgium (NBB) because, according to the NGO, the central bank did not consider environmental requirements when purchasing corporate bonds under the Corporate Sector Purchase Programme. As climate changes intensifies, banks may also be challenged for their failure to adequately assess and disclose the risk their investments and lending activities pose to the climate and to their stakeholders.

1.3 Climate risk as a driver of other risks

The climate risk, as defined above, is already a big challenge for the banks when we take into account the different drivers of the transition and the physical risks. However, the arduous part of climate risk is the threat it represents to the other risks that face the banks. Indeed, the climate risk can be seen as a driver for the other risks, for instance, the physical risks such as floods or periods of drought, other than the destructive nature of these risks, will have an impact on the credit risk; A farmer, who's land cannot be watered during a severe drought, will have its credit risk increase exponentially (Basel Committee on Banking Supervision, 2021). Moreover, In addition, such events could also increase market risk as they would lead to changes in market expectations, resulting in sudden price revaluations. Operational risk would also be affected, as these extreme events would undoubtedly disrupt bank property, branches and data. Climate risk, therefore, has a global impact on risks.

The fact that the credit risk is in itself a driver for the other main risks of the banks, makes it all the more difficult to tackle it and create a global methodology to respond to it. This dimension of climate risk as a driver of the other risks means that an increase of the climate risk will increase the probability of the other risks. Weaker climate risk only means that the other risks are less probable to be impacted by the climate related risk consequences.

2. Risk management within banking institutions

2.1 Risk taxonomy of a bank

Banks have risky activities that could lead to global negative outcomes such as financial crisis or recessions. To mitigate those risks and create a safer economic environment, banks need to have proper risk management framework. To do this, each bank developed a risk taxonomy to mitigate the risks according to their structure. To properly understand what the risk taxonomy of a bank is, we must grasp what is considered a risk for a banking institution.

Banks, throughout their activities, that is, lending capital to businesses and managing portfolios, face all the risks of investment capital in exchange of interests' rates to gain money from their activity. However, for banks to function properly, they cannot lend money without securities that would assure them the minimum loss of invested capital.

This loss of capital can come from a variety of different factors from which the bank has little power over. Generally, banks identify six types of risks from which financial loss may arise:

- Credit risk: refers to when a borrower is in default of payment, and he cannot fulfill his obligations to the bank. Either from paying the interests or the capital borrowed. It is considered as one of the biggest risks that banks face.
- Market risk: refers to the changes in the capital markets in which banks have invested their capital. The loss for banks can come from a variety of factors within the market risk, such as the interest rate, the credit spreads and the volatility of the stock exchange. This risk could be considered as the most important risk that the banks are facing. For example, the sub-primes crisis that contributed greatly to the 2000's financial crisis, was a market risk due to a speculative bubble.
- Operational risk: this risk refers to the human factor within the banking system. It can come from a simple computation error, a bug from the system, or fraud. The latter being more difficult to detect as large-scale fraud often originates in more complex operations and because it is created with the purpose of being hidden, rendering it really difficult to detect.

- **Liquidity risk:** banks need to have enough liquidity to fulfill their obligations towards their clients, such as cash or equity withdrawal from the banks. Failure to comply with this obligation might cause fear within the clients.
- **Reputation risk:** refers to the possibility that the bank's actions or practices, such as financial scandals, risk mismanagement, involvement in controversial activities or cyber-attacks, may result in a loss of trust or credibility with its customers, business partners, investors and regulators. Reputation is essential for a bank as it can influence the bank's ability to attract and retain customers or recruit new talents.
- **Legal risk:** refers to any legal actions taken against the banks. These actions can be the results of regulatory breaches or legal disputes.



Graph n°2: Different types of risks

These risks are the main sources of loss for the banks. Incapacity to respond to the risks may cause loss of capital and income for the banks. Moreover, it can create a sentiment of distrust within the clientele, creating a snowball effect resulting in diminished activity for the bank as the less clients they have, the less they can offer. Hence, they need to find

ways to lessen either the impact or the probability for the risks to occur as the consequences can be devastating.

Strong risk management is then primordial for banks to prevent any financial loss from their activities. They need to be able to identify and measure in the most accurately possible the risks to determine which one they need to prioritize or be more cautious about, regarding the activity concerned.

Regarding all this information, this is how we will define the risk taxonomy of a bank: “it is a classification system used by the banking institutions to help them identify, assess and manage the risks resulting from their activities. It allows the banks to categorize the risks depending on their nature, source and probability”.

2.2 The Basel framework

In order to help banking institutions diminish the risk of their activities, the BCBS decided to create a framework for banks to operate in a more intertwined way regarding certain risks related to their activities. Hence, the Basel Accords were created, and the main purpose was ensuring a minimum set of capital that the banks needed to safeguard to keep operating safely while mitigating the market and credit risks.

By keeping a minimum amount of the capital that they perceived through their activity, the banks will create securities for their own operations. The idea is to be able to cover their financial obligations in a possible situation of distress that may arise from an economic recession or any other event that may cause the activity of the banks to be slowed down or decreased.

2.2.1 Basel evolution

➤ Basel I

The Basel Accords were first introduced in 1988 with the Basel I framework, known as the Basel Capital Accords. It gave outlines and definitions of the minimum reserves that international banks needed to hold for their assets, and it also provided a basic way to weigh the risks depending on the nature of the assets. The aim of the Accords was to take security measures to diminish the outcome on the reputations of banks of a liquidity stress period. The Basel Accords, when introduced, were seen as counterproductive as banks would need to keep more money in their structure rather than investing all of it. The fear was that it would reduce economic growth (Shakdwipee & Mehta, 2017).

Since its introduction in 1988, the Basel framework has been through a couple of updated versions in order for the framework to stay relevant and contemporary with the economic conditions. Indeed, *the world was a rather simple place to conduct financial transactions* (Shakdwipee & Mehta, 2017). Hence the complexification of the framework had to be on par with the financial world, resulting in the creation of Basel II.

➤ Basel II

In 2004, the Basel II Accords, also known as The New Basel Accords, redefined more precisely the obligations of the banks regarding the minimum capital requirement. However, where Basel I was only defining and giving a general outline, Basel II took an approach that was more based on risk management. Basel II introduced the notions of the three reinforcing Pillars to which each banking institution must oblige.

The Pillars in Basel II are:

- Minimum requirement of own funds

Introduction of three types of risks, credit risk, market risk and operational risk. These were used to weigh the ratio between the bank's equity and its assets.

- The supervisory process for the bank activity

The banks needed to create an internal process to measure their performance regarding their own equity. The supervisory authority was responsible for the verification of the assessment process made by the banks.

- Market discipline

The banks were made to have more complete and exhaustive reporting data. They needed to give a more detailed structure of the ownership, the risk exposure, the capital adequacy and the risk profile.

Basel II is quite important as it begins to highlight the fact that not only the credit risk, which is the risk mostly associated with banks, is important and can have an impact. The market volatility and the human factor were identified as important factors. However, even though an emphasis was put on the possible market volatility, the framework might have created a false sense of security as the 2008 crisis happened while banks were under Basel II. The crisis demonstrated how the fall of one bank could impact the whole banking system.

To enforce safer capital regulation and to assure a better solvency between the different banking institutions, the BCBS had to come up, right after the crisis, with another Accord that would eliminate the chance of a similar crisis happening again.

➤ Basel III

Basel III is a set of international banking reforms that was developed by the BCBS in response to the global financial crisis of 2008. It is the current Basel Accords and took years before being fully implemented. Even today, Basel III might be considered as unfinished. The purpose of these reforms is to strengthen regulation, supervision and risk management in the banking sector (Bloomenthal, 2022). It has three Pillars that provide a framework for banks to manage their risk and capital (Borad, 2022):

1. Enhanced minimum capital & liquidity requirement

Pillar I of the Basel III framework is similar to the first Pillar of Basel II as it concerns the minimum capital that banks need to weigh in function of the risks they are facing: operational risk, market risk and credit risk. The latest version of the Accords introduces the notion of liquidity risk and with it, the minimum liquidity ratio, which will be explored further later. The new framework also strengthens the Basel II capital requirement.

2. Enhanced supervisory review process for firm-wide risk management and capital planning

Pillar II can be seen as an extension of the first Pillar. Pillar II ensures that banks have adequate capital and liquidity to support all the risks in their business. Pillar II also encourages good risk management.

This Pillar is based on four principles:

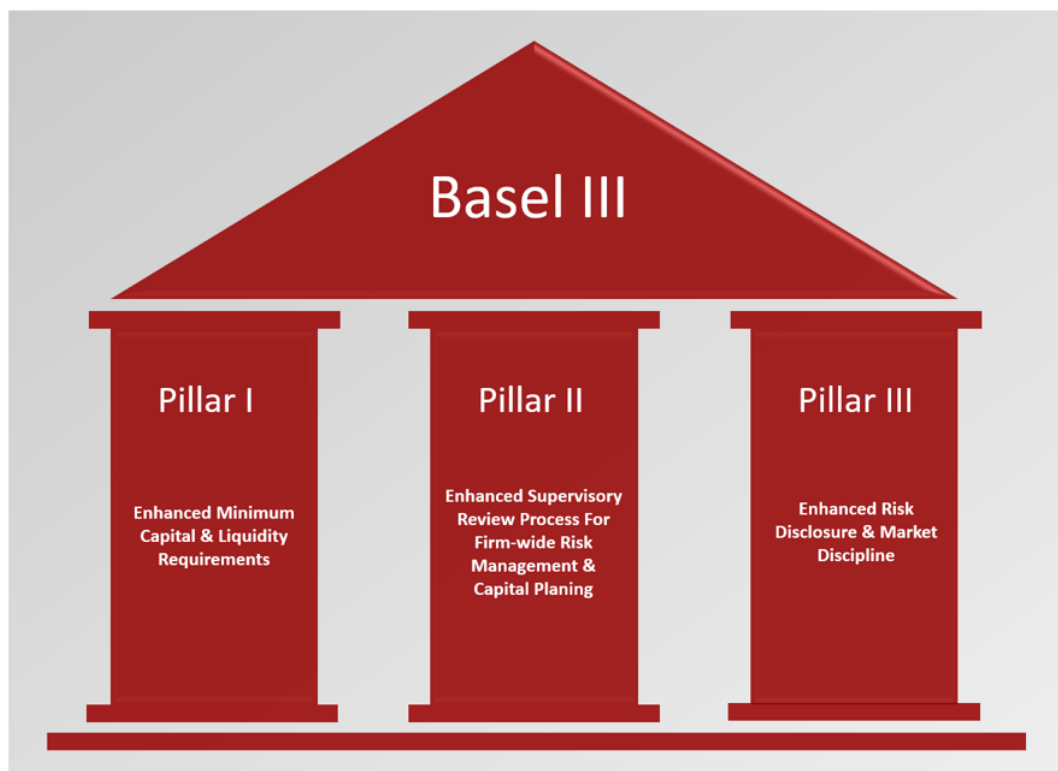
- Banks must have a clearly defined risk profile and based on this; their capital must be adequately retained to cover the risks that may arise.
- Supervisors review and evaluate banks' capital adequacy assessments and strategies, their ability to monitor and ensure their compliance with regulatory capital ratios. Based on the risk assessment, regulators may impose additional capital requirements on banks to cover specific risks to which they are exposed.

- Supervisors expect a proactive approach from banks. This means that banks should not be satisfied with the minimum regulatory capital ratios.
- Supervisors should intervene as soon as possible to prevent capital from falling below the minimums required to support a given bank's risk characteristics and should require prompt corrective action if capital is not maintained or restored.

The second Pillar aims to strengthen prudential supervision and promote a risk-based approach to ensure that banks are adequately capitalized and able to cope with a range of risks that would not be covered by the first Pillar.

3. Enhanced risk disclosure and market discipline

The purpose of Pillar III of the Basel framework is to provide additional regulatory disclosure requirements. These requirements allow all market participants to access key information about a bank's regulatory risk capital, in order to increase transparency.



Graph n°3: Basel III Pillars

The idea behind those three Pillars is that the stronger they are, the more the risks of a global banking crisis are weakened. Each Pillar is there to further strengthen the structure than the previous one. For instance, Pillar I is there to mitigate the risks linked to the activities (operational, credit, market). Pillar II is there to input a supervisory process regarding Pillar I, making sure that the first Pillar's requirement is not only respected, but that the bank is doing more than the minimum required, depending on the structure of the entity.

➤ Basel III+

As mentioned previously, the Basel III framework is considered unfinished. In 2017, the last review of the Basel III was made and published. However, the mechanisms that were mentioned in this last review were delayed due to the economic stress of the covid pandemic. This last review is considered to be the Basel III+ or Basel IV as it is bringing a few changes. For instance, there will be an increase in the input floors of Probability of Default (PD) and Loss Given Default (LGD), meaning that the banks will have to hold more capital. This update of the Basel III became effective at the beginning of 2023.

2.2.2 *Basel III*

These three Pillars are composed by a series of regulatory elements that strengthen each Pillar:

➤ Minimum capital requirements

Under the first Pillar, Basel III requires banks to maintain a certain level of capital. This capital is defined by multiple components. The BCBS identifies three components: the common equity Tier I, the additional Tier I and the Tier II capital. In CAP10 (Basel Committee on Banking Supervision, 2019), the BCBS defines the different elements that are present in each category of capital.

Basel III framework requires banks to maintain a minimum level of high-quality capital, including a Tier I capital ratio of at least 6% and a total capital ratio of at least 8% of Risk-Weighted Assets, hereafter RWA.

In addition to the Tier I capital requirement, there is a common equity Tier I ratio that must be at least 4.5% of the RWA. Tier I capital is the highest quality and most loss-absorbing form of regulatory capital, consisting primarily of a bank's common equity and retained earnings.

From Basel II to Basel III, the RWA on Tier I capital, now called additional Tier I went from 4% to 6%. Tier II capital is a lower quality and less loss-absorbing form of regulatory capital, consisting primarily of subordinated debt and other instruments that have a fixed term and are subject to certain restrictions.

Basel III's role is to address the shortcomings that led to the financial crisis. An increase in the minimum capital requirement would not be sufficient to decrease the systemic risk of a global crisis. Hence, the BCBS came up with two additional buffers that are compulsory for banking institutions.

➤ Capital conservation buffer

Banks are required to hold a buffer of capital above the regulatory minimum, and they can rebuild the buffer by reducing discretionary distributions of earnings, such as dividends and bonuses, and raising new capital from the private sector. The framework imposes distribution constraints on banks that have depleted their capital buffers, and the constraints increase as their capital levels approach the minimum requirements which is set at 2.5% (European Systemic Risk Board, 2021).

It is an additional safeguard measure that the BCBS felt necessary to implement since the financial crisis. The aim is for the banks to keep more capital buffers within their structure to be able to withstand periods of financial stress. It is a macroprudential measure, meaning that it is intended to diminish the systemic risk.

➤ Countercyclical capital buffer

The countercyclical buffer is the second buffer introduced by Basel III. Paralleling the capital conservation buffer, it is a macroprudential measure meant to mitigate systemic risk and to protect the banks globally. The aim of this buffer is to protect the banks from

any excess of credit that they would have accumulated in a period of financial stress. The BCBS requires the authorities to maintain an internationally consistent buffer guide.

This second buffer is an extension of the first one, meaning that, as the capital conservation buffer, if a bank fails to meet the required capital, it will suffer from the same restrictions regarding the distributions of its dividends, share buybacks and discretionary bonus payments. Furthermore, this buffer can also only be made of common equity Tier I capital.

➤ Liquidity standards

The Basel III liquidity standards establishes a framework for the management of bank liquidity, requiring banks to maintain an adequate level of stable funding to withstand short-term and long-term stress periods. Banks are required to continuously monitor their liquidity profile and maintain a sufficient liquidity buffer to withstand market shocks.

The Basel III liquidity framework consists of two key standards: the Liquidity Coverage Ratio (LCR) and the Net Stable Funding Ratio (NSFR). The LCR measures a bank's ability to meet its short-term liquidity needs, while the NSFR measures a bank's ability to maintain a stable long-term funding structure.

2.2.3 Risk taxonomy and the three Pillars of Basel

Since the risk taxonomy, which we defined hereabove, consists of the bank's capacity to withstand different risks that are linked to their activities, and the Basel III framework consists of regulations imposed to banks to mitigate the risk of crisis due to unsafe use of the bank's capitals. The correlation between both is quite strong.

In a certain way, Basel III could be seen as regulatory taxonomy, as its purpose is to mitigate some of the risks linked to the capital and liquidities that banks may face. Force it to say that the Basel Accords, by creating stronger capital requirements and stronger standards for the banks, decreased drastically the probability of structural damage caused by their activities, and especially regarding the market risk.

Even though Basel III mitigates some of the basic risks, the risk taxonomy still varies a lot between each bank based on their structure and their capacity to absorb a risk. Bigger banks are more resilient as they have more activities, hence, they will have more ease to scrub off one of their sources of income if it becomes a liability.

The Pillars of Basel could be imagined as the base of the risk taxonomy and the banks would need to strengthen their structure with their own risk appetite. Basel III is only a framework, and it is not sufficient for a whole taxonomy. It is required of the banks to create their own, based on their financial objectives, their professional judgement and their activities.

2.2.4 Risk taxonomy and climate risk

As mentioned previously, climate risk is only an emerging matter. Only from 2015 and the Paris accords that resulted with the European Union Green Deal (EUGD), did it become an important topic. Since the banking institutions based their risk management framework on Basel III who was published in 2010, it is only logical that the risk taxonomies of the banks did not include climate risk prior to that. Meaning that the risk management framework of the different banks was not created with the climate risk as a threat to recognize.

Since 2015, however, great efforts have been made in the identification and inclusion of climate risk within the different risk management processes. With the shifting mentality of the public and the emergence of the consequences of climate change, banks are forced to take climate risk within their risk taxonomy even if they are unlikely to suffer from either physical or transition risk in the very short term.

2.3 Climate risk within Basel

To date, there are no binding regulations requiring banks to maintain capital to cover climate risk. Meaning, that except for a general inclusion of the climate risk within the framework, the risk is not covered by any obligations of the banks. Hence, the measures taken to counter these risks depend only on the professional judgment brought by the banks and the authorities that supervise them.

However, Basel III provides an opportunity for banks to address climate risks and to ensure that they are properly managing these risks. It is essential for banks to consider the potential impact of climate change on their business operations and to take steps to mitigate these risks to ensure their long-term viability.

Indeed, in November 2021 the BCBS released a consultative document called: "Principles for the effective management and supervision of climate-related financial risk". This paper outlines how banks can identify, quantify and manage climate-related financial risks. It highlights the need for banks to develop a comprehensive approach to climate risk management, including the integration of climate risk into their overall risk management framework.

According to this paper, banks are responsible for their own management of the climate risk within their structure as *they should therefore consider the potential impacts of climate-related risk drivers on their individual business models and assess the financial materiality of these risks. Banks should manage climate-related financial risks in a manner that is proportionate to the nature, scale and complexity of their activities and the overall level of risk that each bank is willing to accept* (Basel Committee on Banking Supervision, 2021). This framework is supposed to give banks basic outlines on the manner to assess the climate risks within their structure, whether it is a small entity or a bigger international entity.

In these principles, we can see that it is of utmost importance to assign competent persons to the responsibility for climate risk. This implies that the people involved have an adequate understanding of the risks related to climate change. This also includes training and cooperation with expert organizations.

2.3.1 Pillar I

Nowadays, no regulation obliges banks to hold additional capital to cover climate risk. However, it is not absurd to think that some parameters of climate risk are already included in the first Pillar of Basel. The elements that are included in order to set up a regulatory capital percentage could indirectly include climate risk. Indeed, certain climate risks that are already observable, such as extreme weather events like heat waves or floods that could have a negative impact on crops, are already partly covered by the approach of calculating credit risk capital requirements because they increase the probability of default. So even if these events do not constitute a percentage of regulatory capital on their own, they can still be partially included in Pillar I of the Basel Accords.

2.3.2 Pillar II

The way banks assess their capital is regularly reviewed by supervisors. If the risk situation, the level of capital or the quality of capital is not sufficient, supervisors may intensify supervision or require an immediate increase in capital. This could be the case, for example, if a bank does not take sufficient account of climate risk.

The fifth principle of "Principles for the effective management and supervision of climate-related financial risk" vaguely addresses the issue of capital and liquidity. *Banks should identify and quantify climate-related financial risks and incorporate those assessed as material over relevant time horizons into their internal capital and liquidity adequacy assessment processes* (Basel Committee on Banking Supervision, 2022).

Banks should assess the impact of climate-related financial risks on solvency and liquidity and include in their internal assessment processes those risks that may negatively impact their capital and liquidity business. The integration of climate-related financial risks into these assessments will be a gradual process as methodologies and data continue to evolve. Banks should begin to strengthen their risk analysis capabilities by identifying relevant risk factors, developing key risk indicators and metrics, and assessing the linkages between climate-related financial risks and traditional types of financial risks.

➤ Pillar II Requirement

To integrate climate risk within Pillar II, the authorities could have added capital, through the supervisory process which will be detailed later, with the Pillar II Requirements (P2R). Those requirements are additional buffers that the supervisors can add to the bank assessed if he considers that there is insufficient capital held by a bank. The P2R are, as their name suggests, a requirement. This means that the banks are obligated to follow the additional buffers that the supervisors require. P2G might be the first way to introduce capital requirement for climate risk. Indeed, the regulators could ask the banks to hold additional buffers for climate risk under P2R depending on the results of the testing performed by the regulators.

➤ Pillar II Guidance

The regulatory authorities can also ask for additional buffers with the Pillar II Guidance (P2G). Those buffers are, in contrast to the P2R, only preferences from the regulators to hold additional buffers and are in no way binding. Hence, the banks are not obliged to follow those P2G, but they are highly recommended to do so. The supervisory authorities will certainly begin to use those P2G to start implementing capital buffers for climate risk. However, P2G for climate risk is still not a possibility for the moment as there is a lack of know-how and data availability.

2.3.3 Pillar III

Under the third Pillar of Basel III, banks are required to develop and implement effective risk management processes. Banks must also disclose information about their risk exposure to investors and regulators. It is therefore in the third Pillar of Basel that the climate risk is addressed in the regulation of banks. Indeed, with the Corporate Sustainability Reporting Directive (CSRD), the banks will have to disclose their ESG figures.

As mentioned above, there are already in the Basel framework some links to the climate risks within the banking institutions. Though it should be noted that there are no real binding regulations for climate related risks except on the reporting obligations. The principles cited previously are more related to the professional judgement and cautiousness of the different banks and their supervisory authorities.

➤ ESG reporting under Pillar III

In January 2022, the European Banking Authority (EBA) put into place the ESG Pillar III disclosure. In order to help tackle climate risk and to force bank to disclose their strategies regarding the ESG and the targets they set to achieve carbon neutrality by 2050. The banks are now required to disclose different information on the companies they finance, such as fossil fuel and other carbon-related sectors. The GHG emissions also need to be disclosed. The Key Performance Indicators (KPIs) needed for this Pillar III Disclosure are similar to the ones used under the Non-Financial Reporting Directive (NFRD), this to facilitate and accelerate the timelines of the reporting obligations (European Banking Authority, 2022).

3. Progress of regulatory institutions on climate risk

3.1 The European Central Bank

3.1.1 ECB guide on climate-related and environmental risks

In Novembre 2020 the ECB published a report entitled: “Guide on climate-related and environmental risks”. This non-binding report serves as a basis to enhance dialogue on climate-related and environmental disclosures. More specifically, the ECB will outline its expectations regarding any possible divergences in institutions’ practices. ECB recognizes that climate-related risks are key risk drivers for the European banking system.

This guide is aimed in particular at significant institutions but the ECB stresses that the national competent authorities had co-develop this report, which is why the ECB recommends that the national competent authorities apply this guide to non-significant institutions. Obviously, this application will be proportional to the size of these smaller banks.

When analyzing the practices of certain banks (which represent around 44% of total banking assets in the eurozone), the ECB noted that banks viewed climate and environmental risks from a corporate social responsibility perspective and not from a risk management perspective. Banks are increasingly recognizing the importance of reducing the impact of climate and environmental risks, but few are incorporating this into their risk management through measures such as stress-testing, defining an appetite, measuring the impact on their balance sheet, etc. The reason given by banks for the slow incorporation of climate risk is that they do not yet have the tools needed to assess the impact of the risk on their balance sheet correctly.

This report contains 13 expectations divided into four main areas:

I Supervisory expectations relating to business models and strategy	
1	Institutions are expected to understand the impact of climate-related and environmental risks on the business environment in which they operate, in the short, medium and long term, in order to be able to make informed strategic and business decisions.
2	When determining and implementing their business strategy, institutions are expected to integrate climate-related and environmental risks that impact their business environment in the short, medium or long term.
II Supervisory expectations relating to governance and risk appetite	
3	The management body is expected to consider climate-related and environmental risks when developing the institution's overall business strategy, business objectives and risk management framework and to exercise effective oversight of climate-related and environmental risks.
4	Institutions are expected to explicitly include climate-related and environmental risks in their risk appetite framework.
5	Institutions are expected to assign responsibility for the management of climate-related and environmental risks within the organizational structure in accordance with the three lines of defence model.
6	For the purposes of internal reporting, institutions are expected to report aggregated risk data that reflect their exposures to climate-related and environmental risks with a view to enabling the management body and relevant sub-committees to make informed decisions.
III Supervisory expectations relating to risk management	
7	Institutions are expected to incorporate climate-related and environmental risks as drivers of existing risk categories into their existing risk management framework, with a view to managing, monitoring and mitigating these over a sufficiently long-term horizon and to review their arrangements on a regular basis. Institutions are expected to identify and quantify these risks within their overall process of ensuring capital adequacy.
8	In their credit risk management, institutions are expected to consider climate-related and environmental risks at all relevant stages of the credit-granting process and to monitor the risks in their portfolios.
9	Institutions are expected to consider how climate-related and environmental events could have an adverse impact on business continuity and the extent to which the nature of their activities could increase reputational and/or liability risks.
10	Institutions are expected to monitor, on an ongoing basis, the effect of climate-related and environmental factors on their current market risk positions and future investments, and to develop stress tests that incorporate climate-related and environmental risks.
11	Institutions with material climate-related and environmental risks are expected to evaluate the appropriateness of their stress testing with a view to incorporating them into their baseline and adverse scenarios.
12	Institutions are expected to assess whether material climate-related and environmental risks could cause net cash outflows or depletion of liquidity buffers and, if so, incorporate these factors into their liquidity risk management and liquidity buffer calibration.
IV Supervisory expectations relating to disclosures	
13	For the purposes of their regulatory disclosures, institutions are expected, to publish meaningful information and key metrics on climate-related and environmental risks that they deem to be material, with due regard to the European Commission's Guidelines on non-financial reporting: supplement on reporting climate-related information.

Table n°1: Overview of ECB supervisory expectations

3.1.2 Responses on the guide on climate related and environmental risks

A public consultation was made available by the ECB when they drafted the guide on climate related environmental risks. The ECB received concerns from different institutions, either banks or national authorities (European Central Bank, n.d.). This section will focus on summarizing those comments.

➤ Lack of availability and completeness of environmental and climate data

Many organizations appreciate the ECB's acknowledgement that ESG data may not be sufficiently available. Indeed, a very important problem when it comes to climate risk is the lack of availability and completeness of climate data. (Banque et Caisse d'Épargne de l'État, French Banking association, European Banking Federation, Deutsche Bank)

➤ More precise explanations are required to meet expectations.

Among the organizations that wished to comment publicly on this report, we can highlight the fact that most organizations (Dutch Banking Association) are asking for more clarification and illustrative examples. There is significant demand from organizations for guidance on how to meet the ECB's expectations (D-fine GmbH, Deutsche Bank, BBVA, European Banking Federation). There is a lack of understanding of the measures to be used to achieve the expectations set. Some organizations are going even further and asking the ECB to formulate clearer expectations regarding the changes expected in the pillars of the Basel Accords (D-fine GmbH, Dutch Banking Association).

Some other organization (such as the French banking association and BNP Paribas) go even further, stating that banks will not be able to implement all the ECB's expectations at the same time for all clients.

➤ Timing identification

Another criticism levelled at the “Guide on climate-related and environmental risks” is that it lacks strict timing for the implementation of each guidance. Even though this report is not binding, some organizations would have liked a more precise time frame (BBVA).

In addition, banks such as Deutsche Banque and BNP Paribas, as well as associations such as the European Banking Federation and AFME & ISDA, argue that some of the ECB's expectations are challenging and will take time to implement. Hence, the time frame for the implementation needed to be adequate.

➤ Principle of proportionality

Proportionality is the fact that supervisory authorities need to take the size of the bank into account when implementing regulations. If a regulation is to be followed for a systemic bank, the Less Significant Institutions (LSI) also need to follow this regulation but appropriate to the institution's size.

In their guidelines, the ECB mentions the proportionality for the LSIs and that the national authorities who supervise should take account of it when implementing those guidelines in their supervisory process. However, the main critic made was that there was a lack of a clear definition for this proportionality. Thus, different institutions (Dutch Banking Association, Austrian Federal Economic Chamber, EACB) are asking for the ECB to be more precise and give proper definition for this proportionality.

3.1.3 ECB good practice on climate risk

A few months after releasing its climate stress test report, the ECB has published a report entitled "Good practices for climate related and environmental risk management" which will respond to the industry's desire for information on good practices. This report goes into more depth on strategy-setting, governance and risk appetite and management.

This report contains 26 good practices divided into four different sections. The table below presents each good practice detailed in the report (European Central Bank, 2022d):

Section	Sub-section	Topic
Materiality	Identification of risk drivers	Transmission channels
	Identification of exposures	Materiality assessments
	Determination of materiality	Materiality thresholds
Business strategy	Strategic approaches	Transition planning
		Key performance indicators
		Products
	Strategic steering tools	Client engagement
		Client transition plans
Governance and risk appetite	Management body	Governance framework
	Remuneration	Remuneration policies
	Organisational structure	Second line of defence
		Third line of defence
	Risk appetite	Key risk indicators
	Reporting	Data governance, processes and collection
		Internal risk reporting
Risk management	Due diligence	Data collection
		Controversies
	Risk classification	Credit risk
		Market risk
		Operational risk
	Collateral valuations and pricing	Collateral valuations
		Loan pricing
	Capital adequacy	Internal capital adequacy assessment
	Environmental risks	Exclusion approach
		Due diligence
		Risk measurement

Graph n°6: Observed good practices described in the ECB report

This document serves as a compendium to the ECB report on the results of the 2022 thematic review on climate-related and environmental risks.

The 2022 thematic review on climate-related and environmental risks apply some deadlines for the banks identified as significant. These deadlines are shown in the timeline below (European Central Bank, 2022e):



Graph n°7: Systemic banks deadlines for good practices integration

The ECB also sent a feedback letter to the significant banks with an average of 25 shortcomings.

A member of the ECB Supervisory Board, Anneli Tuominen, affirms the ECB's support for further work by the Basel Committee on Banking Regulations on the three Pillars of the prudential framework, adding that malus on brown investments or bonuses on green investments should not be applied to respect the risk profile of banks (European Central Bank, 2022c).

Anneli Tuominen also addressed the fact that to reduce greenwashing, credit ratings need to be improved. Indeed, if we analyze the ECB's report on this subject, we realize that there is still a lot of work to be done, particularly in terms of (i) transparency about definition and assessment of Climate Change Risk (CCR); (ii) disclosure of the magnitude of adjustment to the credit rating stemming from material CCR; and (iii) an explanation of the methods and models used for CCR assessments (European Central Bank, 2022b).

3.1.4 Stress test done by the ECB on climate risk

For some years now, the ECB has taken a strong interest in climate risk and has even made it a central point. In July 2022 the ECB published the report of the stress test performed earlier that year (European Central Bank, 2022a). This document was drawn up following the recommendations of the Supervisory Review and Evaluation Process (SREP) and is intended to create awareness of climate risk. It was a learning exercise that had no impact on the regulatory capital requirements of supervised institutions.

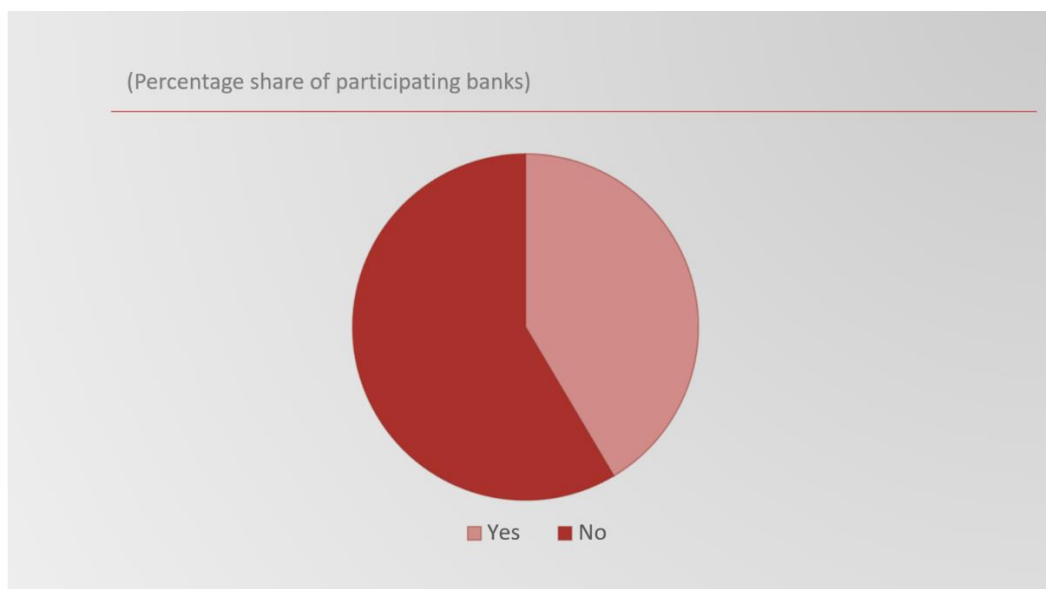
This report is divided into three distinct modules:

1. A qualitative questionnaire
2. Two climate risk metrics on sensitivity of banks' income to transition risk and their exposure to carbon emission-intensive companies
3. A bottom-up stress test

The ECB has taken up the scenarios developed by the NGFS as already discussed in the climate risk section of the paper. As a reminder, these scenarios are the orderly, disorderly and hot house world scenarios.

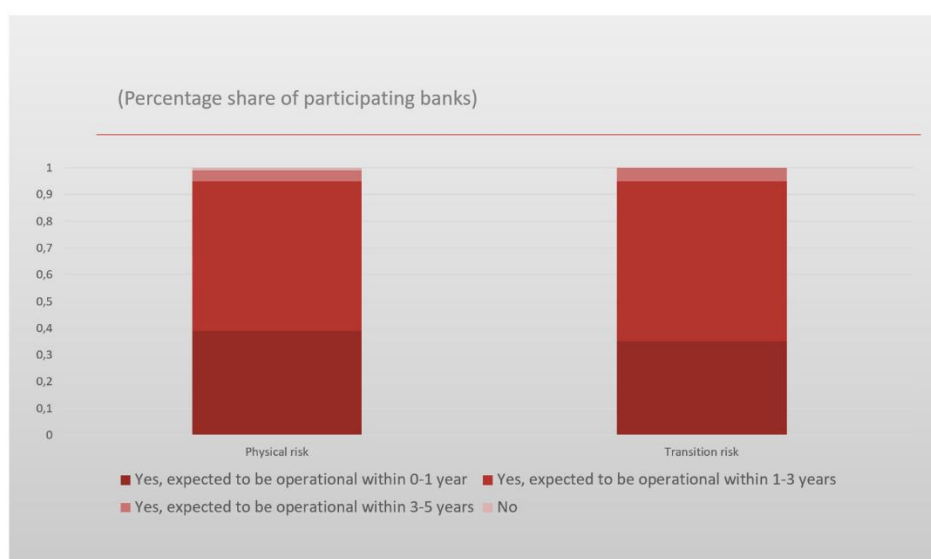
Report findings:

Although European banks have made some progress, they are not yet meeting the ECB's expectations regarding the integration of climate risk into their frameworks. Shortcomings, data gaps, and inconsistencies were identified across institutions. A clear example to illustrate this is the percentage of banks that do not yet have a well-integrated climate risk stress test framework. It represents almost 60% of the sampled banks.



Graph n°4: Is climate risk currently included in the institution's stress test framework?

The majority of these banks intend to integrate physical and/or transitory climate risk in the medium to long term, as shown in the graph below.



Graph n°5: Time frame envisaged for implementing climate risk stress-testing frameworks

The ECB criticizes banks for relying heavily on proxies rather than actual counterparty data to measure climate data. The ECB adds that banks should invest more in the climate-related assumptions that are used to measure greenhouse gas emissions. In addition, while the ECB recognizes that data collection is a real challenge, it emphasizes that it is critical to increase client engagement in order to obtain the relevant data that will enable supervisors to enforce their expectations regarding climate risk management practices.

The ECB also called for more Pillar III information, as 60% of banks with a stress testing framework for climate risk were not providing or planning to provide such information.

➤ Result of long-term transition risk projections

According to the ECB's climate stress test report, long-term transition risk projections showed that losses are expected to be lower in the orderly transition scenario than in the disorderly and hot-house scenarios. This demonstrates the importance of making the transition sooner rather than later.

➤ Result of short-term transition risk projections

Results from the short-term disorderly transition scenario showed that banks show increases in losses relative to the baseline scenario over the scenario horizon. The high carbon emission sectors are mainly responsible for this increase in the projection. Indeed, sectors such as mining or petroleum refining are likely to be strongly impacted due to their high carbon price needed to reach a net zero level.

Good practices identified:

The ECB's climate risk stress test report also aims to identify good practices implemented by some banks. The ECB lists five of them:

1. Banks' engagement with their clients to retrieve climate-related data at the counterparty level.
2. Integrating climate risk into their capital adequacy assessment process supported by a good governance framework.
3. Another point that highlights the ECB is the involvement of banks in their climate risk modelling. When banks develop their models (i) by integrating sector or even company details, (ii) by integrating the differentiation between transition risks and physical risks or (iii) by using real data regarding emissions.
4. Appropriately allocating their revenues and exposures by sector or country and issue intensity using correct and real data and not approximations.
5. Although it is currently very difficult to establish a long-term strategy, some banks have succeeded in developing plans with concrete objectives and use of KPIs to face the climate challenge.

In conclusion, the ECB states that banks must intensify their efforts on the green transition, which includes several points such as better collection of real data to optimize modelling or improving the capacity of stress tests in the coming years. Ultimately, the ECB hopes to see a better integration of climate risk into their stress testing frameworks and internal models of supervised banks.

The ECB also argues that the climate stress tests remain a learning exercise for banks and supervisors and that there are no direct implications for regulatory capital at this stage.

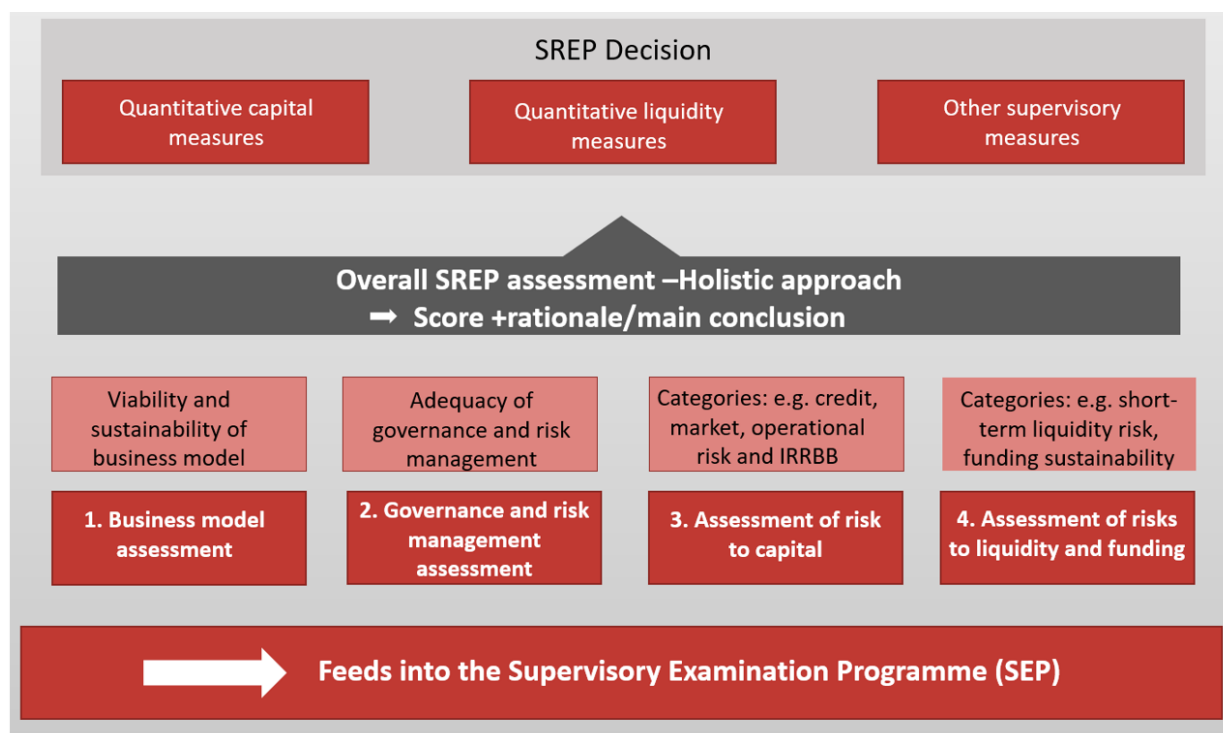
3.2 European Banking Authority on climate risk

3.2.1 Current supervision

The EBA is an institution that was created in 2011 to reinforce the European finance system. The aim of this institution is to create a handbook with harmonized regulations for banking institutions. Hence, the supervisory methodology they created is called “Supervisory Review and Evaluation Process” or the SREP.

This evaluation process has three purposes for the banks:

- Overall assessment of the viability of the banking institution
- Check of the minimum capital requirements and other supervisory measures
- Minimum level of supervisory engagement for the specific institution as part of the next Supervisory Examination Program.



Graph n°8: SREP methodology at a glance: four key elements

This evaluation process is the main way of supervising the banking institutions. It is contrived of four key elements:

1. Business model and profitability assessment
2. Internal governance and risk management assessment
3. Assessment of risks to capital on a risk-specific basis
4. Assessment of risks to liquidity and funding on a risk-specific basis

Each of these elements will be assessed following multiple phases:

1. Data gathering
2. Automated anchoring score
3. Supervisory judgement

The outcome of their SREP test can result in P2R or P2G. The first one is used by the EBA when a bank does not take sufficient capital, according to the EBA, to cover a specific risk. Hence the bank needs to add capital requirements. The P2R is legally binding, meaning that noncompliance with it can result in fines (European Central Bank, 2023c). The P2G, is, on the contrary, not legally binding and only an expectation from the EBA for the bank

The “guidelines on common procedures and methodologies for SREP and supervisory stress testing” as used by the EBA does not mention the climate risk within the supervisory process. However, in the final report published on the 18th of March 2022, *respondents expressed concerns about the inclusion of climate risk within P2G.*

The concerns that were expressed relates to the current inadequacy of the system to treat the climate risk within the Pillar II and the fact that the EBA previously stated that before implementing climate risk within the P2G, new data and methodologies concerning climate risk needed to be developed. The EBA answered by re-affirming that climate risk will not be instated within the P2G for the moment as such methodologies and developments were not sufficient yet.

Hence, we can safely conclude that P2G regarding the climate risks will not be implemented before some time. The EBA needs to gather more data regarding the climate risks before creating requirements that would become binding for the banks.

However, even if the EBA cannot yet create regulatory requirement because of a lack of data, they will have to assess banks based on their supervisory judgment. The climate risk could be found in any key elements of the SREP.

In the near future, the EBA should concentrate their efforts on the banks that will be highly impacted by the climate risk, either on the transition or physical risk. For instance, banks that rely heavily on highly GHG emissions industries such as petrol, coal and heavy manufacturing as their main source of income will have to rethink their business model and profitability assessment in order to shift towards greener portfolios as their first sources of income.

Internal governance and risk management assessment will also become an important part of the supervisory process regarding climate risk as the EBA will have to assess the efforts that the banks put into the treatment of climate risk.

The two last key elements, assessment of risks to capital on a risk-specific basis and the assessment of risks to liquidity and funding on a risk-specific basis, will be more complicated to tie to the climate risk at first as the EBA lacks the data required. However, the EBA might still use those key elements on a case-by-case basis depending on each bank's exposure.

The data gathering of the EBA will be critical to the assessment of the climate risk within the next few years. They will use the data harvested to try and implement climate risk within P2G. The aim is to have an easier supervisory process of the climate risk assessment within all the different banking institutions using a single methodology rather than a case-by-case one approach. P2G on climate risk would allow a first implementation of capital requirement within the banks before becoming more binding in the future.

3.2.2 EBA supervision of banks in the future

The climate risk assessment challenge will prove to be a real test for the EBA as the large modifications required to the current legislation will more surely than not add a colossal load of work to the supervisors as they will have to go through way more data than for

the moment. Most of their work will consist of insuring that the compliance regarding the new legislation is followed correctly.

According to our interviewees, Pietro Maiorana and Steven Mulkens, a possible solution to ease the workload of the ECB would be to make mandatory audit report on the ESG compliance. That report should be made by external auditors such as the big four: Deloitte, PwC, EY and KPMG. This report already exists but is very limited and does not have any other use than presentation, for now.

An external audit from a third party might be an efficient way to reduce the workload of the regulators but will result in another plethora of new regulations. Indeed, even if third parties' audit are already used today, they mainly do it on a voluntary basis meaning that they can disclose the information they want to address, and the audit firms are used more in a consultancy and advisory role rather than supervisory.

As of the 1st January 2024, all the financial firms will have to disclose the taxonomy alignment of their investments. The new corporate sustainability directive will also oblige the banks to publish the near majority of what the institution is doing regarding the ESG.

3.3 Corporate Sustainability Reporting Directive

3.3.1 What is CSRD?

The CSRD will become mandatory on January the 1st 2024. It is a directive that was first introduced in 2021 and approved by the EU regulations in 2022. It is the conclusion of the 2010's work towards sustainability reporting from the companies, with the final goal of achieving carbon neutrality within Europe in 2050. The aim is to oblige the large companies to report their sustainability data to the public in order to make them more accountable of their internal policies and by making the stakeholders aware of their direct or indirect choices on the environment. It is an upgrade of the current reporting obligations called "Non-financial Reporting Directive" which is considered lacking and not optimal for transparency regarding ESG matters.

Banks are included within the first wave of mandatory reporting on sustainability. Indeed, this CSRD will make obligations progressives based on the nature of the entities. However, since the banks are considered public interest entities and are often on the stock exchange, they are amongst the first companies to be contrived to publish the report.

The first mandatory report using the CSRD obligations will be the report of the data 2024, hence it will be published in 2025 (European Commission, n.d.). However, it is more likely than not that for the 2023 data, the companies that need to comply to CSRD obligations will publish their data using the CSRD approach if the data is available.

Our interviewee, Steven Mulkens stated that the CSRD will probably become the major regulation for climate risk reporting within the following years and that companies should embrace it as an opportunity to transition to greener activities.

Regarding the additional cost of report due to the CSRD, the European Commission position is that it will increase the cost of reporting at first, but, in the following years, it will decrease. Indeed, since the different stakeholders are already requesting more information regarding the ESG, companies will have to endure those costs anyway, and by creating a global reporting methodology, the costs will stabilize over the years.

3.3.2 How will the CSRD affect the banks and the regulators?

The passing of the CSRD showed that the regulators, in this case the EU, were serious about implementing the climate risk within the regulatory framework. The fact that the ESG report will become mandatory means that the EU will most certainly than not implement other regulations to achieve carbon neutrality by 2050. The banking institutions and the EBA then need to find a solution to integrate the climate risk within the two first Pillars. However, the fact that the ESG reporting will become mandatory is also an opportunity, indeed, the regulators and the banks will be flooded by information regarding climate risk.

All this data will be used for the creation of a model for the integration of climate risk. The problem is the processing of all the data. As regulations will become more binding from year to year, they will need to process the data from the previous year quickly in order to update their policies and regulatory requirements.

Furthermore, the reporting obligations of CSRD will need to be audited by a third party, which means that there will be control over the information that the bank publishes. Currently, there is no obligation for the banks to audit the information they provide within their pillar III disclosure.

3.4 Bank of Belgium on climate risk

At the Belgian scale, the National Bank of Belgium (hereafter NBB) has not a lot to offer regarding the climate risk, it relays the information from the different entities such as the European Commission, the European Central Bank, the EBA and the Network for Greening the Financial System. Furthermore, the NBB is not qualified to supervise the bigger banks, called systemic banks. As those banks have a more global impact, they are supervised by the ECB. The NBB can only supervise and have a direct impact on the banks that are not qualified as systemic banks.

However, even if the NBB does not produce any regulations or guidelines on the treatment of the climate risks, the entity produces a yearly report called “Financial Stability Report” in which the NBB disclose the current health state of the financial services entities, such as the banks, insurances and investment funds.

Even if the NBB has been *studying the climate-related risks to financial stability since 2018* (National Bank Of Belgium, 2022), the 2022 report was sadly focused on the war in Ukraine and the repercussion it will have on the Belgian entities. The report still mentioned the climate risk, especially in the insurance sector where the insurance companies are still mainly contrived of assets from sectors that are at greater risks regarding the climate. *Around 48% of the corporate bonds portfolio, 54% of the equity portfolio and 36% of the commercial loans portfolio held by the insurance sector are exposed to industries that could be sensitive to risks associated with the transition to a low-carbon economy* (National Bank Of Belgium, 2022).

The NBB is also responsible for the supervisory process of the non-significant banks, which are banks that are not considered as systemic. Even though they have theoretical direct supervision, the NBB is monitoring closely and implementing on a smaller scale the decisions of the ECB. The non-significant banks are less supervised than the systemic banks. In February 2023, the NBB communicated the “Expectations on climate-related and environmental risks” with LSI in scope that they were to follow the guidelines as published by the ECB (National Bank Of Belgium, 2023). However, those banks need to consider proportionality, meaning that they need to account for their size when implementing those guidelines.

Section III: Empirical approach

1. Methodology

Research question

In the literature review, the focus was on the definition of climate risk, the current regulatory framework of the banks and the mechanisms that would facilitate integration of climate risk within the current and future regulations of the banking system. It has been established that capital requirements for banking institutions on climate risk are not mandatory but is an important discussion for the years to come.

To focus on this very wide and complex topic, we decided to create research questions. The aim of this approach is to target specifically the information needed to analyze and comment on. We were able to isolate two tropes on the subject. The empirical approach will then focus on the current state of climate risk integration and the possible evolutions of its regulatory process.

The research questions drawn were then:

- How is climate risk considered in the current banking regulation for regulatory capital and what are possibilities to better integrate it in the future?
- How is climate risk integrated into the risk taxonomy of some Belgian banking institutions?

Qualitative approach

Our approach to tackle this topic is qualitative, and we will start by answering our second research question: "How is climate risk integrated into the risk taxonomy of some Belgian banking institutions?" This will give an insight of Belgian banks' current integration of climate risk within their risk taxonomy and the possible tracks for improvement in the second part of our qualitative approach.

To address this very interesting and complex topic, we decided to analyze the 2021 reports of three Belgian banks and see what they are doing to tackle climate risk. The analysis of these reports will give us the state of the climate within the banking institution in Belgium and the different ways in which the banks deal with it. We will also analyze,

as far as possible, the reports for 2022, in order to have a better view of the changes that have taken place in the space of one year. Unfortunately, Degroof Petercam had not yet published its report when we carried out the analysis of the different bank reports. We decided to analyze the 2022 reports of KBC and Belfius because they are systemic banks and Degroof Petercam is a non-significant bank. Therefore, it has fewer means to implement measures to counter climate risk. Moreover, it seemed more relevant to use the latest reports, even if the one from Degroof Petercam is missing, because the evolution of climate risk analysis is very fast, and it is therefore preferable to focus on the latest information.

Chapters four and five aim to answer our main research question: How is climate risk considered in the current banking regulation for regulatory capital and what could the possibilities to better integrate it in the future? We will discuss the possibilities regarding the integration of climate risk within the capital requirement and talk about the complexity of creating a model. Furthermore, different proposals for implementing the climate risks within the capital of the banks will be assessed to better comprehend the feasibility of capital requirement regulations.

To help ourselves on this topic and to gather opinions from experts, we interviewed four people from the biggest audit and counselling firms, whose specialties are climate risk, banking institutions or both.

- An Schoovaerts: Executive Director in Sustainable Finance & CFO Consulting at EY
- Pietro Maiorana: Senior manager in Advisory in Risk management-ESG at KPMG
- Steven Mulkens: Executive Director in Sustainability Services at KPMG
- Thomas Eeckhaudt: Senior Manager in Sustainable Finance at Deloitte

The main source for the assessment of potential techniques of climate risk integration is "7 Proposals to integrate climate risk into capital requirements" (Chappuis Halder & co, 2020). It will serve as a basis for developing the different methods for integrating climate risk into bank strategy. However, this document does not cover all the methods for integrating climate risk, so we will highlight other methods and analyze which ones are the most suitable for banks.

2. How is climate risk handled by Belgian banks

In this section we will summarize and analyze the risk reports of different Belgian banks, those reports are the equivalent of the pillar III disclosure obligations. We will then compare the consideration of climate risk in the reports. We will focus on the analysis of the KBC report as well as the Belfius and Degroof Petercam reports.

We chose these three banks because they are Belgian entities and have similar mechanisms of reporting. Indeed, reporting within other Belgian banks such as Bpost Banque and AXA is not similar with a pillar III report separate from their annual report. KBC and Belfius are both systemic banks and Degroof Petercam is considered an LSI. The consideration to assess these banks is to use banks that treat climate risk differently and are in different states of climate risk integration.

2.1 KBC

2.1.1 Risk report 2021

Regarding climate risk, the report states that KBC has an approach with a double materiality, financial materiality (outside-in view) and environmental and social materiality (inside-out view). Meaning that KBC focuses on the effect of the climate risk on the activities of the bank and the effect of the bank on the climate.

Regarding the integration of the climate risk within the risk management framework, KBC, in 2021, reported that they were going to expend their current climate risk methodology to the other ESG related risks as the climate related risk are the most developed. However, since there is a lack of data-driven methodologies, KBC created a special “Data & Metrics” department within their Sustainable Finance Program. The aim is to find a more data-driven approach and to identify the “climate-related data needs”, to ensure a better management of climate-related data and a better reporting regarding those data.

The bank states that they try to fill the gap of the available data regarding the climate risk with their sustainable finance project. They also are trying to implement a longer-term dimension to risk management than the usual two-three years horizon. They are taking into consideration the fact that climate risks have a longer lifespan than more classical

risks. Hence the considerations for those risks are expanded in medium- and long-term assessments within the risk identifications, risk appetite and stress testing.

Risk identification

The risk identification is done by considering the eight carbon-intensive industrial sectors: energy, commercial real estate, agriculture, food production, building and construction, chemicals, transportation and metal. Those sectors are considered material both from a GHG perspective and from an exposure perspective. In 2021, the total outstanding loans to those sectors were equal to 22.5% of KBC's total loans outstanding.

Particular attention is given to the new products or services procured by KBC in order to stay adequate with the EU taxonomy and the International Capital Market Association (ICMA) green bond principles, which is an incentive to promote the investments that have positive outcomes for the environment. Hence, a sectorial heat map has been created by the bank to monitor more easily the climate risks within the sector concerned. The heat map's scope is not only contrived of the transitional and physical risk but also the other environmental matters such as the water pollution, waste, biodiversity and social risks.

KBC in 2021, also took the first steps of development of Internal Carbon Pricing (ICP). It is an approach using the estimated cost of carbon emissions and it is a metric that could help organizations to manage the climate-related risks. The Task Force on Climate-Related Financial Disclosures (TCFD) considers the ICP to be a key metric system to consider climate-related issues.

The bank also performs different stress tests, either internally or externally, to assess the potential impacts of the different extreme weather conditions. KBC uses the KBC Insurance model to create the reproduction of those impacts as the external brokers and vendor are used to this model. KBC is using third parties to better the capacity of identification and measurement of climate risks.

Climate risk impact map

In 2021, the bank also initiated the development of a climate risk impact map. It is designed to identify the most material climate risk drivers for the bank's portfolios and businesses. It reflects the different impact of both transitional and physical risks drivers. Those impacts are calculated based on the three scenarios of the NGFS, explained earlier in this thesis, as those scenarios were also the base for the ECB stress test in 2022.

TRANSITION RISK DRIVERS	
Policy and regulation	Introduction of policy changes/regulations to enable the transition towards a greener economy, e.g., an increase in carbon and energy prices, carbon taxes, reduction of emission rights, energy efficiency regulation for commercial and residential property
Technological change	Substitution of existing products and services with green alternatives based on new technologies, failure of/uncertainty surrounding new technologies
Consumer preference	Changes in customer behaviors and preferences, investor expectations, uncertainty in market signals, community perceptions of an organization's contribution to climate change, green competition
PHYSICAL RISK DRIVERS	
Temperature-related	Chronic temperature change, e.g., an increase/decrease in average and min and max temperatures in different geographical locations - Acute temperature events, e.g., an increase in frequency and severity of heat/cold waves, wildfires
Wind-related	Chronic wind-related changes, e.g., changing wind patterns - Acute wind-related events, e.g., cyclones/windstorms and tornados
Water-related	Chronic water-related changes, e.g., sea level rise, a structural increase/decrease in average rainfall, changing precipitation patterns - Acute water-related events, e.g., an increase in frequency and severity of acute floods (coastal, river, pluvial), droughts and hailstorms
Solid mass-related	Chronic solid mass-related events, e.g., soil degradation - Acute solid mass-related events, e.g., landslides, subsidence, erosion

Graph n° 9: Climate risk drivers as considered in KBC's climate risk impact map

Impact on risks

As mentioned previously, KBC does not recognize the climate risk as a separate risk but rather as a risk driver for the existing risks. Hence, the bank did a summary of the repercussion of climate risk for each of the risks.

For example, KBC identifies as key risk driver for the credit risk the transition risk as it can have an impact through the upcoming low carbon regulations and the reliance of companies on obsolete technologies, regarding those regulations. Hence, a significant impact on KBC's portfolios is expected because of this change in policies. The increased costs for the compliance with the technologies regarding those new regulations will, most certainly than not, impact credit quality. Furthermore, the companies in the sectors mentioned above might suffer from a loss of revenue due to the decrease in clients' numbers. For instance, the decrease in meat consumption in the agricultural sector might impact negatively on credit risk.

The physical risks are also considered key risk drivers for the credit risk. For KBC, the most relevant risk is the water-related climate risk. The disruption of activities and the possible damage to the clients' assets might create an increased default of payment probability. The most vulnerable sectors are the agricultural and real estate, either from floods or from severe drought periods. On the longer time horizon, if extreme physical risks materialize, the impact might echo on the health sector and the sovereigns and financial institutions in the countries that are most affected by the physical materializations.

The different risks are more likely to materialize in the different NGFS scenarios. Meaning that the transition risks are more likely to happen in the orderly scenario in the short- and medium-term periods. While the physical risks are more likely to stay under control in the orderly scenario, the probability of occurrence increases significantly in the delayed and hot house scenario. The hot house scenario would see devastating impacts due to the extreme weather conditions presumed.

Risks measurements

KBC performed stress testing and sensitivity analysis to identify weaknesses and blind spots as well as capital and liquidity adequacy. The climate drivers have been integrated within the different internal stress testing performed by the bank.

For their capital adequacy assessment, KBC did a reverse stress testing and added a specific climate risk scenario that was then split into two sub-scenarios:

- The first one focused primarily on the transitional risks in a disorderly scenario with disruptive policy actions. The stress test included the different impacts of such scenario considering corporate probability of default in climate-vulnerable sectors, write-offs on Small and Medium-Sized Enterprise (SME) exposures and lower property values.
- The second one focused on the physical risk in a hot house scenario with the “current policies” actions. The stress test was done with the same parameters as the first one with the addition of an increase in life and non-life insurance claims.

The tests concluded that the climate risk is a relevant and more and more important as driver of the other risks. However, it is not considered as an immediate threat to the bank’s capital adequacy. Indeed, the tests results were that KBC would be resilient enough for the worst-case scenarios of each test.

KBC affirms that they will enhance the different stress tests performed with additional data that will be available in the months or years to come. In 2021, the bank has already put in substantial efforts for the regulatory stress test performed by the ECB in 2022. The future stress tests performed by supervisory bodies will help further develop the internal climate risk stress testing.

Risk appetite

KBC has a well-defined risk appetite regarding climate-related risks and the bank already incorporated this appetite into its strategies, as it is explained in the climate report that

was published in September 2022. KBC evolves its strategies in synchronization with the internal and external strategic ambitions.

Regarding credit risk, the aim of the bank is to limit the impact of its activities on the environment and encourage positive impacts in its clientele. The exposure to non-sustainable activities will be decreased and the bank will in counterparty facilitate the transition towards a sustainable economy.

Risk analysis

The risk report concluded by stating that there will be a lot of changes in the following months or years. The legislative pressure will only increase for better management of climate-related risks. The main problem facing the banking institutions and their supervisors is the lack of granular climate-related data.

The several new ESG disclosures regulations that started to be put into place will gradually increase the different data collection in the coming years. The aim of the data collection is to steer the different portfolios of the banks to achieve compliance with those new regulations.

2.1.2 Risk report 2022

Integration in risk management framework

As for 2021, KBC does not identify climate risk as a separate risk but rather as a key risk driver of the other risks. In 2022, KBC considers more of the ESG risks rather than solely the climate risk. In this year's report, the bank will assess three different angles, from direct to indirect impacts.

- The direct impact through its own operations
- The impacts through their outsourced activities and suppliers
- The indirect impacts through their core activities and clients' exposures

Since KBC is a financial institution, most of their exposure to the ESG risks is indirect, through their core activities of lending, insurance and investment. As mentioned in the sustainability report 2022, KBC focused more on the other ESG aspects than climate-

related issues as it is the most developed regarding integration within the risk management frameworks. KBC are extending their climate approach to the rest of the ESG-related risks.

However, there is still a lack of data and standardized methods to qualify and measure those risks compared to the traditional risks. Substantive progress was made in the dedicated Data & Metric project. The implementation of the Pillar III requirement and the EU taxonomy are monitored and managed by this project.

KBC, in the same way as in 2021, took longer than usual periods when risk identification, risk appetite, stress testing and risk reporting for the transition and physical risks were assessed. The transition risk was more considered in the short- and medium-term risks while the physical risks were considered in the medium- to long-term risks.

Regarding the direct ESG impacts, more than one department is impacted by the direct impacts, such as the corporate sustainability, HR, facilities, compliance committee, risk, marketing & communications and complaints handling. However, the considerations for climate risk are very limited in the internal aspects.



Graph n° 10: Overview of main risk processes

Risk identification

Regarding risk identification, the main changes from last year are that KBC now takes into consideration the other ESG-related risks for the sectoral heat map and the new and active products process. KBC identifies the other ESG risks as drivers of the other risks. Hence, the methodology to incorporate them within their risk management framework will be similar to the one for climate risk.

The ICP established in 2021 is reviewed annually to ensure that it is still relevant. KBC uses the ICP mostly in the lending context for larger credit files, in order to better understand and assess the financial impacts of GHG intensive companies. The bank is currently performing further tests to identify further activities in which the ICP would be relevant to use. However, they do not disclose how the ICP is currently used.

Regarding the climate risk, both physical and transitional, there was no change to KBC's policies to use the different scenarios of the NGFS to make their strategies to tackle the climate risks. The three different scenarios allow the bank to make predictions with different market conditions.

Credit risk impact

Same as for 2021, the credit risk is split between transition and physical risk regarding climate. The transition risks are related to the changes in policies and regulations and do not depend on the bank. The strictness of those regulations will impact the clientele and the bank, increasing the cost for the transition to green energy for example. This will impact the credit quality. The most vulnerable sectors in KBC's portfolios are the eight sectors described earlier (building, real estate, agriculture, chemicals, energy, metal manufacturing, automotive and transport). The most probable physical risk is still the water-related risk. Either floods or periods of droughts are the principal key drivers of this risk within the bank's stress testing.

Credit risk	ST	MT	LT
Net Zero			
Delayed transition			
Current policies			

Graph n°11: Impact on credit risk according to the different scenarios of NGFS

Risk measurement

In 2022, KBC used different tools and methodologies to assess and identify transition risks for their lending, investment and insurance activities. They still use the double materiality to assess the effect of the transition on their activities and the effect of their activities on the environment.

The five tools or methodologies used by KBC are the following:

- The Paris Agreement Capital Transition Assessment (PACTA) measures the decarbonization of the portfolio of the bank to check if the transition targets are followed by the companies. The result of this exercise is that KBC is not exposed to companies that contribute the most to CO₂ emissions. Only 3.2% of the total portfolio of KBC's loan book is considered in the PACTA scope for the highest emitting companies.
- The use of the TRUCOST, which is a company who identify the impact of a company on the environment methodology to assess the carbon footprint of the aggregated investment products.
- In 2021 and 2022, the bank used the United Nations Environment Programme Finance Initiative methodology to assess the impact of the transition within the most relevant sectors by estimating the portfolio's expected losses. This exercise output gives important data to compute for the climate risk impact map.
- The bank calculated the financed emissions of the totality of their portfolio.
- Substantial progress in 2022 for the physical risk assessment for the loan and insurance portfolios.

All the data recovered from these different tools were used to produce the internal climate risk impact map and target setting. If needed, policies adjustments were made to better suit the targets set by KBC.

Stress testing

Regarding the stress testing performed in 2022, there were only a few changes made compared to 2021. For example, in the ICAAP and ILAAP stress-test made, the impact of climate change has been increased as the changes are felt earlier than anticipated. Indeed, Western and Central European countries have seen an increase in the frequency and severity of windstorms and floods. Furthermore, stronger EPC score regulations set out by multiple European governments create a downward correction in the housing market.

The bank's focus was mainly the short-term market shocks created by transitions risks impacts. Equity prices, equity volatilities, portfolios and credit spreads were selected as the most relevant because they have the strongest link with climate risks, however, the overall impact is considered immaterial to the portfolios.

KBC also participated in the 2022 ECB stress test, and the outcome of it is that KBC is never, within all the different scenarios projected by the ECB, in a capital inadequacy position. This further proves that KBC does not have a lot of exposure to the risk.

Risk analysis

Regarding the internal monitoring and reporting of the climate-related risks (and ESG-related), it has already been well implemented within the internal capital and liquidity adequacy assessments process. There also is an integrated risk reporting which gives indicators for risks and opportunities within the KBC Sustainability Dashboard, which is presented twice a year to the Board of Directors.

Regarding external reporting, KBC has multiple reports with different focus points. The sustainability report addresses how the company manages corporate sustainability and how the strategies are implemented. The targets are also described in a broader way, as they are more defined in the climate report.

The risk report 2022 is the Pillar III report and for this year's version, the EBA templates were used in the risk report. However, the basis for the data collection is on a "best-effort" basis which is not the most reliable source as it relies on proxy estimations.

2.1.3 Climate report

KBC is the only bank from the three analyzed that has a report regarding the climate separated from the sustainability report. The climate report was published in September 2022 and relates to the numbers of 2021. This report details the climate actions that the bank undertakes. The report gives, sector by sector, the current status of the climate impact, using the previous year as reference and 2030 and/or 2050 as targets.

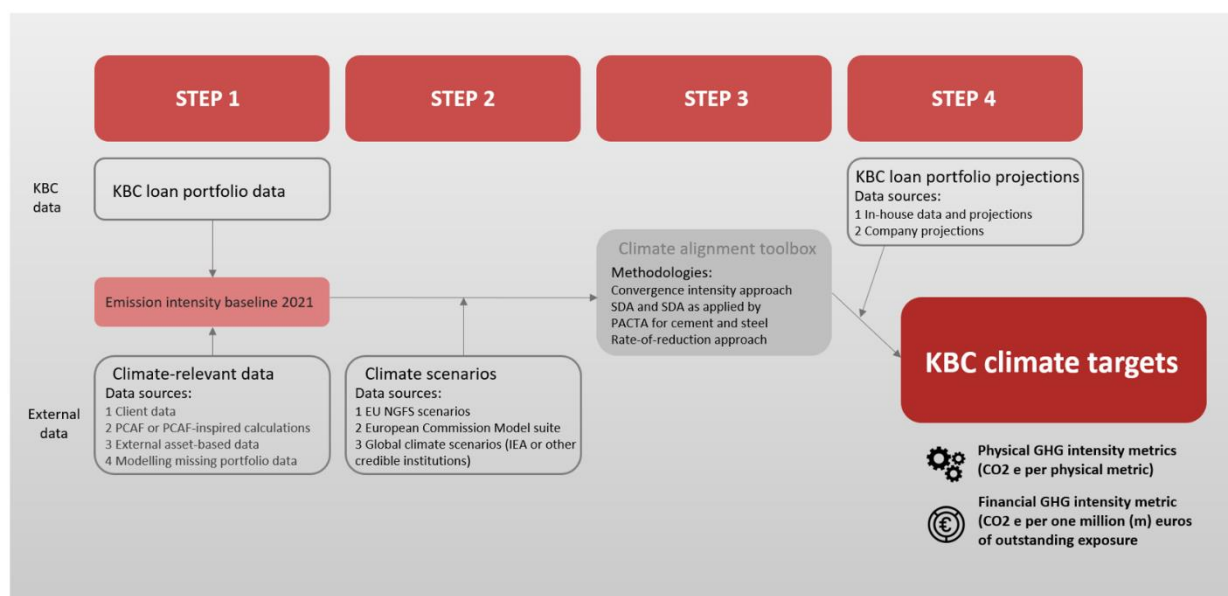
They also explain the actions they are to take in order to diminish the impact on the climate of the sectors that they finance. For instance, the Real Estate sector, which represents 47% of their outstanding loans and 12.5% of the GHG financed by KBC, will undergo a lot of changes internally to promote greener assets. The bank stated that they will promote and advise the possible subsidies for renovation of real estate with the purpose to increase the Energy Performance Certificate (EPC) score. A way to decrease the GHG in this sector for KBC is also to decrease the interest rate for higher EPC score habitation. The targeted goal for this sector is a diminution of 72% of the total emissions by 2050.

They also acknowledged that some data are not yet available to set out clear targets. The main sector affected by this is agriculture. Even though it represents only 3% of their portfolio, it represents 17% of the GHG financed by KBC, however, by the nature of the sector, clear targets cannot be set as it is not yet clear how this particular sector could reduce its emissions while keeping the same level of activity. The answer might be in funding alternative agricultural techniques such as carbon farming practices, however, the decision regarding this sector needs to be taken at a national level.

The KBC climate report is quite extensive on how the bank will address the different challenges in the different sectors that are at risk of going under a lot of changes due to climate risk. KBC, in the technical annexes, gave an overview on how the climate targets were set.

They input their internal data and their client's relevant data together, then using the different regulations and scenarios presented by the different authorities they create benchmarks to understand how the different sectors need to be decarbonized.

Using the convergence intensity approach, which is a method where the portfolio intensity target needs to be equal to the sectorial intensity target by the end of the period stipulated within the scenario used, they can project their data to their current portfolio to conceptualize what their portfolios will look like in the future. All these different data put together allows KBC to output climate targets by sector. However, they are aware that a lot of changes in regulations might cause their current targets to be underestimated. They stated that they are ready to recalculate their targets if new information is available.



Graph n°12: Methodology for KBCs climate targets setting

2.2 Belfius

2.2.1 Risk report 2021

At the governance level, the Board-level Risk Committee, Group Committee and Management Boards of Belfius are focused on monitoring climate-related risks. Belfius' intentions are to align with the expectations set by the European Central Bank guidelines. Even though Belfius has already invested in strengthening its sustainability team, the bank plans to strengthen its staff through training and acquiring new tools from external data and services providers.

When assessing ESG risks, Belfius always considers a double materiality. This means that the bank considers the impacts of climate change on itself, whether directly through its own operations, or indirectly through its financing, but also the impacts of Belfius on climate change.

Belfius has set up an ESG data program; this program aims to collect data on GHG emissions from counterparties and energy performance certificates from real estate assets. The gathering of these data will give Belfius more opportunities to create a methodology to better implement climate risk within its risk management framework.

For some years now Belfius has been developing a framework for better understanding of the climate risk. The key points of this framework are:

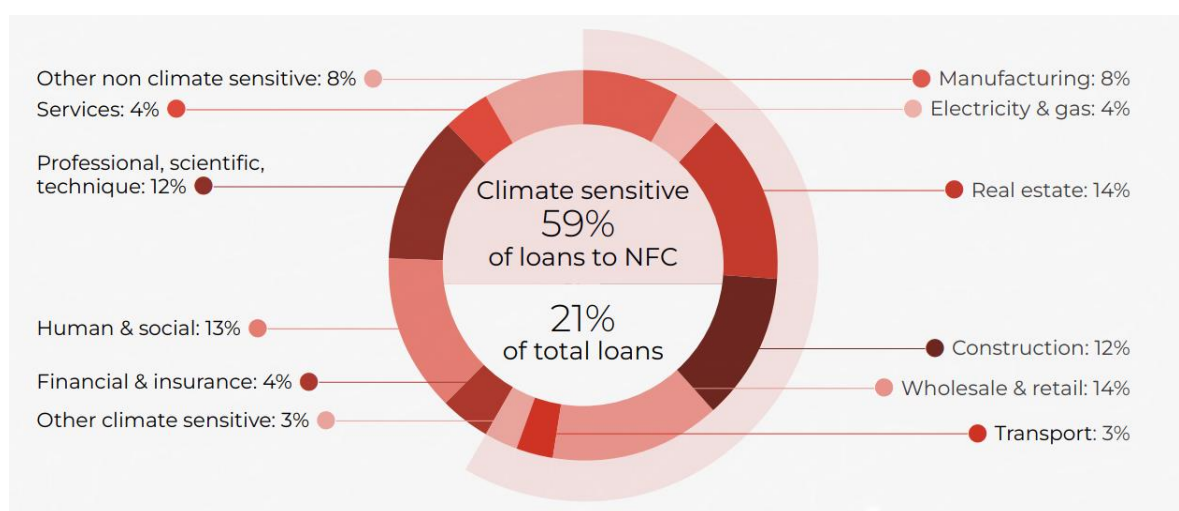
- Setting-up a specific ESG governance
- Continuously scanning the environment
- Raising awareness
- Foreseeing a good proactive regulatory watch
- Capturing granular data
- Having access to best-in-class resources and tools
- Sharing knowledge and best practices
- Engaging with stakeholders
- Improving the disclosures

Belfius' ambitions are clear, to align practices and plans with the expectations of the EU. Their set targets are slightly above the recommendations of the ECB to stay ahead of the minimum, but their aim is not to become best in class regarding climate risk.

In addition, Belfius has incorporated a Transition Acceleration Policy (TAP) which aims to eliminate controversial or sensitive sectors from the portfolio. The eight sectors are: tobacco, gambling, weapons, energy, mining, palm oil and soy, agricultural commodities but this will evolve in the future to include as many climate-sensitive sectors as possible.

Belfius is also working on strengthening its Risk Appetite Framework (RAF). The bank aims to gradually increase the number of key risk indicators to include the indirect impacts of the activities financed and to implement additional targets and limits.

Belfius assesses the materiality of its climate change risk in its portfolio. In order to measure the assets most vulnerable to climate change Belfius has developed heat maps in 2021. The results show that Belfius has a very limited exposure to sectors that are highly sensitive to climate change (e.g., agriculture and mining). Only 21% of the total loans and advances are related to sectors that are sensitive to climate risks. Not to mention that these sectors are quite large and that one could refine the calculations to identify the climate-sensitive loans and advances within these sectors.



Graph n°13: repartition of Belfius' portfolios

Belfius also tries to identify the percentage of fossil fuel exposure in its balance sheet. The bank estimates that it finances 1% of its balance sheet in fossil fuels, this is mainly due to a legacy from the Dexia era and will have to be kept to maturity.

In 2021, the bank had firsthand repercussion of the physical risk exposure, with the floods that happened in Wallonia in July 2021. The gross claim amount regarding Belfius clients was 181 million euros. The amount was seen as strongly mitigated thanks to a reinsurance program initiated in 2019 to counter the effect of climate change. This further proved the effect climate risk can have on banking institutions.

2.2.2 Risk report 2022

ESG strategy and framework

In 2022, Belfius is using a double materiality approach, with the financial materiality and the impact materiality. The financial materiality considers the impacts of climate change on the bank, while the impact materiality considers the impact of the bank on the environment.

Belfius created a “climate risk materiality matrix” assessing the impact within a time horizon of certain key risk drivers for both transition and physical risks. The different time horizons are short-, medium- and long-terms and coincide respectively with less than three years, between four and ten years and more than ten years. For example, a key risk driver of the transition risk is the regulations and policies change and the description of Belfius regarding this risk driver is “increase in cost of GHG emissions due to policy or regulatory changes (through carbon pricing mechanisms such as tax, quotas, etc.)” which will translate into “increased cost of emissions of customers” affecting the financing of activities of Belfius.

In 2022, the bank still operates its TAP, which means that companies that do not respect the United Nations Global Compact will not be able to become Belfius’ clients. This policy’s goal is to accelerate the transition to greener activities and to entice the sectors that are seen as pollutant to be more responsible for their activities. The TAP was further refined to exclude completely certain sectors, to allow others to have transitional arrangements and others if they have certain requirements within their companies’ policies.

Risk management framework

As the management of environmental and climate-related risks and opportunities is being implemented more and more within the risk management framework of the bank, Belfius decided to opt for a three-line defense model.

- The first one is the business line, which means that raising awareness for the employees and for the services they procure is the first aspect to work on to better the sustainability of the bank.
- The second one is the ESG Risk Competence Center, which goal is to create a comprehensive ESG risk framework. It has different tasks such as the development of Belfius' methodologies towards climate risk integration, providing general advice on climate-related matters and designing the overall ESG action plan.
- The third one is the internal audit that Belfius does to assess the level of compliance, readiness and performance of the bank on strategies, risk management, policies and governance.

Identification and assessment of risks

In order to correctly manage the damage of the climate crisis on the bank's activities, Belfius first needs to understand how to identify the climate risk drivers within each of the risks that the bank is facing. For instance, the bank assessed that the credit risk is going to be the risk that has the more chance of being influenced by the climate risk. The main driver of this climate risk is the physical risk through the possible floods in Belgium. The transition risk is also considered as a top driver for climate risk within the credit risk.

Belfius' internal stress test resulted in an average increase of risk cost of 15%, however, the risk is still considered limited as less than 12% of Belfius' assets are located in risks zone. The test also forecasted that the increase of floods and the better-informed buyers will create a permanent discount on those assets.

Belfius' opinion regarding their position on the ESG related risks and opportunities is that *in the context of significant expected macro- and microeconomic changes stemming from the transition to low carbon, climate-resilient and environmentally sustainable economy, its*

climate-aware business strategy and risk management framework combined with its robust balance sheet structure will ensure resilience and growth opportunities (Belfius, 2023).

Belfius is, according to the ECB stress test performed in 2022, amongst the best 40% banks in Europe regarding climate-related risks. However, the results need to be interpreted with caution as the global lack of data does not allow to give results other than sectorial. Furthermore, Belfius has very few activities within the highly emitting sectors and the majority of their portfolio is located in Belgium, which is considered by the ECB as limited risk regarding the physical risk.

2.3 Degroef Petercam

2.3.1 Risk report

Integration in the risk management framework

The action plan made in 2021 by the bank was the following:

- Conduct a first high level risk assessment as part of the April 2021 ICAAP
- Develop a first set of key risk indicators
- Incorporation in credit granting policies and processes
- Implement a Group climate-risk policy, which will evolve towards an ESG-risk policy
- Prepare the data requirements in order to conduct a more detailed risk assessment as part of the April 2022 ICAAP.

It is continued in 2022 to achieve certain goals:

- Using the ECB risk test methodology, creation of a risk assessment
- ESG risk disclosure as part of the Pillar III report
- Identifying more precisely the threats, risks and opportunities that grants the ESG risk if incorporated into the business processes.

Risk assessment

The Degroef Petercam risk report identifies climate risk as a transversal risk, which means that it is not assessed individually but as a global risk that impacts all others.

The bank separates climate risk into two distinct sources, physical risk and transition risk. The ICAAP performed by the bank concluded that, regarding the balance sheet and the business model, the bank was not materially exposed to climate risk, either physical or transitional.

Risk	Transversal climate and environmental risks		
	Physical risk	Transition risk	
Credit risk	Low	Low	Exposures are mostly in low vulnerability countries and sectors
Market risk		Low	Limited risk due to limited volumes and possession periods
ALM risk		Low	Exposures are mostly in low vulnerability countries and sectors
Liquidity risk	Low	Low	Limited impacts on both the asset and liability sides of the balance sheet
Operational risk	Low	Low	Limited physical risk given the nature of the Bank's activities, location and premises. Transition risk has been assessed on the basis of reputational impact resulting in loss of customers.

Table n°2: Impact of climate risk on the other risks

An exercise was performed by Degroof Petercam using the scenarios taken from the ECB stress test. The parameters used were considered as worst-case scenarios such as reduced revenues on equities and outflow of clients due to reputational impact. The result of this test was that the bank would still be above the regulatory requirements regarding their solvency ratios.

Regarding risk disclosure, the bank will follow the evolution of the regulations mainly the CRR, the CSRD and the EU taxonomy.

Risk Exposure

Degroef Petercam took the data from the ECB climate stress test of 2022 to create a summary table of the different sectors that are at risk. They are grouped by their sensitivity to the risk in the case of the disorderly scenario.

Sector	Sensitivity to a disorderly climate transition	Sector description
B05-B09	High	Mining (etc)
C19	High	Manufacture of coke and refined petroleum products
H49	Medium	Land transport and transport via pipelines
D35	Medium	Electricity, gas, steam and air conditioning supply
C23	Medium	Manufacture of other non
C24-C25	Medium	Manufacture metal
H51	Low	Air transport
G45-G47	Low	Wholesale trade
C20	Low	Manufacture of chemicals and chemical products
E36-E39	Low	Water
L68	Low	Real estate activities
C10-C12	Low	Manufacture food & beverage
c30	Low	Manufacture motor vehicles & transport
H50	Low	Water transport
C26-C28	Low	Manufacture electronics & elec equipment
F41-F43	Low	Construction buildings & civil engineering
C21-C22	Low	Manufacture pharmacy & plastic
A01	Low	Crop & animal production
A02-A03	Low	Agriculture (forestry etc)
H52-H53	Low	Support activities for transport & postal services
C13-C18	Low	Manufacture (diverse)
C31-C33	Low	Manufacture furniture, machinery, etc.

Table n°3: Sensitive sectors summary table as from the ECB

The bank compared the sectors of their clients and portfolios to assess the risk exposure of their activities.

Their lending activities are not exposed to the risk as the majority of their clients, 56%, are individuals, hence they are not applicable within the risk exposure. Further than that, the bank did not lend any capital to companies that were considered in the high sector of the table above, and only 1% of their lending was to sectors that have a medium sensitivity.

For their bond portfolio, the bank's policies are to not invest in securities in high carbon-intensive sectors or activities that are clearly detrimental to the environment. Only 3% of the total portfolio of Degroof Petercam is invested in sectors that have high sensitivity to the disorderly scenario and 6% is invested in sectors that have medium sensitivity. Hence, the vast majority of the portfolios of the bank are not exposed.

Regarding the physical risk exposure impact on the lending activities in a disorderly scenario, the bank only has 1% of lending that is exposed highly to the risk of flood. However, the bank has 49% in medium risk exposure, which is quite high, as it means that 50% of the lending activities is exposed to medium flood risk exposure.

Methodology

The different scenario analysis performed by Degroof Petercam was made possible using the events occurring in the bank, its environment, its competitors and by following the recommendations and regulations of the supervisory entities. The ECB stress test performed in 2022 allowed the bank to better identify the data required and the methodology for the scenarios.

The exposure measurements were performed via quantitative and qualitative assessments. Degroof Petercam combines a lot of different information such as location, credit purpose and real estate efficiency scores to determinate the risk exposure.

3. Comparison of the climate-related risks methodologies

Before comparing these banks together, it is important to point out their size. Belfius and KBC are amongst the four largest banks in Belgium and Degroof Petercam is considered a smaller bank. In 2021, KBC was considered the second largest in Belgium, Belfius was the third and Degroof Petercam was the seventieth (TheBank.EU, Retrieved March 1 2023). The size of the banks is an important aspect in this comparison to understand better the potential resources that a bank has at its disposal.

In million euros	KBC ¹	Belfius ²	Degroof Petercam ³
Total income in 2022	355,872	179,466	71,100
Total assets in 2022	8,463	2,982	559

Table n°4: Banks' size comparison

Each of the three banks have integrated climate risk within their risk management framework. It is then interesting to compare the approach KBC, Belfius and Degroof Petercam took to tackle this risk. We separated the 2021 report and the 2022 to compare more easily the steps which the banks went through. Degroof Petercam did not publish a 2022 risk report yet, however, they already disclosed in their 2021 risk report the initiatives they aimed to take in 2022.

Furthermore, it needs to be noted that making a comparison between the different reports is quite arduous. Indeed, even though the banks must follow the Pillar III disclosure obligations, the lack of a general model can be felt in the inconsistency of the information given. Hence, a comparison between the banks using the exact same information is impossible.

¹ KBC. (2023b). *Risk Report 2022 KBC Group*

² Belfius. (2023a). *RISK REPORT 2022*

³ Degroof Petercam. (n.d.-b). *Annual report 2022*

To try and categorize their climate risk methodologies as much as possible, six categories were used:

- Risk recognition: does the bank recognize the climate risk?
- Risk identification: how does the bank identify the risk?
- Risk assessments: what tools does the bank use to measure the risk?
- Risk mitigation: what does the bank do to diminish the risk?
- Risk strategy: what is the goal of the bank regarding the risk?
- Impact on other risks: how does the bank consider the risk compared to the other risks?

3.1 Risk report 2021

	KBC	Belfius	Degroef Petercam
Risk recognition	Yes	Yes	Yes
Risk identification	- Distinction between transition and physical risk	- Distinction between transition and physical risk	- Distinction between transition and physical risk
Risk assessment	- Internal and External stress tests to assess the impacts - Use of the Insurance model for more precise estimation - Financial stability - Stress test performed with transition risk in mind (orderly scenario) - Creation of a climate risk impact map, to identify the material risk drivers - Use of the three scenarios of NGFS to forecast the impact - Measurements done for short, medium and long terms - Use of double materiality	- Materiality assessment of activities in climate sensitive sectors - ECB stress test (in 2022) - Heat maps to detect exposures of the sensitive sectors to the climate risk - Use of the green asset ratio - Use of double materiality	- Internal stress test using the methodology of ECB stress test - Comparison of portfolios and sectors that are at risk - Use of location, credit purpose and EPC score for measurement of the risk
Risk mitigation	- Internal Carbon Pricing method is starting to get developed - Consideration of the 8 more sensitive sectors - Sectorial heat maps with considerations for physical and transition risk	- Creation of the Transition Acceleration Policy (TAP) - elimination of 8 sectors that are considered controversial or sensitive	- No investment in high GHG emitting sectors
Risk strategy	- Risk appetite strongly linked to the strategies - Exposure to non-sustainable activities will be decreased - Towards green energy transition - Targets are stricter than ECB recommendations	- Strategies and risk appetite to be in line with the ECB regulations - RAF enhanced with ESG related risks	- Risk appetite is weak for climate risk as most of their activities are not in scope for measurement
Impact on other risks	- Climate risk is identified as a risk driver	- Climate risk is identified as a risk driver	- Climate risk is identified as transversal risk (risk driver)

Table n°5: Risk report 2021 comparison

KBC

For 2021, the observation that can be done is that KBC is far ahead of the other banks on the Climate risk matter. Indeed, they already have implemented within their risk management framework climate risk with a diverse set of stress tests. Furthermore, they are developing different tools to better assess and integrate the climate risk. The main goal for the development of these tools is to better identify the risk, its origin and potential impact on the bank's activities. KBC already uses the double materiality, which will become mandatory under the CSRD.

KBC already incorporated the climate risk within different stress tests to assess the current state of their capitals and liquidities and observe the impact that the different climate risk will have to see if they have enough securities to withstand the risk. It can be noted that that KBC's policies are stricter than the recommendations of the ECB, which shows real devotion to the greening of their system.

Belfius

Belfius' strategy regarding the integration of climate risk is mainly to use the sectors that are considered at risks and to assess whether the bank is exposed to these sectors in their activities. Through the TAP, they aim to promote the transition to green energy. The different tests realized by Belfius are way less developed and not as numerous as for KBC. Belfius also uses the double materiality in its risk assessment.

The results of these tests are then analyzed to assess their materiality in the bank activities. Their global strategy and risk appetite is to be on par with the ECB recommendations, which denotes an involvement in the climate risk matter, but their aim is not to be leader in the subject.

Degroof Petercam

As for Degroef Petercam, their climate risk management framework is weaker than the other two banks. Their methodology for the implementation of climate risk is mainly taken from the ECB stress test. They also used the sectors that were the most sensitive to climate risk exposure and assessed their own exposure to the risk considering their portfolios. It is the only bank to not use the double materiality, however, in their annual

report 2022, they stated that they will use the double materiality as it will become mandatory in the new reporting directive.

As the bank is a smaller entity than the others, it is expected to have a less refined approach as they do not have the same structure and resources to allocate to climate risk management. Hence, they took the framework given by the ECB to assess the risk in the stress test. Furthermore, Degroof Petercam has very minimal exposure to climate risk as most of their activities are not in the most sensitive sectors.

3.2 Risk report 2022

	KBC	Belfius
Risk Recognition	Yes	Yes
Risk Identification	- Distinction between transition and physical risk	- Distinction between transition and physical risk
Risk Assessment	- Internal and External stress tests to assess the impacts - Use of the Insurance model for more precise estimation - Stress test performed with transition risk in mind (orderly scenario) - Stress test performed with physical risk in mind (disorderly and hot house scenario) - Increased climate change impact on all tests - ECB stress test - Assessments of market shocks impact due to short-term transition risk - Calculation of Carbon footprints of aggregated investments - Portfolios expected loss on the most relevant sectors - Double materiality	- Participation in the ECB stress test - Internal Stress test performed on the physical risk (emphasis on floods) - Internal stress test performed on the transition risk (emphasis on policies change) - Use of the Belgian zones that are at risk to identify the exposure - Climate risk materiality matrix to measure the potential loss - Use of the three scenarios of NGFS to forecast the impact - Measurements done for short, medium and long terms - Double Materiality
Risk Mitigation	- Internal Carbon Pricing method is more developed - Sectorial heat maps with considerations for physical and transition risk - ECP score for Real-Estate market - Consideration of the 8 more sensitive sectors - No new client from sensitive sectors except for green transition	- Climate risk materiality matrix - Through the TAP, elimination of sectors and refined policies for companies in sensitive sectors
Risk Strategy	- Risk appetite strongly linked to the strategies - Exposure to non-sustainable activities will be decreased - Towards green energy transition - Targets are stricter than ECB recommendations	- Strategy in line with the ECB recommendations - Further improvement in the RAF
Impact on other risks	- Climate risk is identified as a risk driver	- Climate risk is identified as a risk driver

Table n°6: Risk report 2022 comparison

2022 was an important year for the development of climate risk within the different banks. Indeed, the ECB stress test performed in early 2022 allowed banks to better assess their climate risk management framework and compare their approach to the other banks. For example, Degroof Petercam incorporated the scenarios used in the Stress test into their own risk management framework. Giving this smaller bank, when compared to the other two, a basic methodology and approach to implement climate risk within their risk management framework (Degroof Petercam 2021,n.d.-a; p77).

KBC

KBC strengthens its position as best of the class in 2022 as they further improve their methodology and tools to incorporate the different aspects of climate risk within their activities. KBC is ahead of the two other banks, especially in their risk assessment and stress tests performed. Indeed, where Belfius and Degroof Petercam improved their global methodology thanks to the ECB stress tests results, KBC used those results to improve their already existing stress tests.

Belfius

Belfius, in 2022, performed more internal stress tests regarding climate-related risks than previously. They performed tests using the transition and physical risks as main drivers. They used the ECB recommended methodology for the scenarios within their stress test to assess their exposure. For example, in their short-term stress test, they mainly considered the flood risks and regulations changes. This approach is clearly an added value to their methodology when compared to 2021. (Belfius, 2023a, pp.105)

3.3 In-depth analysis of the reports

We will perform an in-depth analysis of the risk reports of the three banks. This analysis has the purpose of comparing the treatment of climate risk within the three banks. We will first count the number of occurrences of certain expressions in the reports. The objective of this method is to observe and compare whether banks treat climate risk differently. Indeed, even if this method does not prove the quality of the information provided in the reports, it does allow to see to what extent each bank addresses the key issues of the implementation of climate risk in their risk management strategy. This table is therefore to be used as an indication.

	KBC		Belfius		Degroof Petercam	
	2022	2021	2022	2021	2022	2021
Climate risk	76	61	50	19	Not available	8
Physical risk	82	22	16	5		6
Transition risk	45	22	13	7		6
Risk driver	21	14	18	6		2
CSRD	4	2	0	0		1
ECB Climate stress test	3	4	8	4		5
Flood	44	12	30	10		1
Droughts	14	5	1	1		1

Table n°7: Expressions usage in risk reports

When looking at the use of expressions linked to ESG and climate, we can observe that KBC, even in 2021 was far ahead of the other banks. As they mentioned the selected expressions more than the most recent risk report of Belfius. We can observe an improvement of the consideration for physical risk, transition risk and risk driver denoting a deepening of the climate risk classification.

We can also observe that KBC and Belfius both take very seriously the flood risk, and from what transpired in their reports, it is their main way of assessing the risk exposure for the physical risk. However, the drought risk seems to be only recognized by KBC, as

Belfius and Degroef only mentioned it once in their report while KBC mentioned it 14 times. This can be explained by the fact that KBC has assets in Eastern Europe where droughts periods are more likely to happen.

As mentioned previously, Degroef Petercam and Belfius saw the ECB climate stress test performed by the ECB as a great step forward as they mentioned the test more often compared to KBC. This further proves the point that KBC did not consider the ECB stress test as useful for their climate risk integration as the other two banks.

The most peculiar remark to be made concerns the lack of mention of the CSRD from Belfius in both of their reports. This is particularly odd as the bank uses the double materiality assessment, and it will become mandatory under the CSRD. Even if the directive will only be made mandatory as from the first of January 2024, KBC already takes into account some of the regulations that will be necessary and even Degroef Petercam mentions the fact that they will have to evolve their internal reporting information to stay within the requirements of the CSRD.

3.4 Similarities between the reports

Through these reports, and even though the banks are in different stages in the climate risk integration process, there are already some common grounds for the treatment of climate risk within those three banks. Those similarities are what will render possible the creation of a model, once enough data is processed.

Banks recognize that climate change is one of the most important challenges facing society and the economy, and that it poses direct and indirect risks. Banks identify the risk of climate change but also other environmental degradation such as biodiversity loss, water stress, pollution and waste.

Banks divide climate risk into financial and environmental materiality.

- The financial materiality relates to the negative consequences of climate on banks' assets; it includes transition risk impacts such as asset revaluation, market volatility and credit loss related to so-called "brown" assets, i.e., assets resulting from the financing of obsolete technology or infrastructure (e.g., coal mines). There is also physical risk, which manifests itself, for example, in the increase in claims related to losses under the insurance policies that banks have purchased.
- The second materiality is environmental and social materiality. This view is based more on the external impact of banks on the climate.

These indications are found in the reports of KBC and Belfius but are not much developed in the report of Degroof Petercam. This is logical because the size of the reports is not at all the same, just like the banks. It can be observed that KBC is investing more in the design of its reports.

The selected banks do not identify ESG risk as a risk in its own right but rather as a driver (transversal for Degroof Petercam) of other risks. Which means that they tackle the climate risk within the other risks, such as the credit risk. The three banks separate the climate risk between physical and transition risk.

KBC, Belfius or Degroof Petercam have conducted climate risk assessments to identify physical and transition risks associated with climate change. KBC and Belfius have developed scenarios over different time horizons (short, medium and long term) to

assess the potential financial impacts of these risks on their operations and clients over a longer term than what is usually forecasted.

All selected banks comply with the TCFD. The TCFD was created by the Financial Stability Board to develop recommendations for more effective climate-related financial disclosure. The report provides guidance on how companies can disclose climate-related risks and opportunities in their financial filings. The working group structured its recommendations around four main thematic areas that represent critical elements of how organizations operate: governance, strategy, risk management, metrics and targets (Task Force on Climate-related Financial Disclosures, 2017).

Another point that the Task Force addresses is that organizations describe the resilience of their strategy, considering different climate-related scenarios. KBC and Belfius are both paying particular attention to this by setting up a scenario analysis. The selected NGFS scenarios correspond to the three scenarios also selected by the ECB for its 2022 climate resilience test.

However, Belfius announced that "climate scenarios will gradually be embedded into the internal stress tests for the financial planning process as well". It appears that Belfius is at a less advanced stage than KBC in developing climate risk scenarios.

Degroof Petercam also assures that it performs scenarios "based on events observed in Degroef Petercam, its environment or its competitors while incorporating market practices or supervisory requirements".

3.5 Assessment of selected banks involvement in climate risk

It is extremely difficult to classify each bank's involvement in climate risk, as each bank uses different tools and strategies to identify and manage its climate risk.

Furthermore, when looking at the report's level we do not have access to all the banks' internal data. This makes it difficult to compare banks. However, with the new CSRD, the reporting obligations should level the playing field of the banks and the report should be more comparable than this year.

We can notice that KBC has a much more proactive approach than Belfius or Degroof Petercam. Indeed, the earliest is, as mentioned previously, the only bank of the three to have a separate climate report which denotes a particular involvement with climate risk and the plethora of information available on all climate matters of the bank shows that the bank truly incorporate the climate within its strategies and its core business model. We can safely assume that KBC is considered as best of the class regarding climate risk integration. Our interviewee An Schoovaerts believe that KBC is the most interesting bank in Belgium regarding climate risk. KBC's role within climate risk integration is to be the leader, especially when considering Belgian banking institutions.

Belfius, on the other hand, has for current strategies to be within the recommendations of the EU. Though they are above the required threshold regarding green investments and other regulations of ESG, it transpires from their sustainability report that they will not try to set targets above what is required. The role Belfius plays in the development of climate risk within banking institutions is to bring granular data to create a general model as they do not seem to be the more proactive towards climate risk.

Degroof Petercam is more complex to assess as it is the smaller banks of the three, it is only logical that their climate risk management is much less developed than the other two banks, however, it transpires that the bank is only tackling the climate risk with the other ESG risks. Meaning that, they are investing and moving their portfolios to sustainability funds but only because of the market shift and not a particular willingness to address sustainability. Furthermore, the bank would only have limited exposure to climate risk, as it is currently assessed.

3.6 Conclusion

The comparison between KBC, Belfius and Degroof Petercam gave insight into the treatment of climate risk within different Belgian banking institutions. Even though these banks are different in size and activities, they have acknowledged that climate risk represents an increasing risk for the banking system, and it needs to be addressed.

In a general manner, the banks recognized that climate-related risks are drivers for the other risks, hence the implementation within their risk management framework is a complex task. The banks used projections of the scenarios used by the ECB in their Climate risk stress test to assess their exposure to climate risks. This stress test proved an important step forward for Belfius and Degroof Petercam as they used ECB's methodology as primary source of stress testing within their organization.

The three banks identified that the two most important risk drivers are the policy changes and the flood risk for the transition and physical risk respectively. The banks assessed the exposure of their assets and portfolios to these risks to identify the risk and whether it was material for the bank or not. The three banks had the same conclusion, their risk exposure regarding these risk drivers is not material. Thus, climate risk is not considered a direct threat and does not require additional buffers to be put in place.

However, what transpired through all the reports was that there is a lack of granular data to process the climate risk in a more modeled approach. The banks are currently identifying the risk on a case-by-case basis and assessing their materiality to their total assets and portfolios. The data they have is not sufficient to determine the global impact of climate risks on their activities.

The data collection of the next years will be important in the integration of climate risk within the risk management framework of the banks. When comparing the report of 2021 and 2022, we can observe that there is already great improvement in risk identification and assessment. However, no initiatives or tests for implementation of climate risk within capital requirements were disclosed in the reports.

The CSRD will certainly play an important part in the development of a model that all the banks will be able to use. Since KBC has already a well-developed climate risk integration it could be used as a benchmark for Belgian banks to use.

Through Degroof Petercam, we could observe the importance that the bigger banks, in this case the systemic banks, have in the implementation of climate risk. It is indeed the results of the stress tests performed in all the systemic banks that gave their methodology to Degroof Petercam. LSI or their regulators, in this case the NBB, would not have the resources necessary to develop efficient and globalized methodology for climate risk management. Meaning that, the implementation of climate risk within the different risk management frameworks will begin with the larger banks.

4. How to integrate climate risk in the regulatory capital of banks in the future

4.1 *Why is climate risk so difficult to integrate into bank regulations?*

As discussed earlier, it is extremely difficult to implement climate risk into banks' regulatory capital. Indeed, the predictions of this risk are very difficult to evaluate because it depends on many factors.

- **Time scope:** some climate risks may also materialize beyond a bank's traditional capital planning horizon (two or three years), but within the horizon of longer-term positions. Moreover, it is not easy to use the available data to make predictions. The evolution of climate change is highly uncertain, particularly regarding the frequency, intensity and impact of extreme weather events. It is therefore difficult to accurately model the potential financial impacts of climate change on banking activities. Based on the nature of the risks, it is much more difficult to take past figures and make a projection on them, as can be the case with credit risk.
- **Data availability:** there is uncertainty about future emissions. The amount of greenhouse gases that will be emitted in the future is uncertain and depends on a range of factors, including population growth, economic development and technological innovation. Without knowing the amount of greenhouse gases that will be emitted, it is difficult to accurately predict the evolution of the climate and even more difficult to predict the impact of this evolution on the banking sector. Furthermore, predicting climate risks is also difficult because it depends on human behavior. The amount of greenhouse gases we will emit in the future depends on political decisions and individual choices. These factors are difficult to predict with certainty, making it difficult to accurately assess future climate risk. This is why many organizations use stress tests with different scenarios to analyze climate risk.

- **Know-how:** ESG risks are often complex and interconnected. They can have direct and indirect impacts on banking activities, and even more widely on national and global economies. This makes it difficult to accurately model these impacts and understand the interconnections between different risks. Since climate risk is seen as a driver that will have an impact on other risks, it is even more difficult to isolate it and calculate its own impact. Furthermore, the data required to create these models are not yet known, meaning that there is still no globalized instructions for ESG risk integration.

In addition to these factors that make climate risk modelling more complex, there are factors related to the decision-makers in the banking sector.

Indeed, there is resistance from the banking industry. An increase in regulatory capital would automatically imply a decrease in the profitability of banks. This is why banks are generally opposed to the regulatory changes that involve further capital requirements.

In conclusion, uncertainty and complexity make the implementation of climate risk in regulation difficult. However arduous the implementation of a more global climate risk approach may seem, banks and every other company will have to adapt and respond to the current climate crisis. The 2050 objective set by the Paris Accord will force the integration of climate risk within the banking institutions, one way or another. The question is whether the banking institutions and their regulators have the capacity to absorb the quantity of data necessary to create a functioning model to tackle the climate risk before more drastic measures are put in place or before we fall into the disordered and hot house scenarios.

4.2 Seven principles to integrate climate risk into capital requirements of banks

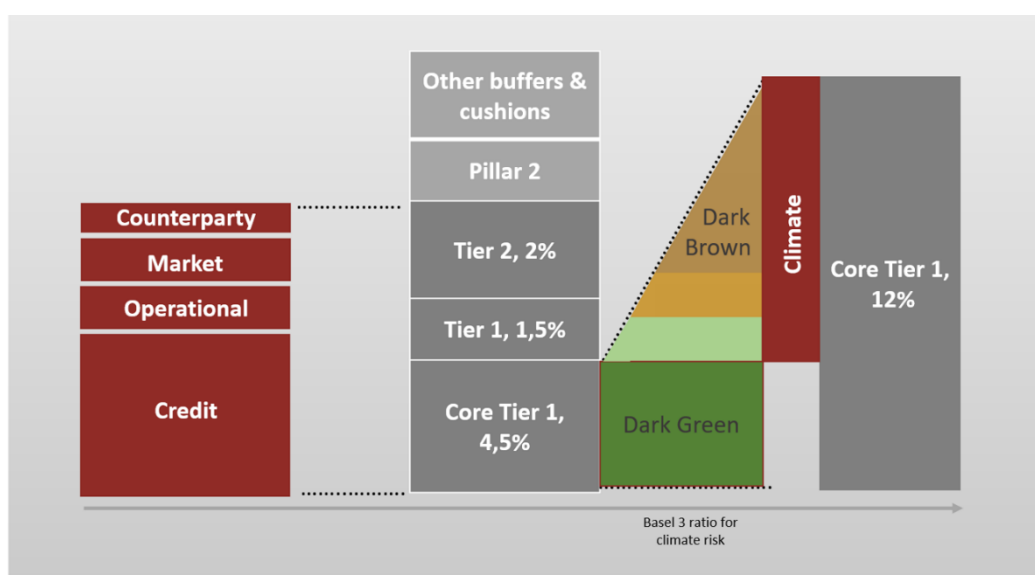
The Global Research & Analytics CH&Co has published a document including seven principles to integrate climate risk into capital requirements of banks (Chappuis Halder & Co.,2020). This paper will serve as a basis for discussing some of the steps that could be taken to integrate climate risk into banks' regulatory capital.

1. The most obvious approach to implementing climate risk into banks' regulatory capital is to require banks to hold additional capital buffers for climate-related financial risks. This would ensure that banks have sufficient capital to absorb losses that may arise from these risks. By having additional buffers, the banks would be more resilient towards the different risks. However, the downside is that banks will lose a lot of investment capital, resulting in a poorer result for the banking institutions.
2. Another proposed guideline is to create a climate stability fund financed by the banks. It would be supervised by the competent banking authorities and central banks. A proportion of the capital provided to cover the climate risk would be injected directly into this fund.
3. This Climate Stability Fund created with the capital of each bank could then be used to help banks absorb unexpected losses on “green” and “transition” financing. This would push the banks to accelerate their transition and promote a more sustainable economy. This would work like an insurance for the banks towards the climate transition risk, allowing banks to transition more easily to a greener portfolio while diminishing the risks.
4. The fourth principle aims to make the regulatory capital portion of Pillar I of the Basel Accords evolve according to a factor α . This factor would incorporate climate risk as it is based on a calculation linked to the indexed Representative Concentration Pathways (RCP) 4.5 ratio. The RCP 4.5 is one of the RCP developed by the IPCC. This ratio is intended to project future greenhouse gas concentrations and their effects on the earth's climate system over the long term. RCP 4.5 can be considered as an intermediate emission mitigation scenario, compared to the other scenarios listed in the table below (Detlef Et Al. 2011).

Scenario Component	RCP2.6	RCP4.5	RCP6	RCP8.5
Greenhouse gas emissions	Very low	Medium-low mitigation Very low baseline	Medium baseline; high mitigation	High baseline
Agricultural area	Medium for cropland and pasture	Very low for both cropland and pasture	Medium for cropland but very low for pasture (total low)	Medium for both cropland and pasture
Air pollution	Medium-Low	Medium	Medium	Medium-high

Table n°8: Main characteristics of each RCP

5. The fifth principle is the implementation of a regulatory ratio based on the asset color. The mechanism behind this principle is quite simple but the realization is more complicated. Banks would have to incorporate a climate ratio within their capital requirement, and this ratio would be a variable one. The variance proposed in this paper would be that the greener asset have a ratio of 4.5% of Tier 1, as it is currently under Pillar I, while the brown assets would have a ratio of 12% Core Tier 1 to counterbalance the risks linked to the color of the asset.



Graph n°14: Implementation of a regulatory ratio based on the asset color

6. The sixth principle is the isolation of the potential climate crisis effect on the credit risk. The way to proceed would be to identify the Risk Weight of the climate effect, in order to integrate it within the credit risk formula. Climate risk weighting must include climate effects on credit risk levels. For example, by increasing the level of PD or LGD. The calculation is more detailed in the following proposal.

7. The last principle is tied up to the previous one. The review of the Asymptotic Single Risk Factor (ASRF) model to better integrate the climate risk. Although banks are encouraged to use credit risk models that best suit their risk management, the BCBS proposes a model called ASRF that calculates a conditional expected loss (Basel Committee on Banking Supervision, 2005). To calculate this conditional expected loss, a calculation is proposed which is equivalent to multiplying a PD, which describes the likelihood that a debtor will default, and a LGD parameter, which describes the loss rate on the exposure in the event of default.

The seventh proposal is therefore to implement the climate factor in the formula at the level of the PD and LGD. The seventh principle therefore aims to implement the climate factor in the formula at the level of the PD and LGD. According to the paper, the correlation restrictions should be removed (currently limited to 12% and 24%). The methodology should be revised to incorporate a correlation matrix by sector and by country. Moreover, this proposal also aims to reduce the confidence level in the formula. In fact, the Basel Committee has added to the formula a confidence level set at 99.9%, i.e., an institution is supposed to suffer losses that exceed its level 1 and level 2 capital on average once every thousand years. The seventh proposal aims to reduce this rate as it also protects against estimation errors, which could inevitably result from the internal estimation of banks.

$$\begin{aligned}
 & \textbf{RW}_{climate} \\
 = & \left[\boxed{LGD_{climate}} \times N\left[\frac{1}{\sqrt{1-R}}\right] - G(\boxed{PD_{climate}}) + \sqrt{\frac{R}{1-R}} \times G(\boxed{0.9993}) \right] \\
 & - \boxed{PD_{climate} \times LGD_{climate}} \times \left(\frac{1 + (M - 2,5) \times b(PD)}{1 - 1,5 \times b(PD)} \right)
 \end{aligned}$$

Graph n°15: RW climate formula

5. Discussion on the integration of climate risk into banks' regulatory capital

The document with the seven principles summarized above provides guidance on how to integrate climate risk into regulatory capital in the future. Even if it does not cover all possibilities, it remains a good basis to explain some solutions. An evaluation of each proposal to try to find out which ones will be the most appropriate to deal with climate risk for banks in the future.

5.1 Integration of climate risk through regulatory capital and first Pillar

As observed in the analysis of the banks' reports and the interviews conducted, banks generally consider that climate risk is a driver of other risks because it has a global impact, and it is therefore extremely difficult to isolate its impact. Hence, the idea of integrating climate risk within capital requirements by additional buffers is not viable for the short-term projections of climate risk.

As discussed in the section on the difficulties of integrating climate risk into bank regulations, certain factors make it difficult to model the risks. In these circumstances, how can banks be required to hold regulatory capital to cover climate risk? In the paper "The challenge of capturing climate risks in the banking regulatory framework: is there a need for a macroprudential response?" (Baranović et al. 2021), the ECB admits that some of the principles and methodologies underlying the Basel Pillar I framework may not be valid given the difficulties in capturing the impact of climate-related financial risks.

Given the historical methodology of adding buffers and capital requirements to create globalized models, structural changes to the first Pillar will probably have to be undertaken in the longer term. However, banks will need to accumulate granular data to quantify the key drivers of physical and transition risks within their current model before implementing capital requirements.

Except for the current lack of data, another issue is the know-how for pillar I integration. Indeed, there are two approaches for these integrations based on the categorization of climate risk. If climate risk is identified as a separate risk, further capital and buffers would be requested from the banks. A more suitable integration as a separate risk would be, as in the fourth principle, to consider climate risk as a factor that would evolve over

time. The benchmark for changing this factor could then be the global temperature rise or the total GHG emissions. This would make climate risk integration more flexible.

However, as is the case with the analyzed banks, climate risk is to be considered as a risk driver of the other risks. Meaning that if there is an integration of climate risk within pillar I, the risk should be considered as a factor for the other risks, and it should influence each risk interdependently depending on the exposures of the banks. Hence, the difficulty is to isolate the climate risk and quantify it in each of the different risks.

5.2 Integration of climate risk via ratios based on the asset color

Regarding the colorization of the assets, the Bank of England's view is that regulatory capital regulations should be used only to cover risk and not to support greener finance (UK Finance, 2022). Adjustments to capital rules that are not intended to mitigate climate risks, such as color ratings of financial assets, will have a significant impact on the profitability of banks.

Indeed, two intentions can be identified behind the increase in regulatory capital:

- An approach that aims to increase the resilience of banks to climate risk (risk-based approach)
- An approach that aims to accelerate the transition to more sustainable assets (transition approach)

Even if the two approaches are interconnected, regulatory capital for climate risk should be used to limit the consequences of climate change. Indeed, according to Pietro Maiorana and An Schoovaerts the financing of high-emission assets will become increasingly risky as they are destined to disappear for several reasons:

- Regulatory pressures: governments and regulators are stepping up their efforts to reduce greenhouse gas emissions and combat climate change. Stricter regulations may limit or prohibit activities with high greenhouse gas emissions to meet certain targets. For example, in June 2022, the European Parliament backed the European Commission's proposal for zero emissions for new cars. This means that engines based on diesel or petrol will be banned (European Parliament, 2022).

- Reputation: this refers to the negative reputation that arises from investing in high emission assets. As already discussed in “how to define climate risk”, involvement in controversial activities can have a disastrous impact on the reputation of a bank. It could reduce customer confidence in the bank, and customers may want to switch to a bank with faster climate transition intentions.
- Investor preference: ESG factors are increasingly important in investment decisions. Investors are increasingly considering the environmental impact and sustainability practices of companies and projects. High-emitting assets with a negative environmental footprint are under scrutiny and may have difficulty attracting investment. This reduces their access to capital and increases financial risk.

This principle could be a good idea to encourage banks to move towards a greener portfolio, by rewarding institutions that use mainly greener assets. However, some disadvantages of implementing such a tool have been identified. For example, the implementation of bonuses on green assets could create a "green bubble". Some projects with a low real economic value or without a correct assessment of their risks could be approved just because they represent an advantage because they have a lower capital requirement (Berenguer et al., 2022). In addition to this, the Prudential Regulation Authority linked to the Bank of England reminds us that "green" investments are not necessarily risk-free. They could be treated too generously thanks to this classification. This could threaten the safety and soundness of all individual companies and thus have consequences for financial stability as a whole (Bank of England Prudential Regulation Authority, 2021). This could also increase greenwashing as the projects could be obsessed with attracting the capital requirement premium. Over time, the mechanism could be discredited as not providing sufficient economic or environmental value.

Penalizing brown assets could probably reduce investment in high-carbon sectors, but it also has disadvantages. For example, the prospect of political acceptability of adopting a Brown Penalty Factor could prove extremely difficult. In addition, penalizing brown activities would penalize certain strategically important products such as cement and this could affect the economy. As our interviewee Thomas Eeckhaudt explained, some sectors will probably be necessary in the future even if they have high greenhouse gas emissions.

This is the case of cement, which is known to be a very polluting sector. In 2019 the global cement industry accounts for around 7% of total global CO₂ emissions (Hasanbeigi, 2022), unless huge technological advances disrupt the sector, cement will be needed to renovate and construct buildings in the future. So, malus on these kinds of assets would just be passed on to the end consumers. This whole mechanism would certainly have an impact on strategic prospective but not on risk prospective.

Overall, policy makers and academic researchers have been openly critical of the Green Supporting Factor and the Brown Penalizing Factor, as they could lead to serious market distortions and potential financial instabilities (D'Orazio, 2023).

Our interviewee, Pietro Maiorana, is also against a forced bonus or malus for the banks, as for him, the market will regulate itself and the banks will have to take more securities for brown assets anyway. Hence, tougher capital requirements for industries that will have difficulties finding financing and that will have to give more securities than greener industries might only damage the banks' revenue. This can already be observed in the banks, as they remove the more sensitive sectors from their financing.

An Schoovaerts also stated that colorized assets could have strong repercussions, even on the individuals and not only the industries. Indeed, the colorization of assets would also impact the real estate sector, which is an important activity for the banks, with the EPC score. In the one hand, low EPC score would mean that house that are more affordable because of bad energy score would not be financed by the banks as it would be too risky. This would create an imbalanced and unfair system where the people with less economic advantages would find it impossible to finance their housing. In the other hand, bonus for better EPC score would only give more comfort for people with higher economic advantages to acquire real estate. Those two outcomes might unsettle the real estate market and create a crisis.

5.3 Integration of climate risk via the review of the ASRF model

Nowadays only a few institutions have estimated the impact of climate change on PD and LGD (Network for Greening the Financial System, 2022). This is not surprising given the challenge of modelling the practical impact of climate risks on the parameters of internal rating models PD/LGD. Incorporating climate risk into the ASRF model introduces additional layers of uncertainty and complexity. Climate change is a multi-faceted phenomenon influenced by numerous factors.

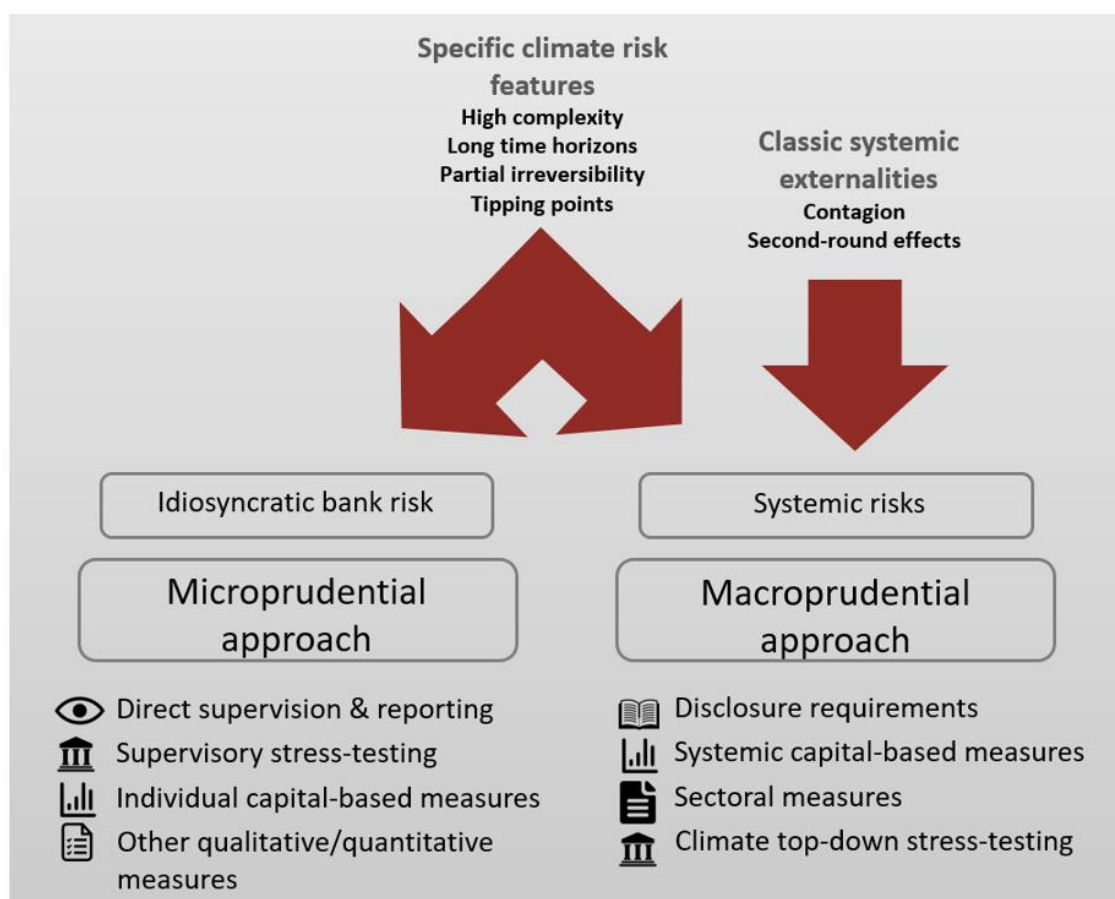
Predicting the specific impacts of climate change on PD and LGD accurately is challenging, and there is inherent uncertainty in climate projections. For the time being, integrating climate risk into the ASRF model requires making assumptions and simplifications, which may lead to less precise or accurate results. However, when enough data and the quantification of climate risk will be made possible, the ASRF model could be a good way of implementing climate risk into the credit risk.

5.4 Other possibilities to integrate climate risk into banks' regulatory capital

Estimates suggest that if that if no action is taken to reduce greenhouse gas emissions, the physical impact of climate change on the global economy in the second half of this century will be considerable (Network for Greening the Financial System, 2022). Therefore, it makes sense to take steps to implement climate risk into the strategy of banks as soon as possible. As seen above, the seven proposals seem to be useful but are not easily implemented quickly. There are probably other measures that can be taken to address climate risk more adequately.

5.4.1 Integration of climate risk via a microprudential and macroprudential approach

Climate risks can create a threat both at the level of idiosyncratic risks and at the systemic level (Baranović et al., 2021). The figure below resumes the main alternative ways to implement climate risk in the banks' strategy.



Graph n°16: Infographic in a macroprudential approach for climate risks

➤ Integration of climate risk via direct supervision & reporting

The Pillar II mechanism of the Basel Accords allows the supervisor to require a bank to increase its regulatory capital if it considers that the risk is not sufficiently covered by the first Pillar of Basel. This more customized approach therefore allows for much more individualized action. For example, if a bank has assets with high greenhouse gas emissions and does not take any measures to cover its climate risk, supervisors can force it to increase its regulatory capital. This method seems difficult to maintain in the long term, but it does provide a way to start implementing regulatory capital in the short to

medium term. Indeed, there are still capacity gaps, although these data and modelling gaps are probably less significant than in the implementation of Pillar I regulatory capital. This method may therefore be more appropriate until the major challenges of modelling and obtaining better data are resolved.

In the UK there is an institution called the Prudential Regulation Authority (PRA) which pushes banks to capitalize climate-related financial risks and may also require an additional buffer if it judges a bank's risk management to be inadequate (Bank of England Prudential Regulation Authority, 2021). As previously mentioned, the EBA stated that there was not enough data nor solid methodology to incorporate climate risk within the P2G. This means that, the possibility to incorporate climate risk within Pillar II with the P2G is currently studied by the EBA but they lack the data and know-how.

➤ Integration of climate risk via stress-testing

Stress testing seems to be essential for banks to integrate climate-related financial risks into their risk management strategy. This method assesses banks under various economic scenarios and takes into account their performance and capitalization (UN Environment Programme, n.d.). As mentioned above, stress testing can be carried out by institutions such as the ECB but also at the level of individual banks.

While these stress tests do not conclude on the precise measures to incorporate climate risk, they do allow for an assessment of the ability of a company, sector or economy to withstand the impacts of climate change. This allows policy makers, investors and regulators to make informed decisions based on the implications of climate change. They can then adjust their policies, investment strategies and business practices to minimize risks and identify opportunities. The results of the stress tests can be used as a catalyst to encourage economic actors to take proactive measures in response to climate change.

➤ Integration of climate risk via the disclosure requirements (Pillar III)

In our view, it is therefore preferable to continue what has already been done and to capture climate change within the existing framework, for example, by improving the overall risk management of each bank. Under the third Pillar of the Basel agreements,

financial institutions must improve their assessment and management of risks associated with climate change. This allows for more accurate identification of potential risks related to extreme weather events, changing environmental policies and transitions to a low-carbon economy.

As observed in the analysis of the KBC, Belfius and Degroef Petercam reports, the obligation to improve their disclosures is forcing banks to take the lead and put climate risk at the center of their discussions. Nowadays, the option of having to improve disclosures seems very appropriate as it encourages banks to develop internal tools and to ask themselves how to integrate climate risk into their risk management. Moreover, this measure can be implemented in the short and medium term, which gives it an undeniable advantage.

In addition to pushing banks to increase their research on climate risk, it also gives stakeholders the opportunity to assess ESG risks and the banks' sustainable finance strategy themselves.

Although the implementation of climate risk through the third Pillar of the Basel agreement does not cover crucial aspects of climate risk, i.e., the cross-sectoral, global and systemic dimensions (D'Orazio, 2023), it does allow for action in the short term and, as mentioned earlier, the climate challenge needs to be addressed as soon as possible.

➤ Integration of climate risk via other measures

It is obvious that a multitude of other measures can be taken to counteract climate risk. Whether at the individual (bank could decide on its own to increase its capital if it deems it necessary) or sectoral level (regulators could impose regulatory capital requirements for specific sectors).

5.5 Summary and evaluation of the methods of this report

In order to clarify our vision of the methods, we have drawn up the table below showing the Appropriateness, Feasibility and Timing of Implementation that we believe to be closest to reality. This table has been made with the help of our readings but does not represent a general opinion, it just aims at exposing our own feeling about the implementation of the different methods.

Option	Appropriateness	Feasibility	Timing of Implementation
Pillar I	High	Harder	Longer-term
Ratios based on color	Low	Moderate	Medium-term
Review ASRF model	Medium	Harder	Medium-term
Micro/macro prudential approach	Low-Medium	Easier	Shorter-term

Table n° 9: Evaluation of the methods of this report

In our view, the most appropriate methods are microprudential and macroprudential approaches in the short term, until the data and modelling issues are resolved, as they begin to ensure that banks have sufficient loss-absorbing capacity to deal with systemic and idiosyncratic climate-related financial risks. The problem with these approaches is that they rely strongly on a case-by-case basis and are not modeled. Stricter regulations will be needed to harmonize the financial sector's approach to the topic of climate risk.

However, once these issues are resolved, the Pillar I approach seems more appropriate, as it allows for the implementation of regulatory capital for all actors. But implementation within Pillar I is still far from reality as there is a huge lack of data to be able to quantify climate risk.

6. Limitation of the work

This section will concern the limitations of the work to consider when reading it. Shortcomings regarding the availability of the data were an important part of the work and the nature of the risk makes it difficult to create a model.

6.1 Data

As explained in the methodology, we used risk reports that were published by the banks to analyze and compare the current handling of climate risk within Belgian banking institutions. The use of such reports may present some shortcomings.

- The banks publish the report concerning the data of the precedent full year to pass. Meaning that there is a time lag between what transpired and the reporting of it. This impacted the writing of this thesis as, at first, the reports concerning the 2022 data were not available for the selected banks. However, Belfius and KBC published their report in mid-April. The aim was not to use those reports as they were not all available, such as Degroof Petercam. However, the progress made, and the relevance of the 2022 risk reports were too important to not include it in our work.
- The data published by the banks were not homogenous. Finding Belgian banks that had similar reporting mechanism was difficult. Indeed, except for the systemic banks, the LSI do not have yet obligations regarding the reporting of their climate intensives. Meaning that the other Belgian banks had different reports that did not contain the information required to compare it to Belfius and KBC. Furthermore, even if the reporting mechanisms were the same, the information contrived within the different report is not modeled at all and is still on a voluntary basis. Meaning that the banks disclosed what they wanted to disclose without particular methodology, creating a mismatch between the information retrieved from the reports.

- The integrity and objectiveness of the information within those reports might also be questioned. Indeed, as mentioned previously, there is no audit requirement for the information regarding pillar 3, meaning that the banks do not verify their information with a third party on a regulatory basis. Hence, some greenwashing might be possible within these reports as they are produced internally and since their aim is to show how the banks perform regarding risk management to the stakeholders.

6.2 Nature of the risk

As previously mentioned throughout the thesis, climate risk in itself is a difficult concept for the banks to face as it is unpredictable, and the repercussions might range from minor to severe. The fact that the risk is also widespread to nearly the entirety of the activities makes it even more difficult to assess. Hence, the banks and their regulators are using all the available data to process this risk and create a methodology. However, it is mainly based on predictions and uses only basic scientific data such as the probability of floods and droughts to measure the impact of the risk. Even if the risk is correctly assessed, the unpredictability and the growing occurrences and severity of the risk might render the possibilities evocated within this thesis inoperable for the banking institutions.

Section IV: Conclusion

Through this thesis, we were able to notice that regulators and banks alike seem to recognize the importance of climate risk and the challenge it represents. Since the Paris Accords in 2015, that saw the birth of the EU Green deal and the target of carbon neutrality in 2050, the banks and their regulators have been trying to implement this climate risk within the taxonomies of the bank. Indeed, ignoring this threat becomes more and more complicated as time goes on. Either from a public's perspective or from the direct result of climate change, banking institutions need to tackle this risk as soon as possible.

However, climate risk is not an easy subject to tackle. Indeed, just the fact that the risk is transversal to the other risks makes it very complex to find a solution as it will impact every activity of a bank. Regulatory authorities cannot, as they did previously when a crisis arose, ask for the banks to have supplementary capital requirements and buffers to cover the impact and avoid a systemic crisis.

The challenge of integrating climate risk within the risk taxonomy is as complex as the risk in itself. Banks' current framework, Basel III, does little to tackle the risk as it was created before climate risk became an issue. Hence the banks find themselves in a peculiar situation where they have no knowledge of how to integrate this risk into their risk management cycle.

While the regulatory authorities are creating a binding methodology to follow, the banks are mitigating the risk by using methodologies that are linked to climate risks but were used for other risks, such as the flood risk, which was already implemented in insurance and banks to cover the operational risk. Finding a globalized methodology that would not penalize the smaller entities, as they are less resilient, is complicated and since climate risk is a new topic, not a lot of data is available.

To counter this lack of granular data, the banking authorities and the EU decided to put in place reporting obligations for the systemic banks. The target of these reporting obligations is to accumulate data and know-how of different entities to create a globalized model that would be flexible enough for the systemic banks and the LSI. In 2022, the Climate Stress Test performed by the ECB gave insight of the current state of climate risk integration within the banking institutions.

When comparing the current banking institutions climate risk management, the lack of model is palpable. Indeed, finding relevant information that can be compared within the different reports, in this case the Pillar III disclosure report, is very complicated. However, there is still common ground from the bank when identifying climate risk. Indeed, the banks identified the risk to be a driver of the other risks and separated the origin of the risk between transition and physical risk drivers.

The physical and transition risk are assessed and mitigated with different methods and for different time frames. For instance, transition risks are considered in the short- and medium-terms scenarios while physical risks are more considered in the medium- and long-terms scenarios. The banks implemented different methods to cover these risks, but the most common methodology is to remove the most sensitive to climate change and the high GHG emitting sectors from their portfolios.

The three banks that we assessed were in different steps for climate risk integration, and the analysis we performed gave us insight on how the bank is affected by regulators. For instance, the bank KBC was far ahead of the other bank and the ECB stress test gave very little insight on the methodology to integrate climate risk. Belfius, who is above the expectations of the ECB but is not top of the class, still gained insight thanks to the ECB stress test. And finally, Degroof Petercam, which is the smaller bank and an LSI, created their whole methodology from this test.

We are still far from capital requirement, integration in Pillar I, of the climate risk. The different possibilities for integration within the first pillar are, according to our findings, too cumbersome for the banks with the current data available to them. The Pillar I capital requirement will certainly become mandatory in the future once enough data has been processed and accurate models can be developed.

For the time being, with the data that is currently available, we think that the approach that is the most suitable for climate risk are the micro- and macroprudential approaches. It is the current approach used by the regulatory authorities and it functions on a case-by-case basis, where the supervisors can comment on and give directions for each bank independently. This approach will also certainly see the first implementation of climate risk within capital under P2G, however, the EBA clearly stated that P2G for climate risk will not be a reality before more methodologies and data are gathered.

We believe that regulatory changes from the authorities need to happen if the climate risk is to be tackled sufficiently to arrive at the targets set by the Paris Accords on carbon neutrality in 2050. The main problem is that the authorities lack the data to create a general model. Hence, the data collection of the next few years will be the steppingstone for the greening of the financial system.

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Appendices

Annex 1: Glossary

ASRF	Asymptotic Single Risk Factor
BCBS	Basel Committee on Banking Supervision
CCR	Climate Risk Change
CSPP	Corporate Sector Purchase Programme
CSRD	Corporate Sustainability Reporting Directive
EBA	European Banking Authority
ECB	European Central Bank
EPC	Energy Performance Certificate
ESG	Environmental, Social and Governance
EU	European Union
EUGD	European Union Green Deal
GHG	Green House Gas
ICAAP	Internal Capital Adequacy Assessment Procedure
ICMA	International Capital Market Association
ICP	Internal Carbon Pricing
ILAAP	Internal Liquidity Adequacy Assessment Procedure
IPCC	Intergovernmental Panel on Climate Change
KPI	Key Performance Indicator
LGD	Loss Given Default
LSI	Less Significant Institution
LT	Long Term
MT	Medium Term
NBB	National Bank of Belgium
NFRD	Non-Financial Reporting Directive
NGFS	Network for Greening the Financial System
NGO	Non-Governmental Organization
P2G	Pillar II Guidance
P2R	Pillar II Requirement

PACTA	Paris Agreement Capital Transition Assessment
PD	Probability of Default
RAF	Risk Appetite Framework
RCP	Representation Concentration Pathway
RWA	Risk-Weighted Asset
SME	Small and Medium-sized Enterprise
SREP	Supervisory Review and Evaluation Process
ST	Short Term
TAP	Transition Acceleration Policy
TCFD	Task Force on Climate-related Disclosures

Annex 2: Summary of tables

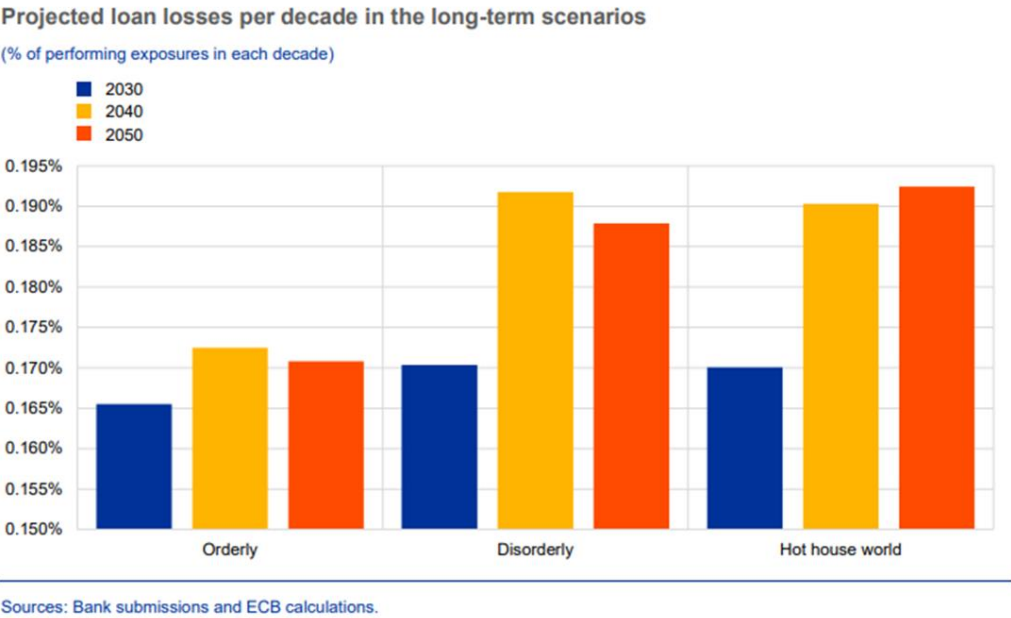
Source		From
Graphs	1	ECB Stress test p34 https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.climate_stress_test_report.20220708~2e3cc0999f.en.pdf
	2	Managing Risk in Investment Banking https://www.investmentbankingcouncil.org/blog/managing-risks-in-investment-banking
	3	Basel III International Regulations https://n3g306.p3cdn1.secureserver.net/wp-content/uploads/2020/09/basel-iii-pillars.png?time=1685211822
	4	ECB Stress test p22 https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.climate_stress_test_report.20220708~2e3cc0999f.en.pdf
	5	ECB Stress test p27 https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.climate_stress_test_report.20220708~2e3cc0999f.en.pdf
	6	ECB good practices p4 https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.thematicreviewwcercompendiumgoodpractices112022~b474fb8ed0.en.pdf
	7	ECB Thematic Review on Climate and Environmental Risks 2022 p8 https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.221102_presentation_slides~76d2334552.en.pdf
	8	EBA supervisory methodology https://www.bankingsupervision.europa.eu/banking/srep/2023/html/ssm.srep202302_supervisorymethodology2023.en.html#toc3
	9	KBC Risk Report 2021 p159 https://www.kbc.com/content/dam/kbccom/doc/investor-relations/Results/jvs-2021/risk-report-2021.pdf
	10	KBC Risk Report 2022 p145 https://www.kbc.com/content/dam/kbccom/doc/investor-relations/Results/jvs-2022/risk-report-2022.pdf
	11	KBC Risk Report 2022 p153 https://www.kbc.com/content/dam/kbccom/doc/investor-relations/Results/jvs-2022/risk-report-2022.pdf
	12	KBC Climate report 2022 p30 https://www.kbc.com/content/dam/kbccom/doc/sustainability-responsibility/20220930-climate-report.pdf
	13	Belfius Risk report 2021 p97 https://www.belfius.be/about-us/dam/corporate/investors/ratios-en-rapporten/belfius-reports/nl/2021%20Risk%20Report.pdf
	14	CH&CO 7 proposal to integrate climate risk into capital requirements p8 https://www.tcfdhub.org/wp-content/uploads/2020/06/2020-05-Climate-Risk-CH-Convictions.pdf
	15	CH&CO 7 proposal to integrate climate risk into capital requirements p10 https://www.tcfdhub.org/wp-content/uploads/2020/06/2020-05-Climate-Risk-CH-Convictions.pdf
	16	The challenge of capturing climate risks in the banking https://www.ecb.europa.eu/pub/financial-stability/macprudential-

		regulatory framework: is there a need for a macroprudential response?	bulletin/html/ecb.mpbu202110_1~5323a5baa8.en.html
Tables	1	Overview of ECB supervisory expectations	https://www.bankingsupervision.europa.eu/ecb/pub/pdf/ssm.202011finalguideonclimate-relatedandenvironmentalrisks~58213f6564.en.pdf
	2	Degroof Petercam Risk report 2021 p73	https://assets.ctfassets.net/ne8byh03zy6e/5lCYMn4GagesoQNwSDCNBj/da1b2375aba30ecadc9fdb638f69610f/BDP_RiskReport2021.pdf
	3	Degroof Petercam Risk report 2021 p75	https://assets.ctfassets.net/ne8byh03zy6e/5lCYMn4GagesoQNwSDCNBj/da1b2375aba30ecadc9fdb638f69610f/BDP_RiskReport2021.pdf
	4	Personal production	N/A
	5	Personal production	N/A
	6	Personal production	N/A
	7	Personal production	N/A
	8	The representative concentration pathways: an overview	https://link.springer.com/article/10.1007/s10584-011-0148-z
	9	Personal production	N/A

Annex 3: Original tables and graphs

Graph 1:

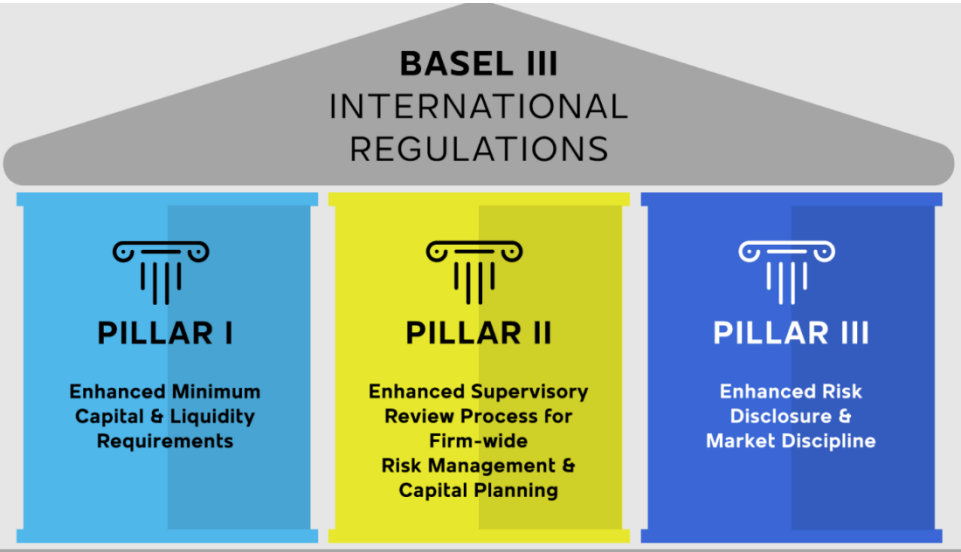
Projected loan losses under the orderly scenario are lower than those both under a disorderly transition scenario and under a scenario with no transition policies (Hot house world)



Graph 2:



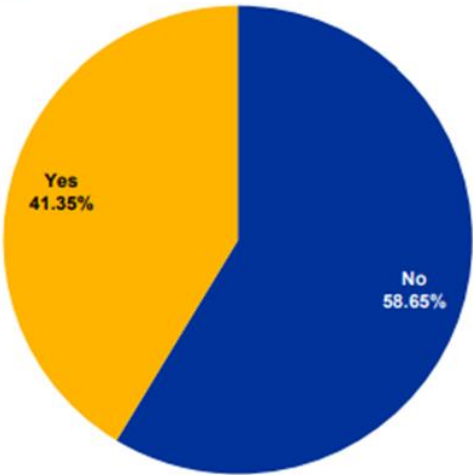
Graph 3:



Graph 4:

Preparedness of climate risk stress-testing frameworks implemented

Is climate risk currently included in the institution's stress test framework?
(percentage share of participating banks)

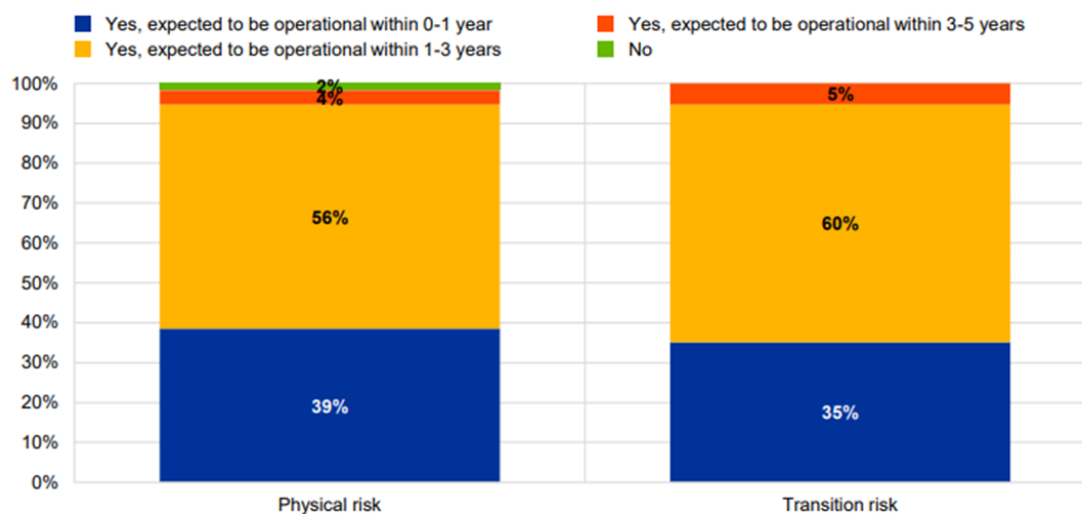


Sources: Bank submissions and ECB calculations.

Graph 5:

Time frame envisaged for implementing climate risk stress-testing frameworks

(percentage share of participating banks)



Sources: Bank submissions and ECB calculations.

Graph 6:

Table 1

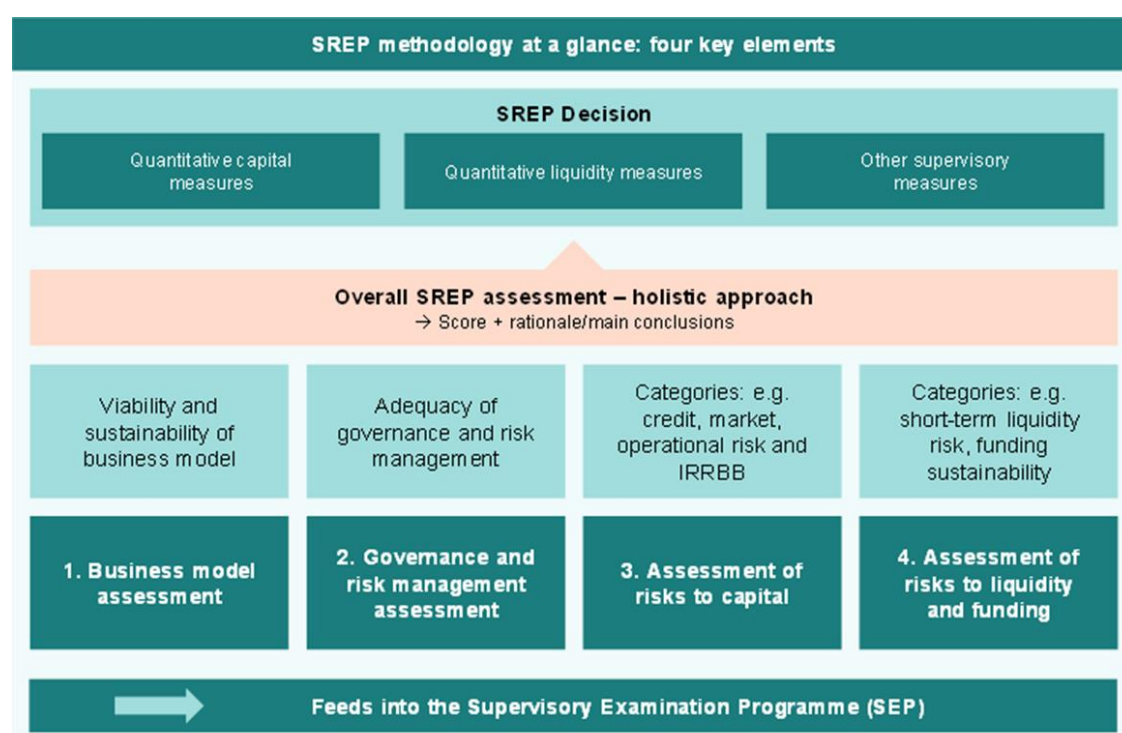
Observed good practices described in this report

Section	Sub-section	#	Topic	Expectation
Materiality	Identification of risk drivers	2.1.1	Transmission channels	1, 7.1
	Identification of exposures	2.2.1	Materiality assessments	7.2, 7.3
	Determination of materiality	2.3.1	Materiality thresholds	1, 7.2
Business strategy	Strategic approaches	3.1.1	Transition planning	2
		3.1.2	Key performance indicators	2
		3.1.3	Products	2
	Strategic steering tools	3.2.1	Client engagement	2, 7.4
		3.2.2	Client transition plans	2, 7.4
Governance and risk appetite	Management body	4.1.1	Governance framework	3, 5.2
	Remuneration	4.2.1	Remuneration policies	4.3
	Organisational structure	4.3.1	Second line of defence	5.4, 5.5
		4.3.2	Third line of defence	5.6
	Risk appetite	4.4.1	Key risk indicators	4
	Reporting	4.5.1	Data governance, processes and collection	6.1, 6.2, 6.4
		4.5.2	Internal risk reporting	6.3
Risk management	Due diligence	5.1.1	Data collection	7.5, 8.1
		5.1.2	Controversies	7.5, 9.2
	Risk classification	5.2.1	Credit risk	8.2, 8.4
		5.2.2	Market risk	10
		5.2.3	Operational risk	9.1
	Collateral valuations and pricing	5.3.1	Collateral valuations	8.3
		5.3.2	Loan pricing	8.5, 8.6
	Capital adequacy	5.4.1	Internal capital adequacy assessment	7.6
	Environmental risks	5.5.1	Exclusion approach	8.1
		5.5.2	Due diligence	7.5
		5.5.3	Risk measurement	7

Graph 7:



Graph 8:



Graph 9:

TRANSITION RISK DRIVERS	
Policy and regulation	Introduction of policy changes/regulations to enable the transition towards a greener economy, e.g., an increase in carbon and energy prices, carbon taxes, reduction of emission rights, energy efficiency regulation for commercial and residential property
Technological change	Substitution of existing products and services with green alternatives based on new technologies, failure of/uncertainty surrounding new technologies
Consumer preference	Changes in customer behaviour and preferences, investor expectations, uncertainty in market signals, community perceptions of an organisation's contribution to climate change, green competition
PHYSICAL RISK DRIVERS	
Temperature-related	- Chronic temperature change, e.g., an increase/decrease in average and min and max temperatures in different geographical locations - Acute temperature events, e.g., an increase in frequency and severity of heat/cold waves, wildfires
Wind-related	- Chronic wind-related changes, e.g., changing wind patterns - Acute wind-related events, e.g., cyclones/windstorms and tornados
Water-related	- Chronic water-related changes, e.g. sea level rise, a structural increase/decrease in average rainfall, changing precipitation patterns - Acute water-related events, e.g., an increase in frequency and severity of acute floods (coastal, river, pluvial), droughts and hailstorms
Solid mass-related	- Chronic solid mass-related events, e.g., soil degradation - Acute solid mass-related events, e.g., landslides, subsidence, erosion

Table 89 - Climate risk drivers as considered in KBC's climate risk impact map

Graph 10:

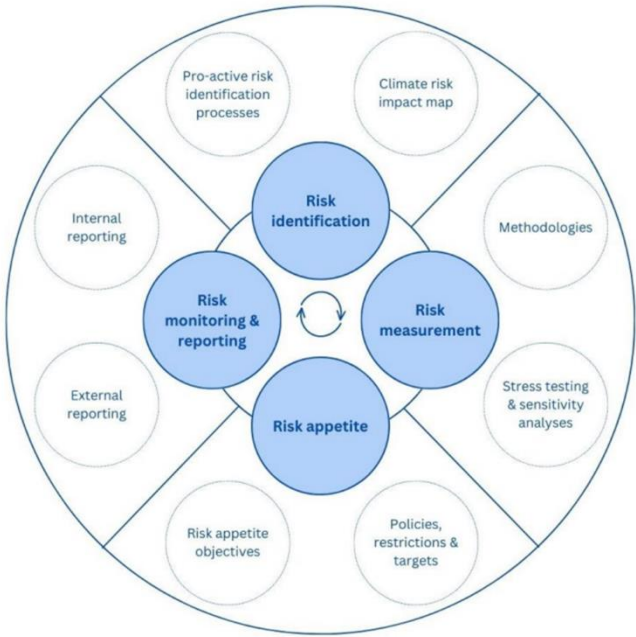
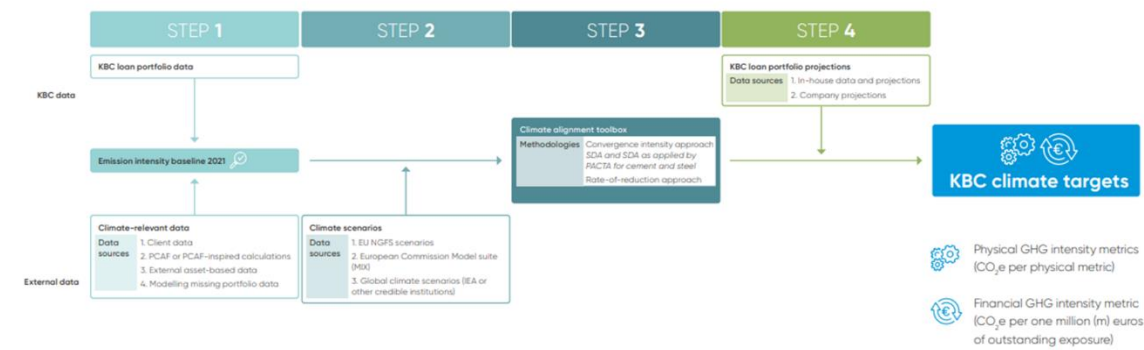


Figure 7 - Overview of main risk processes

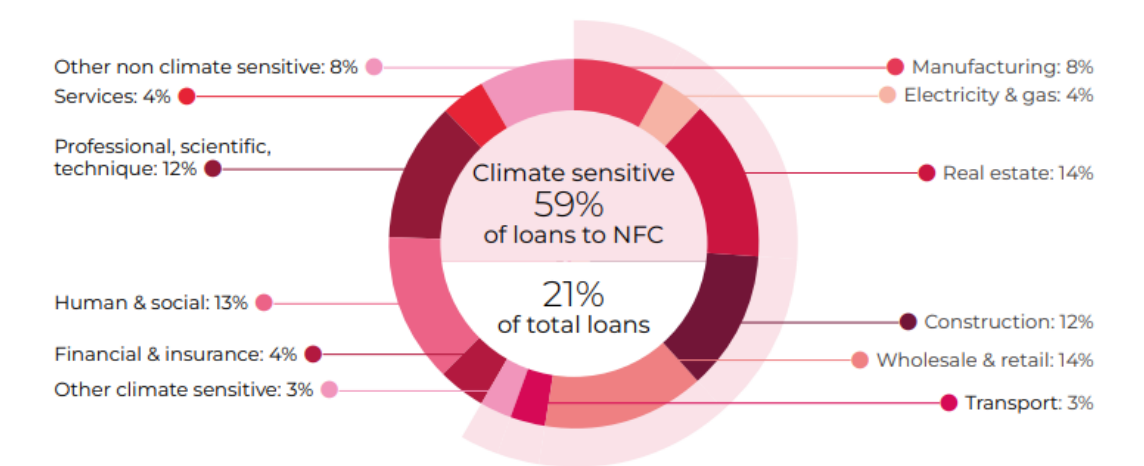
Graph 11:

Credit risk	ST	MT	LT
Net Zero			
Delayed transition			
Current policies			

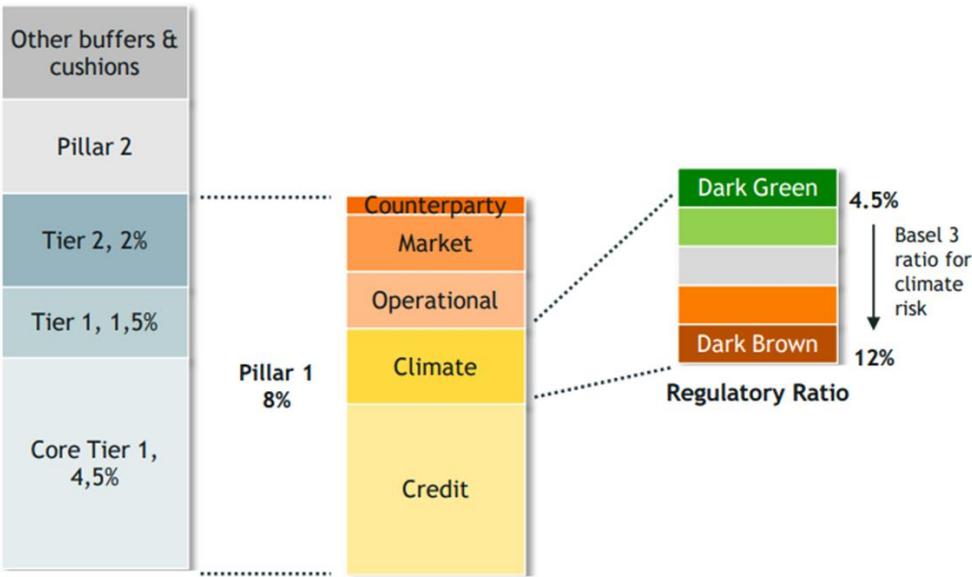
Graph 12:



Graph 13:



Graph 14:

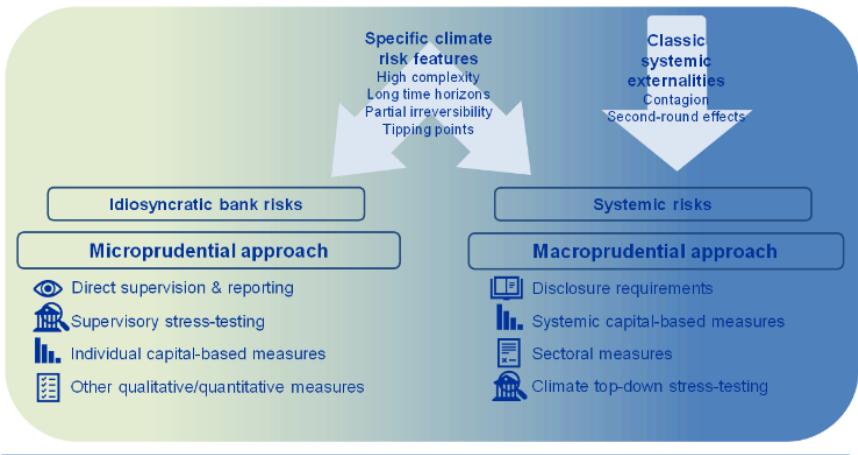


Graph 15:

$$RW_{climate} = \left[LGD_{climate} \times N \left[\frac{1}{\sqrt{1-R}} \right] - G(PD_{climate}) + \sqrt{\frac{R}{1-R}} \times G(0.9993) \right] - PD_{climate} \times LGD_{climate} \times \left(\frac{1 + (M - 2,5) \times b(PD)}{1 - 1,5 \times b(PD)} \right)$$

Graph 16:

Figure 1
Infographic on a macroprudential approach for climate risks



Notes: This infographic is for illustration purposes and not meant to be comprehensive.

Table 1:

Box 1

Overview of ECB supervisory expectations

-
1. Institutions are expected to understand the impact of climate-related and environmental risks on the business environment in which they operate, in the short, medium and long term, in order to be able to make informed strategic and business decisions.
 2. When determining and implementing their business strategy, institutions are expected to integrate climate-related and environmental risks that impact their business environment in the short, medium or long term.
 3. The management body is expected to consider climate-related and environmental risks when developing the institution's overall business strategy, business objectives and risk management framework, and to exercise effective oversight of climate-related and environmental risks.
 4. Institutions are expected to explicitly include climate-related and environmental risks in their risk appetite framework.
 5. Institutions are expected to assign responsibility for the management of climate-related and environmental risks within the organisational structure in accordance with the three lines of defence model.
 6. For the purposes of internal reporting, institutions are expected to report aggregated risk data that reflect their exposures to climate-related and environmental risks with a view to enabling the management body and relevant sub-committees to make informed decisions.
 7. Institutions are expected to incorporate climate-related and environmental risks as drivers of existing risk categories into their existing risk management framework, with a view to managing, monitoring and mitigating these over a sufficiently long-term horizon, and to review their arrangements on a regular basis. Institutions are expected to identify and quantify these risks within their overall process of ensuring capital adequacy.
 8. In their credit risk management, institutions are expected to consider climate-related and environmental risks at all relevant stages of the credit-granting process and to monitor the risks in their portfolios.
 9. Institutions are expected to consider how climate-related and environmental events could have an adverse impact on business continuity and the extent to which the nature of their activities could increase reputational and/or liability risks.
 10. Institutions are expected to monitor, on an ongoing basis, the effect of climate-related and environmental factors on their current market risk positions and future investments, and to develop stress tests that incorporate climate-related and environmental risks.
 11. Institutions with material climate-related and environmental risks are expected to evaluate the appropriateness of their stress testing with a view to incorporating them into their baseline and adverse scenarios.
 12. Institutions are expected to assess whether material climate-related and environmental risks could cause net cash outflows or depletion of liquidity buffers and, if so, incorporate these factors into their liquidity risk management and liquidity buffer calibration.
 13. For the purposes of their regulatory disclosures, institutions are expected, to publish meaningful information and key metrics on climate-related and environmental risks that they deem to be material, with due regard to the [European Commission's Guidelines on non-financial reporting: Supplement on reporting climate-related information](#).
-

Table 2:

Risk	Transversal climate and environmental risks		
	Physical risk	Transition risk	
Credit risk	Low	Low	Exposures are mostly in low vulnerability countries and sectors
Market risk		Low	Limited risk due to limited volumes and possession periods
ALM risk		Low	Exposures are mostly in low vulnerability countries and sectors
Liquidity risk	Low	Low	Limited impacts on both the asset and liability sides of the balance sheet
Operational risk	Low	Low	Limited physical risk given the nature of the Bank's activities, location and premises. Transition risk has been assessed on the basis of reputational impact resulting in loss of customers.

Table 3:

Sector	Sensitivity to a disorderly climate transition	Sector description
B05-B09	High	Mining (etc)
C19	High	Manufacture of coke and refined petroleum products
H49	Medium	Land transport and transport via pipelines
D35	Medium	Electricity, gas, steam and air conditioning supply
C23	Medium	Manufacture of other non
C24-C25	Medium	Manufacture metal
H51	Low	Air transport
G45-G47	Low	Wholesale trade
C20	Low	Manufacture of chemicals and chemical products
E36-E39	Low	Water
L68	Low	Real estate activities
C10-C12	Low	Manufacture food & beverage
c30	Low	Manufacture motor vehicles & transport
H50	Low	Water transport
C26-C28	Low	Manufacture electronics & elec equipment
F41-F43	Low	Construction buildings & civil engineering
C21-C22	Low	Manufacture pharmacy & plastic
A01	Low	Crop & animal production
A02-A03	Low	Agriculture (forestry etc)
H52-H53	Low	Support activities for transport & postal services
C13-C18	Low	Manufacture (diverse)
C31-C33	Low	Manufacture furniture, machinery, etc

Table 8:

Table 4 Main characteristics of each RCP

Scenario Component	RCP2.6	RCP4.5	RCP6	RCP8.5
Greenhouse gas emissions	Very low	Medium-low mitigation Very low baseline	Medium baseline; high mitigation	High baseline
Agricultural area	Medium for cropland and pasture	Very low for both cropland and pasture	Medium for cropland but very low for pasture (total low)	Medium for both cropland and pasture
Air pollution	Medium-Low	Medium	Medium	Medium-high

Annex 4: Interview guide

Our thesis' subject is about the climate risk development within the banking institutions, to explore this vast theme we considered 2 questions:

- How is climate risk considered in the current banking regulation towards the regulatory capital and how will it evolve?
- Regarding the supervision of banks, what will be the role of auditors in the supervisory process regarding climate risk?

The aim of this interview is to get counsel on this specific topic. To get an expert opinion on the future regulation changes and the potential outcome of such changes on the supervisory process of the banks

Do you consent to be recorded and to have the information/opinion you will give during this interview to be used within an academic context?

1. Can you present yourself? Where are you working and what is your post?
2. What are your qualifications on this subject?
3. How would you describe the current state of climate related risk within the banking institution? And within the Basel Framework?
4. What is your opinion regarding the climate risk mitigation within the banking institutions?
5. How do you think it will evolve?
6. How would you integrate the climate risk within the current Basel framework? (Pillar 1, 2 or 3)? In other words, would you find it more suitable to integrate climate risk as a capital requirement, within a supervisory requirement or as a disclosure within a report?
7. What do you think of regulatory capital requirement for climate related risk? Would you consider it to be a threat or an opportunity for the banks?
8. What other solutions could there be to tackle climate risk within the banking institutions?

9. Should ESG scorecards influence the credit process? For instance, industries that have higher emissions of GHGE should receive maluses from the banks.
10. How will the supervision of banks be affected by stronger regulations towards climate-related risks? Does the ECB will still be able to supervise the banks alone?
11. What role auditors currently hold within the supervision of banks? Does the current tasks of the auditor cover (part of) the climate risks?
12. What kind of new supervisory process would stronger regulations for climate related risk require?
13. If regulatory capital requirement regarding climate risk was put into place, what changes, if any, would there be to the role of auditors?

Thank you for your participation and the time you allocated to answer to these questions.

Annex 5: Interview of An Schoovaerts

This interview was done via Microsoft Teams on the 17/05/2023

Interviewee: An Schoovaerts

Interviewer: Randall Colin

RC: Hello, my name is Randall Colin and this is Jean Herrier, we both are student at the LSM in Louvain-la-Neuve, and the topic of our master's thesis is the evolution of climate risk integration within the regulatory framework and the impact on supervisory processes.

First, do you consent for us to use the information you gave in this interview in academic purposes ?

AS: Yes, of course. I was quite excited to hear that you were working on this subject in your studies.

RC: It is a very interesting topic and very complex. And this is why we are seeking the help of different experts on the subject.

To begin with, can you present yourself?

AS: I am Executive Director in sustainable finance and CFO consulting at EY. I was an auditor for KBC and some other systemic banks and then I transferred to consulting. Why? Because we lost KBC and within Belgium it is the most interesting bank for the climate in audit. But instead, I focused on transformation of the finance projects like IFRS9, implementation of IFRS 17. Three years ago, I started working on sustainable finance. Today I'm leading within FSO Belgium. The Sustainable Finance work group and as such have a good view on what our clients are doing relating to ESG and climate risk. And I'm also part of the work group within the IBR/IRE in ESG. They have a workgroup on ESG and a separate word group that just started specifically for ESG for the financial sector.

I have a good view and opinion on where this is going. So I'm a bit excited with the topic. My qualifications is experienced.

RC: How would you describe the current state of the climate risk within the banking institution?

Well, I think you have to split it in in in 2 for that 'cause. On the one hand you have the systemic banks, the systemic banks that are subject to the ECB supervision, which are the big ones. Saying Belgium, you have 6-7. Maybe. Who have received the guidance of the ECB and I have been working on the topic for the last two years quite intensively.

And then you have all the other smaller banks. Who just received a letter from the National Bank. So I don't know if you know the regulatory framework around climate risk to be honest. So the ECBS issued the expectations to integrate climate related risk in risk management framework I think in November 2021, if I remember well. Then they asked the systemic banks. That was self-assessment in 2022 and to make a road map to integrate and to comply with all these expectations. the ECB has reviewed those road maps implementation plans and issued report with a summary saying this is not good enough. They have been inspecting our clients a couple of times to see the progress made and each of these systemic banks have received specific recommendations and a timeline by when it needs to be integrated.

In general, these banks have started with. Looking at climate related risks and doing a qualitative assessment of these risks. To see which ones word most material for them. They have, meanwhile, the majority of them identified KPI and key risk indicators to measure and monitor those risk and have set a risk appetite on it. They also have done the first stress testing on the request of the ECB as well. And the goal of those first stress testing was more to better understand, it was more like a learning exercise, to better understand what data they needed, how they could do the calculation with granularity they needed. So that was a good exercise. In addition, you have the pillar three. You have the pillar three reporting requirements as well. That's made these large banks or forced them to already be transparent on some exposures to these types of risks. Now they still are working on quantifying everything.

The reason why they are not there yet is because they are missing data. They are still looking ar proxies to estimate the data, what to do with the data that is missing, and it will evolve. I expect it will be quickly evolved next year. They will need to report on these as well under the CSRD, which for the large ones is applicable as from 2024. So we see

that the large banks are really embracing it and are making progress on it. It is not yet integrated in the process is. It's not integrated in the credit cycle. But It is not integrated yet in client acceptance or in pricing or in provisioning expected credit. As we're not there yet, but also there I would expect it in the medium term it will need to be fully integrated.

Then you have the small banks and the small banks have received. Last year I believe the letter of the National Bank saying he ECB has published these expectations to integrate climate related risks. It was mandatory for the systemic banks, but you less significant banks will need to comply with that as well, taking into account proportionality. They are a bit behind. We usually see in their annual report that they include some kind of rough description about climate risk, but it all stays very, very general, so they have still work to do.

RC: we looked at some reports from different banks. We used the KBC Reports as benchmark and we compared it to Degroof Petercam. We can see that the sustainability report and the risk reports are very lacking towards the climate risk, so we could already see the difference.

AS: Also, I think there's a difference if you take it. So not only size matters whether they are systemic and pushed by the ECB and the ones that are only supervised by the National Bank. So you see a difference there. You also see a difference on the ones that have integrated ESG in their corporate strategy. And have made commitments to the United Nation Principles for Responsible Banking and SBTi. So the ones that are smaller but have committed themselves on becoming more sustainable are eager to really work on this topic. But they might not always be reporting on it in a very transparent way yet.

RC: Regarding a potential Capital requirement regarding the climate risk, what is your opinion on that? Do you think it would be a good idea or?

AS: I think, I think what will happen. So now they take it with them in their SREP exercise. The regulators for the systemic banks are including this in their SREP governance. The outcome of the SREP determines the minimum capital requirement. What I think will happen is that, as in the expectations of the ECB, it is clearly stated that they expect that climate related risks will have to be integrated in traditional risk categories. If everyone does that, there will be no need of a separate layer of capital requirements dedicated to climate risk as it will be integrated in credit risk market. Relationally, however, I do not

see that happen by 2024. So I believe. That the regulators will in addition, to maybe, giving the banks a higher capital requirement, they might add an addon. That's what we've seen in the past as well and that they might do add on in the calculation for capital requirements cause the governance or the integration of climate related risk is not up to their standards.

RC: Other than the implementing the climate risk into the capital requirements, do you think there could be other solutions? Find a new system for the banks to tackle the climate risk?

AS: It's difficult because at this point, I don't see many alternatives or alternative levers that the ECB would have. Also, don't forget climate risk is not solely related to one bank, it will be similar for the entirety of Belgium. So flooding risk for instance. It's the exposure that the different banks will have will be quite similar. I mean you only have one Belgium that can be flooded, I mean. It's the same with pillar three as well. Now I think, for climate risk there will be a big transparency wave ongoing with the CSRD and with the Pillar 3. The ECB is pushing on climate risk mitigation. But that is not always a good solution. And that is part of your question 4. So the ECB is pushing for climate risk mitigation. Imagine this, you have a mortgage portfolio for retail clients and just mortgage. If you have a lot of mortgages with houses that are situated in high flooding risk areas. What are you going to do to mitigate that risk? You're going to not accept further production of new mortgages in that area? That means that people will not be able to get a mortgage for a house in a high risk flooding area. You are going to have an impact on the value of the properties.

EPC ratings and Climate risk mitigation. The Risk appetite of the Bank is using the Average EPC rating of our new production needs to be a maximum of "X". For the retail mortgages, that means that people that are financially vulnerable do not have the financial capacity to purchase good quality EPC properties. If the bank wants to mitigate the climate risk, the natural reaction would be to not give any loans to people that want to buy high emitting properties. That means that the financially vulnerable people will not be able to purchase a house anymore. That's a risk. It's also not what the National Bank or the ECB want to achieve. But if you don't think and just do what the ECB and the guidance is asking. This will be the result.

RC: Do you think that, to counter that, they will give bonuses? Taking this example, bonuses on better EP score housing?

AS: if they put maluses on the lowest EPC scored houses, they will punish the vulnerable people financially speaking. The houses will not be able to be sold anymore as they will decrease in value. 80% of the of the of the houses in Belgium are with very bad EPC scores. It will crash the market. You know do that.

If you're going to put bonuses on the houses with a good EPC rating, you're rewarding the people that have the financial capacity. That's also not what we want. See the difficulty? What you want to do is, as a bank you want to support the financially vulnerable people by issuing cheaper renovation loans to help them improving the EPC rate.

However. And that's an additional point. If you want to report under the CSRD in the Taxonomy tha a Renovation loan is green, you have to be able to prove that the EPC rate has improved with 30% after the renovation. That means that you have to ask before and after the renovation and EPC certificate. The sector does not want to ask each and every client for the EPC certificate before and after a renovation. Also, a lot of the renovations are done by the people themselves. You have also other criteria's like, the material you use need to be recyclable. There are criteria saying your waste need to be limited. It is very difficult to comply with all the documentation requirements in order to report that innovation as green. So there's work that needs to be done by Fablefin. In order to make sure that the banks are giving enough innovation credits to financially vulnerable people in order to improve the average EPC rate in order to mitigate climate risk mitigation. It's all linked together. That's what makes it difficult.

RC: If stronger regulation towards climate risk happened, do you think that the ECB will be able to supervise the banks alone?

AS: In Europe, of course they don't do that alone. There are statutory auditors that are amended to help or to support on a regulatory supervision. They already do that today, so the auditors, statutory auditors report to the National Bank or to the ECB. By doing the audit on a certain part of the the reporting tables. The reporting tables do not include Pillar three is today. Today regarding climate risk, the banks need to report pillar three reporting tables which are not audited and are not intended to be audited. The annual report where the disclosures on climate risks are still very high level. That part is audited,

but not enough information in there is not enough to support supervision. Under the CSRD. So today they also are expected by the ECB to report the TCFD, the disclosures. The information is still voluntary, but highly recommended by the ECB, which makes it not really voluntary anymore, but also that is not audited by default. Information in there today is not sufficiently detailed for regulatory supervision either, because everyone is still trying to figure out how to quantify everything.

In the future under the CSRD. It will integrate the TCFD disclosures. It will integrate information on Taxonomy and financed emissions and climate risk exposures, but it will only be subject to limited assurance.

Reasonable assurance cannot be given regarding this information, not from the first year, as the data and the processes are not good enough to give assurance reasonable assurance on the first year. In 2028, as from 2028, at the earliest, there might be a shift to reasonable assurance on that information.

It's for transparency, now, of course, the banks, especially the big ones, are pushed to integrate climate risk into their traditional risk categories, and those are subject to audit. So if BNP or KBC or ING integrate in their expected credit loss the aspect of climate change, then, it will be audited. So, more work indeed, but it will be more work and not really as we don't know yet how much influence it will have on expected credit loss, because we're not measuring it yet today.

So do you expect debtors to default more because they have more climate risk? If you say yes, then that also means that if a debtor is not subject to climate risk, he will not default faster than the others, so there will be positive and negative impacts. It's difficult to estimate what the total impact will be for a bank when they integrate and start calculating climate risk in their other risk categories. Because it's not integrated yet today.

What's the risk for the bank? Is it considered as a risk driver? Indirectly, I would say it's already partly covered. The house prices today, because climate risk for a bank will impact first the prices of the houses for mortgages, is already included but not for a full 100%. So it will depend on how the house price will absorb climate related risk as well.

When you go to counterparties and the big debtors, there's the big companies counterparties, then I would say it's more the appetite of the bank to exclude certain sectors in the financing. But that is just based on reputation risk. BNP in France is now

under litigation because some NGOs believed that they should stop financing the fossil fuel sector. Small reputation risk

Whether it will impact the profitability of a company that it's little bit early to really know how that will evolve.

The role of auditors. We need to see first how a bank will fully integrate climate risk. What we know is it will influence a lot of the activities of them. It will have a knock off effect on the process is client acceptance, pricing, internal controls, it could influence risk weighted assets. I know of a bank in France that, because of their ambition to decarbonize their internal pricing mechanism and mechanism to weigh risk related assets. We have adjusted it so that if as a commercial the commercial people of the bank want to do a financing or go into a transaction with the counterparty that is part of High emitting sector it gets punished internally on their margins.

So I mean with the decarbonization pathways at this point it can go in different directions. And it's quite interesting to see because this is less to do with climate risk, but it's also a requirement of CSRD and of pillar three to report progress of the decarbonization journey compared to the Paris Agreement's targets. That means that the banks that did not have any targets on it yet will have to even have to set targets. That's where risk appetite will get influenced by strategy because as a bank, what do you want to show? That you're aligned with Paris or not aligned with Paris? It also depends on how your activities are today and what sectors you are servicing as a bank.

It starts with your starting position and if your starting position is we have very high financed emissions, we have to go down a lot. Compared to a bank that already has no financed emissions, they don't have to go that far. In addition, it's also influenced with what Belgium is doing. What is Belgium doing? When it comes to decarbonization, how fast are they going to Greenify the electricity or the energy networks in Belgium 'cause? That is a factor for the decarbonisation pathways which is affected for the risk appetite.

It's all in together. So that's why it's so interesting to end of discussion on this an I I'm not sure who you talk too of Deloitte or KPMG, but I can imagine that auditors, as I'm no not a pure auditor, have a different view than mine. From an audit point of view, you cannot do an audit if the information is not robust enough and that will be a barrier. Because climate climate change is such a urgent issue. Neither the regulators nor the stakeholders

nor the banks can wait until the information they have is robust enough to make decisions on. You're in a situation where they need to make strategic decisions with a high reputation risk based on information that is not complete and cannot be relied on. And the actions performed will be for when the people taking the decisions are no longer there, this is a first. Information is really hard and to create a model is what is the hardest 'cause there's not enough data yet. It's a case by case scenario, so everyone is doing what they can. But there's no model for now.

Well, actually there is a model for the EPC Rates. Based on EPC score based on a data that is available, they can do that. A big bank can do that. We start to see correlation between EPC and the value of the properties. They have information that links flooding risk to properties. They have to use the manuals of the NGFS and of the ECB. It's a matter of putting it all together to have that integrated in risk models, it takes up to 2-3 years to really understand how the model behaves before they can really implement it. Do I think that it will influence the ratings a lot? I don't think so. I don't think so, because it will only be a small part of the credit Risk, of market risk and of liquidity risk. It will play a part, It's on such a long term that I think it will be diluted.

That's my impression if you look at the results of the climate stress test. We need to make it more important than it is in order to really push actions through it. The actions will not come through these tests, it will come through the ambition of the banks. And the push of the regulators. It's probably something the others did not say to you. Also because I have experience with implementation of IFRS nine, implementation of IFRS 17. In the beginning when a new regulation is upcoming, everyone is like, "this is more complex, it will change how we do our business completely" and in the end what is implemented is a diluted version.

We see voices in the US against integration of climate change, but that's the US. We see that climate risk so the E Pillar of ESG and the S pillar is related. There needs to be a business case as well, 'cause banks are not Not-for-profit organisations. There will be change, but it will not be because they calculate that climate risk is material. You have me on record, that's what I believe. But we'll see, we'll see.

RC: I think that deep down it's quite a lot of people think that

It's more the Reputation risk and the regulator that will keep pushing, I don't think the government themselves, politics will play a role, but by definition they have a short-term vision, not a long term vision. That's the way the system works.

RC: thank you very much for the time you took to answer our questions.

AS: If you have questions still Randall Jean, let me know

RC: Thank you very much. Bye.

AS: Bye

Annex 6: Interview of Pietro Maiorana

This interview was done via Microsoft Teams on the 02/05/2023

Interviewee: Pietro Maiorana

Interviewer: Randall Colin

RC: So hello, my name is Randal colin and I'm doing currently an internship in audit. So I'm I mean, it's actually my last week so I'm finishing this week also. Yeah. And and I've already signed for KPMG for September.

PM: Good choice.

RC/And you can you present yourself?

PM: Yes, So I I'm Pietro, I'm working in not in audit but on the advisory side in the team of banking risk and regulation, more for the financial sector. I joined KPNG recently, so in October last year, so a bit more than six months now. Before that I was in working ING, in the bank and there are work during three weeks on integrating ESG in credit risk in general. And then before that I was working in Euro-clear and there I was mainly busy in regulatory aspects and operational aspects as well before that. I did also a bit of business analysis. So I did a lot of different things in the start of my career and now I'm specializing more and more in the in ESG topics. Okay.

RC: Well then you really spot on for for my master thesis.

PM : Good!

RC: So I'm gonna share the the, the, the guide. There you go. So yeah. Can you see it?

PM: Yes.

RC : Yeah. our thesis subject is about indeed the climate risk development within the banking institutions. So it's really how will the banks will evolve and does the regulatory capital will include the climate risk or is it gonna be included in a different way? And how does the supervisory process of the banks will evolve with this evolution of the climate risk? Okay.

PM: So you have to be aware that this topic is a very, let's say, strategic and tense topic between regulators and the market.

Why? Because capital requirements is a huge cost for banks. Each time they have to issue capital to cover their risk, it is a big cost for the bank. And they don't want to add the ESG risk on top of the other risk already covered by in terms of capital requirements because they know that with the current state of their portfolio, the need of capital requirements will explode basically.

RC :Yeah.

PM : And they say that it's a bit unfair because we are all in transition and therefore if we include ESG in the capital requirements too soon, they will have to inflate their capital requirements too much. And in any case afterwards it will decrease little by little because they will decarbonize for instance completely their lending portfolio or work more and more in transitioning, their products and their activities so that they become more and more aligned with the EU taxonomy for instance. So this is the mechanism that will take quite a lot of time and basically where right now there's no clear indication that the regulator wants to work on that in priority.

So there is currently a regulation, so the capital requirement regulation at EU level that will need to be reviewed and may consider in a way or another this aspects. So right now do they have to integrate ESG or are there specific mechanism allowing ESG risk to be integrated in the capital requirement? No.

Is it already considered in a way or another? Yes. Why? Because beside the CRR, there are other mechanism, I mean within the CRR as there are other mechanism that are more supervision mechanism where the ECB, so the European Central Bank and the NBB here in Belgium are more and more including ESG risk climate more specifically climate related risk into their reviews, into their external audits, and most of the time also based on this external audit, ECB and NBB have the right to ask for an adjustment of the capital requirements and based on the outcome of those external audit. So there is already a tool that allows the regulators to still integrate, in an indirect way, the ESG topics into the capital requirements, but for now it's only from a supervision perspective based on data they are requesting during external audits

RC: Ok, And how do you think it will evolve? Do you think it's gonna go towards more capital stricter pillar one capital requirement or it's gonna stay more in the current way, but a bit stricter?

PM: I think that short term, it will be more and more strict supervision of the bank from regulator on the ESG topic, one more comments from the regulators on how they have to adapt and if the regulator sees that the transition doesn't goes fast enough and if they see that this supervision element doesn't allow to go at the right pace to be ready for 2050, then I think that the pillar one will be completely reviewed to integrate ESG requirements.

But right now the pushback from the market is so strong and the arguments are quite good because they say we are only at the start of the transition, if you if you if you integrate ESG into capital requirements you will kill us in risk cost, so that's a bit where we stand, now what is a bit a pity, is that, right now I have the feeling that what I see from the discussion is that the market and the regulator are seeing these this mechanism, the pillar one mechanism, as only a way to cover the risk, the climate risk, from the additional ESG risk that will come with time, OK, they do not think as a way to incentivise banks to go for a smarter and faster transition.

I mean by that that they don't think enough about a mechanism whereby if they see that the banks have clear transition plans, sound a governance about ESG that they are decarbonizing at the right pace base or even higher than their current KPI or align with their current KPI, if they see that these banks are becoming more and more resilient meaning with less and less risk, they should find a mechanism to add them, and as they become more resilient so more strong against the risk they should then find a mechanism that will help them to decrease the risk cost, so that the banks that are transitioning, will see their risk cost decreasing, while banks that are not transitioning will be less and less resilient as per all the study that we know, because we know that with the climate change if the bank is not prepared enough they will take in their portfolio huge risk that will explode in their face by 2050, so those, need to have a risk cost that increases.

And the problem is that it requires an analysis not only of the financial impacts but also what we call "double materiality", so the fact that we need also to see how the banks is impacting the environment and this means that more and more pillar one will need to integrate the double materiality aspect to go in that direction, because the less the impact

of the bank will be on the environment, so for instance in terms of finance CO2, the more they are making themselves resilient but also the environment around them, including their own clients, therefore they are more and more resilient, in a more and more resilient environment, therefore they should have a decrease of risk cost accordingly.

This doesn't exist, it's not foreseen, because usually it's what you have, ha, you have more risk,-> more capital. I never seen a regulator saying now you can decrease your capital because your and your risk, and therefore, you can decrease your capital because for us your risks are in better shape than expected.

And I don't even know if it's a decrease of capital we need maybe to study order aspects of what is triggering the risks for a bank and see how the regulator can influence that, by decreasing or certain of these aspects if the bank is performing in terms of ESG risk management

So that's a bit where I think the ideal word should, be but that's not on the table right now so there's not this mechanism of rewarding the ones that are resilient and increasing the risk cost of the ones that doesn't want to transition.

RC: But it will certainly come to that no? Not forcefully reward those that are resilient, but maybe give malus to the ones that have still high portfolios in high GHG.

The malus will for sure come, at least via the external audit and is all these mechanisms around the external audit, that will I think come, is just that the challenge of the regulator is to find the right timing.

Because the idea is not that the whole market needs to explode their capital requirements because then you will have maybe a systemic risk, because the banks will not be able to fund their capital anymore or two they will have to fund all at the same time and it will be maybe a huge impact on the market

So all these things need to be considered, and I think that's what they're trying to do, that's why the regulator is not clearly moving on the pillar one when it comes to ESG right now, where they are moving a lot is on the pillar three, so all the reporting and they are trying to find ways to have a good view on what the bank is doing to manage the ESG risk and to manage the financial risks.

But for me it's not enough if they want to move to a direction when it will be integrated into pillar one, they will have to move to double materiality, and they will have to move to a mechanism that doesn't consider capital requirements as such, but the risk cost of the bank, which is the consequence of the capital requirements and how this at risk cost can be increased or decreased according to their resilience in terms of ESG risk.

That's an idea that I have in mind. Why they're not right now thinking about that? and I think it will come, because I hear some here and there some points about this.

I don't know if the risk cost is the right tool to be honest.

I don't know if the CRR is the right tool as well because in decreasing a capital requirements I mean I find this a bit hot but OK, yeah, why not?

So for me that's the only way to say OK right now maybe you will have an increase of capital because you are the start of the transition but then we will find a way to reduce your risk cost along the way while you are better and better transitioning while you are more and more resilient and more and more... because transition is a long term path you know, it's a marathon, it's not a sprint.

And we are only at the start of the marathon

RC: Yeah but pillar 3 ESG report is gonna be obligatory for next year, isn't it?

They ESG pillar 3 has already been in place since last year I think, they had to do a first report on a part of the report which covers the sectors. They will disclose how much they are exposed to the sectors that have the most ESG risk the highest ESG risks, with a focus on climate of course.

And then, this year I think, they had to produce their alignment report, meaning on much they are financing activity that are aligned with the EU taxonomy and then next year I think they will start with... I don't know all this by heart, but if you want I can send you some documentation on this.

And then there is also the GAR and the BTAR, so those are ratio to measure or much they are transitioning and how much they are aligning.

So it's the guides, the green asset ratio, so based on the EU taxonomy, what is the percentage of green activity in lending portfolio GAR and the BTAR the same but in terms of transition, "business transition asset ratio". So you have to GAR BTAR that are the two ratios based on which the regulator will see how much the client is evolving, most probably targets will be set soon, I suppose, if they have set those such KPI's but right now it's only a disclosure requirement.

CSRD is a bit more stringent on that part because you have to disclose not only where you stand in terms of alignment but also how much you plan to improve in the coming years and what you are putting in place in order to reach your targets of improvement, so, for that CSRD is more complete than the pillar three, Pillar three is more checking the risk side of the thing and more how much resilient you are and how much align you are with the EU taxonomy.

But it doesn't give you any formal incentive to protect yourself from an increase of ESG risk for instance.

That will become part of the other two pillars and mainly via the mechanism that I explained to you at the beginning of the call.

So, for now, via external audit, and request to increase capitals and then ideally in the future to put it in pillar one and to find ways to manage the risk cost the bank in a way that it incents the transition of the banks, for the transition of banks are incentivized.

Because why it's important for the risk to have a risk cost that decrease? because right now for banks having green products it's additional cost, why because they have much more controls to do.

They have more responsibility in terms of the activity of the of the companies that are funded behind the green bond, and so on and so on... So it's additional things that is complex to put in place and complex to follow up so it means a lot of cost, but on the other side the market expects that clients are incentivized of buying those products, because making them cheaper, you know, and the fact that if we have a mechanism that allows them to reduce the risk cost, thanks to this product, maybe they will be able to decrease the price as expected by the market.

At the end of the day it will help the markets and the regulator to make green product cheaper than brown product because if you issue a lot of brown bonds, you will have your risk cost increasing, and therefore, you will need to increase your pricing, but if you issued a lot of green bonds if they are assessed as such by the regulator, and the regulator is happy with it, plus all the other things you do to manage your ESG risk, then the risk cost will decrease and therefore you will have the margin allowing you to maybe also decrease the price of those products.

So that's why the regulator needs really to things broader than just only the capital when it comes to CRR integrating ESG in the pillar one of CRR.

And right now, there are too much focus on... like if ESG risk can be managed as credit risk as well as via CRR because its work for credit risk it will work for sure for ESG risk, but no, in credit risk you do have this transition aspect that will take years to come.

RC: yeah they focused on the capital requirements,

And how you think the supervisor of the banks(ECB and EBA) will be affected by those regulations. Will have more work to do? Oh yes, for sure, everybody in the chain will have more work to do.

So the more the regulator is asking for that data, the more the regulation will have work to analyse that data, and to make sure that they take right conclusion and the right action towards the banks, so this is a brand new type of assessments and analysis that for sure will impact the way they are currently assessing the banks and auditing the bank.

They will have to go more in details they will have to integrate for instance value chain aspects, which is not the case today or not as deep as ESG risk requires,

so yes it will change and it will make much more work for regulators, now if regulators can use AI to do so that, it would be great, they have to be assisted by technology to allow them to keep the right level of workload, because, the idea is to still remain fast in recommending actions to the banks. Because if they take instead of maybe today they take six months, they will take one year and a half, it's one year and a half where the bank will not receive any recommendation to transition, and we are in urgency so they will have to invest in technology to keep the time as short as possible in order to come back

to banks in line with the timing requested by the scientific study which is that we need to meet certain objective by 2030 and 2050.

RC: Do you think that maybe auditors will have a role to hold within this?

PM: Auditors will have a huge work and more responsibilities and the board of each bank will have more responsibility on that as well, meaning that there are discussion on the market that, if they do not meet their target or it's not going in the right direction in terms of transition, they could be affected their responsibility as board member or executive, they will have to take some responsibility. So you will see an increase of responsibility in the three : the auditors,... level and the regulator and there will be a huge work for auditors because they will have new assessment missions that are not existing today.

Assessment mission to see if a green bond is really green, audit mission to see if the ESG risk are properly managed, mission to understand the bank is transition in the right way.

These are all brand new topics where auditors will need to get knowledge on and to be efficient as well.

And also there technology will be key.

RC: OK so the main problem with better data to process for the regulators and auditors then coming from the bank regarding the ESG, that would be the main problem, because the banks need to have quick answers but the regulators doesn't have more data to process

PM: Yes there is a conflicting point, there will be a tipping point where regulators will be flooded with data, and where the recommendation needs to be quick to allow bank to reach a level where the regulator will want the bank to be.

There will be a conflicting point where the regulator will need to see what is the right level of data they can still manage and incorporate, and the more they will have to incorporate data the more they they will need people or the more they would have used innovative technologies to allow them to cleans all this data and to come with first feedback that will be double cheque maybe by people.

There may be the auditors will play a big role.

RC: OK it's only maybe ?

PM: no is it my own interpretation of what I see popping here and there.

But I'm sorry I I have to leave I don't know if you're still a lot of question?

RC: No it's OK I mean I think we gone into most of the questions so it's ok.

PM: It's my last day today and there is another person that is very knowledgeable on CRR that's my colleague Jujanna and she will be able to give you even more detailed information on how she things CRR will evolve.

RC: OK

PM: because she knows the way better the capital requirements mechanism and you can also maybe take some of my points and cheque with her if she agrees or not and if she has additional information or raise the question that you not been able to raise to me

RC: OK perfect thank you very much!

PM: And if there is any need, contact me, we can still have a discussion even during my holidays for the next two weeks.

RC: I will try to not bore you.

PM: But in the meantime Jujanna will definitely help you out.

RC: Thank you very much.

PM: Bye bye.

RC: Thank you bye.

Annex 7: Interview of Steven Mulkens

Interview done via Microsoft Teams on the 03/05/2023

Interviewee: Steven Mulkens

Interviewer: Randall Colin

RC: Our master's thesis subject is on climate risk within the banking institutions. With are focusing on the integration of climate risk within regulatory capitals.

SM: There is a difference with the banks' impacts and value chain, so there is a clear difference between corporate and financial institutions. I requested a colleague of mine, Pietro, to take contact with you as he is more of a specialist in this area. Did you already have contact with him?

RC: Yes, I interviewed him yesterday and he was really helpful on this topic.

SM: Perfect, then you already have the expert's view on the topic as well. Ask me what you want to ask me.

RC: first of all, do you consent that the information you provide are to be used within a university context?

SM: That's the purpose, right? So yes

RC: Can you present yourself?

SM: My name is Steven Mulkens and I am an Executive Director at KPMG in Belgium, working for KPMG for about 15 a half years now and about 10 years ago I started to specialise myself in sustainability reporting and ESG reporting insurance. So I started at KPMG as a finance auditor, so that's in short my background.

RC: Can you describe the current state of the climate risk within the banking institution? To be more precise, how is tackled?

SM: It's it's probably in their enterprise risk management that tackles these kinds of risks and most of the time it will be physical risks. So if you look at the two kinds of risks or the two time kinds of perspectives in terms of what is my impact, what is the risk and what is my opportunity. You have your impact materiality, which is the impact you as a

company have on greenhouse gas emissions, for instance on climate change. And you have the financial materiality, it's the impact that these kinds of topics such as climate change have on the enterprise value or on the business of the company. So these two perspectives are really very different from each other and are to be combined in a new in a new sustainability directive and the CSRD that is coming.

I think from a traditional POV, banks always looked at it from the financial materiality perspective, what could be the impact that climate change has on our portfolio and on the business and underperformance of the business. And most of the time and you have two aspects if you look at climate, if you look at the TCFD for instance, the Task Force on Climate Related Financial Disclosures, which clearly provides guidance and guidelines for companies to report on financial impacts of climate change, financial disclosures on climate climate related risks. You see two kinds of risks, there is the physical risks and you have transition risks, and these physical risks are probably the most prominent one in the ERM of banks and other companies. So if they look at risk, they most of the time look at " what are the assets that could be impacted by climate change, for instance, rising sea levels? And how many of these assets do we finance at this point and what could be at stake?" They also are I think increasingly looking into transition risks. What is the risk of the transition towards a more sustainable economy? And that will be probably something that they are building up going forward. That's my high level understanding of how banks will look the climate risks.

RC: Do you think that increasing the minimum capital requirements that the banks have to hold, in order to minimise the climate risk is a good idea? Let's say the banks needs to hold 2% more of their capital, would it be a good climate risk mitigation?

SM: Of course, it's a financial buffer, so it would be probably a benefit if something happens, and they have this buffer for more securities. But if you look at climate risk, if they really want to decrease the climate risk itself because this is not decreasing the climate risk, right, this is just having a financial buffer if there would be a disaster, or something happens. That they could consider additional funding to ensure that they will not be closing with their business. They really need to look into their financed and facilitated emissions probably if you want to tackle climate risk. So what are they financing? Are these sustainable projects? these projects do they have less emissions? What are they facilitating, which services are they providing to the project that they are

financing or any other projects. And I think they really need to investigate that because that's their value chain and that's where they can make impact.

I don't think that's only looking at the, the capital threshold would solve the problem. It's looking into the value chain, and we see banks doing this effort to make sure this is something that they are looking for specifically. "What are we financing" and looking into sustainability linked loans. For instance, KPIs that the companies need to track and the progress towards a certain target, interest rates go up or down, but they really want to make their portfolio greener. And that is also my view on how they should look to integrate climate risk because that's where they have their impact.

RC: So, in your opinion, should the ESG scorecards should influence the credit process, for example, for the industries that come for to the banks?

SM: Well, I think probably the high emitting sectors, they will have difficulty finding financing. For other sectors, of course, it's always relative at "how good are you doing in a certain sector?" So if your sector is an important one, for instance food production and there are still a lot of emissions, we cannot exclude these emissions. Maybe, what you could do is show the bank that you are performing better than your peers and you are better than the sector, which could probably provide you with a more beneficial interest rate. And I think it's probably that, that the banks will be looking at. This perspective will allow banks not to exclude quite a lot of sectors and quite large companies, which is probably also an issue from economic economical point of view. Nevertheless I think certain sectors, and we all know what are the sectors which are of course are at stake. They could have some issues with finding financing because we see that a lot of the banks are hesitant to provide any financing that these companies because of the reputational risk that have

RC: For the banks, what do you think would be the most suitable approach to tackle climate risk

SM: Well, I think it's first it will be reporting it and of course the bank will need to report emissions values throughout the value chain as well, so all the investors and all stakeholders will have insight into what they are financing and what would be the impacts. That could of course have an impact on investors and driving capital into the banks. And that of course is a trigger for banks to go for more green portfolios.

I think there are quite a lot and I don't know them by heart, but I think there are already quite a lot of reporting requirements for banks in relation to GHG or the gas emissions or any emissions that they have to report already. So, it will be reporting at first and I'm not sure if there will be a clear target for this, because that's quite difficult. We already see the case in corporates, when there is a clear target that we're seeing for CSRD, indeed the goal setting needs to be aligned with the Paris agreement. With the climate reality of the European Union, I think it will be more or less the same for banks at this point, in my view, so we all need to go to climate neutral economy based on the target setting and transition plan that we will be provided and that's the same for banks. Banks will need to do that as well and that's a bit different from say having your regulator saying "then now you have to achieve this and you have to achieve this in this". I don't see that coming in the in the near future. But of course, again, I'm not banking specialist, I think it will be more from stakeholder POV. So everybody sees, that reading your report, what you are doing and how ambitious you are and if you're not ambitious enough.

That could have an impact on finding a capital funding firmly for your company. Quite a lot of banks are also listed on the Stock Exchange, and you have to imagine, these are the investors then, but the stakeholder field is a bit broader than that. You as a consumer, you as a client of the bank can have an impact as well if you are bank that is having negative reputation in terms of greenhouse gas emissions and climate change, it could be the case that from stakeholder POV clients are moving away from their bank. The same applies for suppliers, for instance, because they also have to leave to look into their value chain. And if its supplier looks into its value chain and sees that their clients are not elected to the downside upstream and downstream. So also downstream if the if the supplier verifies or identifies risks in its value chain with regard to any companies that that they are supplying. Then the supplier can take the decision to sit and move away from that client and to say "no, I'm not going to do any business with them because it's a reputational risk from my perspective." That could be the case for any company.

RC: regarding the supervisory process of the banks, do you think that new regulations will render the ECB incapable of supervising the banks alone?

SM: If I want that to be honest, I have no idea. I think that ECB will be supervising them but they probably they will need to in source some expertise maybe in relation to energy transition.

But I think what is quite important is that all of the sustainability information in the report will need to be audited. That will of course triggers what the bank has been saying in the past reports and confronts them on the reality.

However, this is not my field of expertise, and I don't quite feel confident enough to give you my opinion on the subject. If you have specific question relating to the climate risk integration, feel free to ask, but the more specific question regarding the banking supervision is not within my expertise.

RC: No problem, I understand, it Is not your primary field, so it is normal.

SM: For those questions you will gain more insight if you ask Pietro, as he is an expert in this domain.

RC: Yes, we already had the interview, and he was very helpful and specific in his answers.

SM: Great, If you have no other question that are more general?

RC: No thank you, I think we can end the call here, you were quite helpful and your views are in line with what Pietro mentioned in his interview.

SM: Happy to here that I am not out of line in this topic

RC: Thank you for the time you allocated and have a great day, bye

SM: Thank you, you too, bye

Annex 8: Interview of Thomas Eeckhaudt

This interview was done via Microsoft Teams on the 05/05/2023

Interviewee: Thomas Eeckhaudt

Interviewer: Jean Herrier

JH: Hello.

TE: Hello Jean.

JH: So, first of all, I will introduce myself. So, I'm Jean Herrier and I have just finished my three months internship at Deloitte in the audit department. I'm writing my master thesis on the subject "how to integrate climate risk in the supervision of banks?". Maybe I can share my screen.

TE: Did you work in the Gateway office?

JH: Yes, I did work in the Gateway office.

TE: Okay, fine.

JH: But I mainly worked with the Liège office.

TE: Yeah, yeah. I see. Will you work at financial institutions?

JH: No, more in the industry department.

TE: Ok, alright.

JH: So, can you present yourself?

TE: I can. So, I am Thomas Eeckhaudt. I have been with Deloitte since June 2021 so two years now almost. Before I worked for eight years in European bank and three years in AXA bank, the bank in Belgium. And then two years and a half in AXA insurance in Brazil, in Sao Paulo. And then I moved back to Belgium and now two years in Deloitte.

I have a background in financial risk management; credit risk, market risk, liquidity risk. That is what I did most of my career I would say. But at Deloitte what I do is I focus on sustainability for financial institutions. I'm part of the risk advisory business unit. So, you

worked for insurance, and I work for risk advisory. It is advisory around risk regulations. When I read your comments, your questions in the interview guides, that's what I do. So, it's what I do more or less and so we'll come to the more details with that today. It's a lot of Pillar II related to work. Not so much Pillar III but CSRD, which is an important regulation. So, integrating climate risk, environmental risk, ESG into risk management and complying with regulations around reporting. But also benefits for example of how to sell investment products, a little bit of sustainability strategy for institutions but focusing bank and insurance on integrating climate environmental and ESG risks into financial institutions. And we are a team of eight people.

JH: Ok perfect you already spot on my master thesis subject. So, first question "how would you describe the current state of the climate related risk within the banking institution and within the Basel framework?"

TE: Within the banking institution, as I said most of the work being done is on Pillar II, because that's what the ECB, the supervisor is today expecting. When we look at what is being done in practice, it's focusing on Pillar II. So, the most important document or requirement there is the ECB guide on integrating climate related and environmental risk on risk management. Are you aware of the publication?

JH: Yes, I am.

TE: Ok. So, that is the guiding principle which is driving the work on climate related risks. Everything that is in there is basically what banks today are working on or have worked on when you talk about climate risk. Next to that, in the ECB guidelines they refer to it. It is the Pillar III ESG templates. So, you know, the Pillar III reporting consists of both qualitative reporting and quantitative reporting. Are you aware of that?

JH: Yeah, yeah.

TE: So, the pdf and the Excel templates basically in which you can compare the banks to each other's. In that excel template, for the first time this year they need to report also a lot of climate information and that's also been in terms of public disclosures of Pillar III, the main focus of the banking. Are they looking at Pillar I? No, they think about it but they're not doing anything. Also because, as an industry it is being considered. And there was the EBA paper issued last year: a consultation of integration in Pillar I. And that's the

reference document. So, I think from that part it's already very clear that the only thing that's being considered is risk-based approach.

So, there's no intention whatsoever to have a sort of a capital requirement reduction for green loans for example. It's risk-based. If there's less risk, then there is less capital. If there's more risk it can be more capital. But it's risk-based I think that's no doubt. But beyond that, it's still a question mark. So, banks today are not acting a lot, they have their hands full with Pillar II and Pillar III I would say.

JH: According to you, should the regulator implement a capital requirement for that? Like the Pillar I?

TE: That is difficult, not today because of the micro-level. If you have a bundle of retail loans, should we start distinguishing between the riskier loans from grand perspective between one and the other? Today the question is "can we?" "do we have the data to actually assign specific climate properties?" You talked about capital requirement for corporate, a loan to a corporate. A corporate has a loan and you are rated A or you are rated B. That is based on you known cash flow information, on solvency information, management quality (which is qualitative, but you can describe it so, you can score it). And you have then a whole history of companies with data, and you see the probability, the default history. You can get these statistical models. All the data is available.

Now, you have cash-flow information on every company that you can compare. With climate data, you don't. Whether that's for corporate, whether that's for retail you don't have the necessary data and sufficient history to look at "do I see potential correlations between higher greenhouse gas emissions?" (That is one of your questions.) "Do we see actual correlation between the default of loans and higher greenhouse gas emissions?". Or if you say, "we believe in the future it will be, even if in the past it wasn't: how are you going to put numbers on that, without a more qualitative approach?"

So, I think today for sure the data isn't there. Both on the one hand to assign certain capital weights to it, neither if you supposed you have those capital risk, you're not able to use them because on your actual exposures you don't have the data to say if it's one or the other. Is that answer clear?

JH: Yes. How do you think that the supervision will evolve in the future?

TE: The supervision will focus on gathering data, improving data availability, and data quality. They will expect much more effort than today. They will focus on using the data to disclose publicly the data on the portfolio level. Data disclosure and stress scenarios or scenario analysis. So, Pillar II, a big part of that is “ok let's suppose that temperature rises by 2 degrees, 3 degrees, 4 degrees. What happens on the short term, on the medium term and on the long term? And they expect, banks, to be able in those scenario analysis to understand how climate is changing, how it's going to affect the economy, how it's going to affect their balance sheet, how it's going to affect the P&L, how it's going to affect their customers? Those rounding scenarios are for understanding step by step what potential routes climate can take and therefore the economy can take and therefore the balance sheet can take. And today those scenarios are very simplistic. Because for example, I take my balance sheet of today and I see what can GDP do? What does inflation do? And I apply shocks on my balance sheet of today. But what I don't see today and what nobody but very few people are companies are doing is able to make a dynamic balance sheet where you have one scenario game. We have a in scenario A, I expect to grow, in the first five years my balance sheet by 5%. But then because there's a disorganized transition, disorderly transition where you have in 2030 or 2027 whenever, policymakers say “ok it's enough, we're not getting there, we're taking very drastic decisions” and then you imagine that your balance sheet will start changing dramatically as well. How will I then deal with strategic changes? How will I then evolve the evolution of the coming years and other strategic decisions. That kind of dynamic in the balance sheet with a dynamic approach of the external roles. So, all dynamically, externally, internally. We're not seeing that.

Also, a second order effects that are not being considered. Today a bank will typically say “on my little workers portfolio, physical risk is not a big impact because the insurance company they cover”. When there is a flood, the insurance company and the government pay. And I don't face any losses as a bank. Because people have just been payed back. With the floods in the area of Verviers 2021, banks lost zero euro, or you know little. Literally. So, they say “if that dramatic event doesn't cost us anything, why should we worry?”

However, what they don't consider is that, supposed this happen a couple of times: how will that put pressure on the governments, in terms of government finances? How will

that put pressure on insurance companies? And how can that impact (the second order effect) their own balance sheet?

Stress testing scenario building will have to become much more sophisticated. Data must be much more sophisticated, for everybody to learn. And then start taking the shift on Pillar I.

JH: Ok, perfect. Do you think the ESG scorecard should influence the credit process? For example, by putting maluses on the banks, who are not resilient with ESG.

TE: There are two aspects to the credit process and there's different parts of the credit process. There's a decision "do I want to lend: yes or no?" and there's a decision "what interest rates do I ask, if I want to lend?". And there are two potential considerations from ESG scorecards. ESG scorecards can be constructed from the perspective of risk. An ESG scorecard, today is "to what extent is our ESG factors going to impact the creditworthiness of my counterparty?" However, it can also be "to what extent lending to this company is generating positive or negative impact on the environment?" So, the first one is the outside-in perspective: how is it creating financial risk? The other one is the inside-out: how can I create an impact in the transition? Now you see there are two scorecards that are being used, linked to those two types of scorecards. Both of them can have an impact on both of the decisions that I described before. You can say from the risk perspective, "I won't do this loan, from my ESG scorecards: it's creating too much risk. It's risk based. It doesn't pass my risk appetite: I don't accept to lend." The question always is: "do you want to take such a drastic decision which is potentially based on not good enough data?"

Let's imagine we have all the data that we want, in this scenario. And we say, "no this is too risky from a risk management perspective." We don't want to lend. But perhaps you say "ok, in principle from a risk perspective this is too risky, but because I want to make, as a bank, an impact. I suppose that technology is extremely risky. But it's necessary. Actually, it doesn't fall within my risk appetite but I want to make an impact, I want to make sure that we have renewable energy in there. So, I do take the decision to grant, based on my impact that I want to have. And with our pricing we will do the same. What's the risk and what is the stimulation that I want to give? The loan pricing you also have different components. You have a risk premium and a commercial premium. From a risk perspective, you add 1% because it's super risky but from a strategic perspective you

deduct 0.5%. As long as you keep on separating those two aspects and you know where the final price is coming from: from a risk or from a strategic perspective? Then yes, I think it should influence! But you should be careful not to start mixing up what you want to have as an impact from a strategic perspective and what the risk actually is of the loan that that you see.

And when, for example, you refer to higher greenhouse gas emissions: should they receive maluses from the bank? Well, it depends. It may be that a lot of greenhouse gas emissions actually result in a competitive disadvantage and therefore a higher credit risk. But it can also be that even if there's a lot of green gas emissions, let's say a cement factory, they are huge green gas emissions, but we will need a lot of cement in the future to renew and generate a lot of buildings. The question is "will we always have to have cement?" well in many cases probably yes. We can think about new technologies for a thing or two, but like this example, we will all need cement. And therefore, some introducers will be able to pass on, typically, the cost of these green gas emissions to their customers. Therefore, it may not necessarily generate that these cement factories will be in bad business in the coming 10, 20, 30 years.

Then, should you give a malus? Well maybe yes, maybe from an impact perspective: you say "no I don't want to support cement, from a strategic perspective and from a strategic perspective I will add more to the industries". From a risk perspective, not necessarily. So, let's distinguish between when it is actually a risk in green gas emission and when it is not necessarily always a risk, or simply a risk.

JH: Ok, perfect thanks. How will the supervision of banks be affected by stronger regulation, throughout the climate risk? And will the ECB still be able to supervise the bank alone? What do you think about that?

TE: The first one, I don't really see any specifics. They will pay attention to it. They are focusing a lot, but I don't think the mechanics, or the supervision will really change. The problem that the supervisor faces is skills. They are also learning. What we often see is that the private sector steals their best people. So, what we saw for example is that the people who designed the stress test exercises, from the Bank of England, that they move to the private sector, where they make a lot more money. And the ECB, they need to find more new people and keep up with the increasing knowledge, etcetera. It is so difficult.

As it is for private sector companies, it's also very difficult for the supervisor. Knowledgeable people in these fields are very scarce resource. Will they be able to supervise alone? To the extent that they have the people, yes. I don't think adding another entity will help. But of course, if they need to be able to find the people, I wouldn't put them in an other entity, I would say.

JH: Ok. What do you think about the role of the external auditor? I know it's not your expertise.

TE: I see the external auditor. I think the external auditor should always ask themselves to what extent, already today, with the data that we have at hand: "do the financial statements incorporate climate risk? Is there something in the financial statements that actually should already be reflected and that I don't see in there?" It's a macro question I know but, I think that's a key question that external auditors should start asking themselves: "is there a possibility that due to climate risk, actually the financial statements in front of me don't reflect the reality of the company? That there are really things which we know, where the data is super clear, that this is not the profit. These are not the expected credit losses for IFRS 9. Because I expect actually more. We already see it today. Are you aware of IFRS 9, the expected credit losses?"

JH: I have seen a bit in class.

TE: Ok, so let me quickly explain it to you. If you have a loan on your balance sheet, as a bank, you have to estimate what you expect the credit losses to be. How much of that value of your assets will you lose because people don't pay back their loans? And that you have to take as a provision already so, it's already a loss in your P&L. Now today, you expect to lose it. So I have a billion of losses, I expect 0.5% actually not to receive back so, I already take that as a provision. I already take it as a loss today because I know it's going to happen. How do you calculate that 0.5%? You have scenarios "how will GDP evolve, how will employment evolve, how housing prices evolved for mortgage loans?" Based on those parameters you will calculate, based on historical data, how much effectively will not be paying back. So, one question at least some auditors should ask themselves "in selecting those scenarios to look forward for your expected credit losses, do you need to integrate there some climate elements that will then cost your provisions and an impact

in your P&L?" I think that's the main and first question that auditors should ask themselves when looking at a bank.

JH: Ok perfect. It was really clear. So yes, I think we covered most of the questions and it was really interesting so thank you so much for your time.

TE: My pleasure thanks for your good questions so, I'm happy to have been able to shed some light on those.

JH: Perfect, thank you.

TE: You're welcome. If anything else comes up, if you have any other questions let me know, or if something wasn't clear. I am happy to help.

JH: Thank you, have a good day.

TE: Have a good day.

Abstract :

In this thesis, we will look at how the banking institutions define climate risk and how it is considered by regulatory authorities. We will analyse and compare the risk report of three different Belgian banks: KBC, Belfius and Degroof Petercam. The aim is to identify the current treatment of climate risk within banking institutions. And we will explore the future possibilities for climate risk integration within the risk taxonomies of the banks.

UNIVERSITÉ CATHOLIQUE DE LOUVAIN
Louvain School of Management

Place des Doyens, 1 bte L2.01.01, 1348 Louvain-la-Neuve
Boulevard Emile Devreux 6, 6000 Charleroi, Belgique
Chaussée de Binche 151, 7000 Mons, Belgique
www.uclouvain.be/lsm