REPORT

ON THE ROLE OF ENVIRONMENTAL AND SOCIAL RISKS IN THE PRUDENTIAL FRAMEWORK

EBA/REP/2023/34 OCTOBER 2023

EBA EUROPEAN BANKING AUTHORITY

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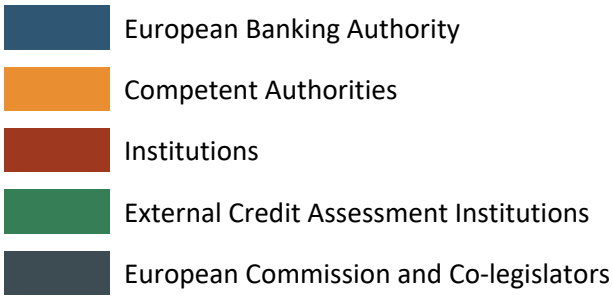

European Banking Authority
Competent Authorities
Institutions
External Credit Assessment Institutions
European Commission and Co-legislators

Abbreviations

A-IRB	Advanced-IRB
ASA	Alternative Standardised Approach
ASF	Available Stable Funding
ASRF	Asymptotic Single Risk Factor
AUM	Assets Under Management
AVAs	Additional Valuation Adjustments
BBM	Borrower-based Measures
BCBS	Basel Committee on Banking Supervision
BI	Business Indicator
BIA	Basic Indicator Approach
BIC	Business Indicator Component
BIS	Bank for International Settlements
BPF	Brown Penalising Factor
CCF	Credit Conversion Factor
CCoB	Capital Conservation Buffer
CCR	Counterparty Credit Risk
CCyB	Countercyclical Capital Buffer
CDR	Commission Delegated Regulation
CET 1	Common Equity Tier 1
CMG	Clearing Member Guarantee
CMH	Client Money Held
CRA	Credit Rating Agency
CRM	Credit Risk Mitigation
CRR	Capital Requirements Regulation
CSRD	Corporate Sustainability Reporting Directive
CVA	Credit Valuation Adjustment
DP	Discussion Paper
DRC	Default Risk Charge
E&S	Environmental and social
EBA	European Banking Authority
ECAI	External Credit Assessment Institution
ECB	European Central Bank
ECL	Expected Credit Loss
EFRAG	European Financial Reporting Advisory Group
ELBE	Expected Loss Best Estimate
ES	Expected Shortfall
ESG	Environmental, social and governance
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
FAQ	Frequently Asked Question
FCP	Funded Credit Protection
F-IRB	Foundation-IRB
FOR	Fixed Overheads Requirement
FRTB	Fundamental Review of the Trading Book
GL	Guidelines
GSF	Green Supporting Factor
G-SII	Global Systemically Important Institutions
HQLA	High-quality liquid assets
HQOF	High-quality object finance
HQPF	High-quality project finance
HR	Human Rights
IASB	International Accounting Standards Board
ICAAP	Internal Capital Adequacy Assessment Process
IFD	Investment Firms Directive
IFR	Investment Firms Regulation
IFRS	International Financial Reporting Standards
ILM	Internal Loss Multiplier
IMA	Internal Model Approach
IMF	International Monetary Fund
IRB	Internal Ratings Based
ISF	Infrastructure Supporting Factor
ISSB	International Sustainability Standards Board
JTD	Jump to Default
KPI	Key Performance Indicator
LC	Loss Component
LCR	Liquidity Coverage Ratio
LEX	Large Exposures
LGD	Loss Given Default
LTI	Loan To Income
LTV	Loan To Value
M	Maturity
MDB	Multilateral Development Bank
MiFID	Markets in Financial Instruments Directive
MoC	Margin of Conservatism
NGFS	Network for Greening the Financial System
NGO	Non-governmental organisation
NMRF	Non-modellable risk factor
NSFR	Net Stable Funding Ratio
O-SII	Other Systemically Important Institutions
OTC	Over-the-counter

PD	Probability of Default
PMC	Permanent Minimum Capital
PSE	Public Sector Entity
RDS	Reference Data Set
RF	Risk Factor
RFET	Risk Factor Eligibility Test
RICS	Royal Institution of Chartered Surveyors
RNIME	Risk Not in the Model Engine
RSF	Required Stable Funding
RtC	Risk to Client
RtF	Risk to Firms
RtM	Risk to Market
RTS	Regulatory Technical Standards
RW	Risk Weight
RWA	Risk-Weighted Assets
SA	Standardised Approach
SbM	Sensitivity-based Method
SFTs	Security Financing Transactions
SMEs	Small and Medium Enterprises
SREP	Supervisory Review and Evaluation Process
sSyRB	Sectoral Systemic Risk Buffer
SyRB	Systemic Risk Buffer
UFCP	Unfunded Credit Protection
VaR	Value at Risk

Executive Summary

Risks stemming from environmental and social issues are changing the risk picture for the financial sector. Economies and societies are increasingly facing the complex and severe consequences of climate change, biodiversity loss, resource depletion, inequality, migration and other environmental and social concerns. Through their effect on traditional categories of financial risks, such as credit, market and operational risks, environmental and social factors are expected to more significantly contribute to risks to both individual institutions and financial stability as a whole. This highlights the need to enhance the prudential framework to better account for environmental and social risks.

On 2 May 2022, the EBA published a DP, which initiated the discussion on the appropriateness of the current Pillar 1 framework to address those new risks. This report is the outcome of that reflection and represents the EBA's response to the mandate in Article 501c of Regulation (EU) No 575/2013, i.e. the CRR, and in Article 34 of Regulation (EU) 2019/2033, i.e. the IFR. It initiates a series of reports expected to be delivered over the upcoming years in accordance with CRR3 and complements past and ongoing EBA initiatives aiming to incorporate environmental risks – and more broadly ESG risks – across all pillars of the regulatory framework in line with the EBA's Roadmap on Sustainable Finance[1].

Recognising the need for a holistic approach whereby market transparency under Pillar 3 and risk management and supervision under Pillar 2 play a major role in addressing environmental and social risks to institutions, the report proposes targeted enhancements to the current Pillar 1 framework, which can be implemented in the short term. Those enhancements aim to accelerate the integration of E&S-related risks across the Pillar 1 framework, while preserving its integrity and purpose. They cover both standardised and internal approaches, while acknowledging that the capture of new risks is better achieved where internal models have been maintained (market risk and credit risk). In addition, the report proposes medium- to long-term actions, including more comprehensive revisions to the framework that could be considered, flagging the cases where, considering the very fundamental nature of such revisions, international cooperation at BCBS level is important.

As part of this report, the EBA has considered introducing specific risk-weighted adjustment factors. The EBA considers, at this stage, that the most consistent way forward from a prudential risk-based perspective is to address environmental risks through effective use of and targeted amendments to the existing prudential regime rather than through dedicated treatments such as supporting or penalising factors. Acknowledging the challenges posed by environmental risks for the safety and resilience of institutions, the EBA will, pending progress to overcome the challenges associated with such adjustments, reassess if and how environment-related adjustment factors could be designed

[1] See EBA (2022), *Roadmap on Sustainable Finance* (link).

as part of a prudentially sound and risk-based prudential treatment of individual exposures, while ensuring that the overall level of capital requirements remains adequate to respond to all risks.

While there is already some evidence about the effect that environmental risks have on risk metrics, more comprehensive changes to the Pillar 1 framework are warranted only where a clear link between E&S factors and traditional categories of financial risks can be established. In this context, and with a view to reassessing potential changes to the prudential framework in the future, the EBA recalls that the main priority remains for institutions to develop techniques to identify how and to what extent E&S risks translate into financial risks. For environmental risks, in particular, this implies institutions being able to identify whether a realised loss is linked to environmental factors and the extent to which the market prices environmental risks, as well as to incorporate environmental factors into their own assessments. The targeted enhancements proposed in this report seek to further catalyse this process of better identifying environmental risks where present. Acknowledging this, the EBA will monitor, as part of its continuous dialogue with competent authorities, the extent to which and how institutions incorporate environment-related forward-looking information into their ECL models, as well as the extent to which and how institutions incorporate environment-related forward-looking information in accounting, including fair value and corresponding prudent valuation requirements.

Furthermore, with a view to developing more accurate E&S risk assessments and ensuring that prudential capital requirements remain appropriately calibrated over time, the report identifies regulatory reporting as one of those areas where further work is needed to enable the collection of relevant and reliable information on environmental risks and their impact on financial losses of institutions. In this respect, the EBA will propose amendments to its supervisory reporting and disclosures framework, including the progressive development of environment-related concentration risk metrics.

From the Pillar 1 perspective, the use of observed data – i.e. most recent data and historical data, where relevant, complemented by expert judgement – represents a structural feature of the prudential framework. However, despite academic literature showing that some environmental risks are already priced in, most recent data may not yet reflect environmental risks in full due to data challenges or other challenges in linking environmental factors to traditional categories of financial risks. The EBA will further consider how scenario analysis could be used to enhance the forward-looking elements of the prudential framework. It will, however, remain important to ensure the continued accurate capture of financial risks other than environmental risks. This includes avoidance of double counting.

Finally, it is acknowledged that several elements of the sustainable finance regulatory framework are still in the early stages of implementation, while others are being developed, such as the case of transition plans. As the sustainable finance framework develops, future phases of work on prudential treatments may also need to consider new policy tools and options, as well as broader considerations around their design. This further underlines the importance of monitoring future developments relevant to environmental risk assessment and allocation associated with the transition to a sustainable economy, when developing potential further risk-based enhancements

to the Pillar 1 framework. In particular, it will be important to ensure that impending and future adjustments result in appropriate risk differentiation between firms that are adapting successfully to this transition, and firms that are exposed to greater risk as part of this transition.

The EBA will continue strengthening the integration of E&S risks across all pillars of the regulatory framework, hence contributing – alongside broader and more critical policy initiatives outside the prudential framework – to supporting the transition towards a more sustainable economy, while ensuring that the banking sector remains resilient.

List of policy recommendations

Credit Risk – Standardised Approach

CR-SA-1

As a **short-term action**, the EBA recommends that external credit assessments integrate environmental and/or social factors as drivers of credit risk whenever relevant. Although at the moment the degree of integration varies across rating agencies, with further assessment needed on the robustness of the methodologies and the level of transparency and disclosure to the public, external credit assessments have the flexibility to integrate environmental and/or social risks and should be encouraged to progressively do so.

CR-SA-2

As a **short-term action**, the EBA recommends that competent authorities verify that due diligence requirements explicitly integrate environmental aspects, to ensure that environmental risks are appropriately captured and reflected in the prudential framework whenever relevant.

CR-SA-3

As a **medium- to long-term action**, the EBA will monitor that financial collateral valuations increasingly reflect environmental factors, both through market values under Pillar 1 and through valuation and valuation methodologies under Pillar 2.

CR-SA-4

As a **medium- to long-term action**, as environment-related risk assessments improve and once experience is gained on the newly introduced exposure class, the EBA will assess whether high-quality specialised lending corporate exposures introduced in CRR3 could be subject to similar environmental provisions as under the ISF, where only exposures meeting strong environmental standards may benefit from the ISF.

CR-SA-5

As a **medium- to long-term action**, the EBA will reassess whether environmental risks should be considered in evaluating the appropriateness of risk weights assigned to real estate exposures.

CR-SA-6

As a **medium- to long-term action**, the EBA will reassess how E&S risks can be reflected in prescribed risk weights in the SA keeping in mind the intended simplicity of the approach and taking into consideration the developments agreed to at the international level by the Basel Committee.

Credit Risk – Internal Ratings Based Approach

CR-IRB-1

As a **short-term action**, the EBA recommends that E&S risks be taken into account in the rating assignment (i.e. risk differentiation step), the risk quantification (through for example margin of conservativism, downturn component, calibration segments) and in the application (e.g. via use of human judgement and overrides) in accordance with the existing requirements. In particular, sufficient information should be available, such that:

- the incorporation of new risk drivers in the risk differentiation step does not materially decrease the overall performance of the rating system;

- the adjustment of estimates during the risk quantification step are based on a sufficient number of observed and reliable data;
- the application of overrides should be used in a conservative manner only in relation to some specific, individual cases, in particular where the institution is of the view that exposures are materially exposed to environmental risks or broader E&S risks, but has insufficient information to estimate the extent to which the borrowers' financial condition or facility characteristics would be impacted and only in relation to a well-justified number of the exposures within the range of application of a rating system affected by environmental risks or broader E&S risks.

In this context, the EBA recommends clarifying the existing regulatory framework by incorporating BCBS FAQs 8 to 15 in the relevant regulatory products (i.e. RTS and Guidelines) of the IRB repair programme.

CR-IRB-2

As a **medium- to long-term action**, the EBA will further investigate and reassess whether E&S risk drivers of a broader relevance across different types of exposures should be added to the corresponding non-exhaustive lists of risk drivers referred to in paragraphs 57 (PD estimation), 121 (LGD estimation) and 177 (ELBE and LGD in-default estimation) of EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures.

CR-IRB-3

As a **medium- to long-term action**, as the impact of E&S risks on defaults and loss rates become available, the EBA recommends that institutions reflect E&S risks in PD and LGD estimates respectively, via a redevelopment or recalibration of the rating system.

CR-IRB-4

The EBA considers it, at this stage, premature to consider further differentiation in the RW supervisory formula, the risk weights applied to the specialised lending under the slotting approach and the LGD and CCF values used for under the F-IRB approach for the purpose of taking into account E&S risks in own funds requirements.

However, the EBA recommends bringing the clarifications provided by BCBS FAQ 8 directly in Commission Delegated Regulation (EU) 2021/598 on slotting approach.

CR-IRB-5

As a **medium- to long-term action**, the EBA will reassess the appropriateness of revising the RW supervisory formula, the risk weights applied to the specialised lending under the slotting approach and the LGD and CCF values used for under the F-IRB approach in light of evolving E&S risks and taking into consideration the developments agreed to at the international level by the Basel Committee.

CR-IRB-6

As a **short-term action**, in line with BCBS FAQ 11, the EBA recommends that institutions be required to consider E&S risk as part of their stress testing programmes referred to in Article 177 CRR. Further specifications could be provided via the mandate set out in CRR3.

Credit Risk – Collateral Valuation

CR-COL-1	As a **short-term action**, the EBA recommends that institutions account for relevant environmental factors in the prudent valuation of immovable property collateral. In particular, institutions should consider making necessary adjustments when the current market value of the collateral does not adequately address relevant risks associated with environmental factors that could affect the sustainability of the market value of the property over the life of the exposure. These considerations should include climate-related transition risk and physical risk, as well as other environmental risks, and should cover valuation at origination, re-valuation and monitoring, whenever relevant for current market values and sustainable market values over the life of the exposure.
CR-COL-2	As a **short-term action**, the EBA will continue monitoring how environmental factors and broader ESG factors are reflected in the value of collateral, with due consideration of national specificities that may exacerbate environmental risks.
Credit Risk – Adjustment Factors	
CR-ADJ-1	At this stage, the EBA does not recommend introducing environment-related adjustment factors.
CR-ADJ-2	As a **medium- to long-term action**, the EBA will reassess if and how environment-related adjustment factors could be taken into account as part of a prudentially sound and risk-based prudential treatment of individual exposures.
Market Risk	
MR-1	As a **short-term action**, the EBA recommends that all institutions, regardless of whether they use the simplified standardised approach, the SA or the IMA, be more explicitly required to consider environmental risks in relation to their trading book risk appetites, internal trading limits and in the context of the new product approval.
MR-2	As a **short-term action**, the EBA recommends that institutions employing an IMA for some of their desks be required to consider environmental risks as part of their stress testing programmes referred to in Article 325bi CRR in line with BCBS FAQ 17.
MR-3	As a **medium- to long-term action**, the EBA recommends that competent authorities assess how ESG-linked products are treated in relation to the risk-residual add-on to ensure that there is harmonised treatment across institutions.
MR-4	As a **medium- to long-term action**, the EBA recommends that competent authorities assess how ESG-linked products are treated in the internal risk measurement model.
MR-5	As a **medium- to long-term action**, the EBA recommends that institutions specifically consider environmental or even broader ESG risks when monitoring their risks that are not included in the model. To this end, the RNIME framework developed by the ECB could be used as a basis.

MR-6 ■	As a **medium- to long-term action**, taking into consideration the developments agreed to at the international level by the Basel Committee, the EBA will reassess the appropriateness of including under the SbM a dimension, in the equity and credit-spread risk classes, reflecting environmental or even broader ESG risks to establish the buckets into which a risk factor falls, or of including an environmental risk class. A necessary condition for this long-term fix is the meaningful assignment of issuers to buckets according to their riskiness in terms of environmental risk, based on a set of factors to be defined. The assignment of issuers and the corresponding risk weights should provide sufficient explanatory power for the observed market risk of the position.
MR-7 ■	With the increasing materialisation of environmental risks, internal models are expected to automatically capture environmental risk drivers either implicitly, by means of time series of classical risk factors reflecting environmental risk drivers in full, or more explicitly. However, to ensure that this is the case, as a **medium- to long-term action,** the EBA will reassess the appropriateness of introducing regulatory provisions explicitly requiring institutions to capture material environmental risk drivers in their internal models.
Operational Risk	
OR-1 ■	As a **short-term action**, the EBA recommends that institutions be required to identify whether environmental and social factors constitute triggers of operational risk losses in addition to the existing operational risk taxonomy. This could, for example, be performed as part of supervisory reporting.
OR-2 ■	As a **medium- to long-term action**, the EBA will following evidence of environmental – and where relevant social – factors triggering operational risk losses in increased frequency and severity, reassess the appropriateness of revisions to the BCBS SA methodology, taking into consideration the developments agreed to at the international level by the Basel Committee.
Liquidity Risk	
LR-1	At this stage, the EBA does not recommend changes to the LCR framework.
LR-2	At this stage, the EBA does not recommend changes to the NSFR.
Concentration Risk	
CONC-1 ■	As a **short-term action**, the EBA will work on the development of a definition of environment-related concentration risk, taking into consideration the developments agreed to at the international level by the Basel Committee.
CONC-2	The EBA recommends that the current large exposures regime continue serving its own specific purpose (i.e. to capture idiosyncratic, name concentration risk) and should be kept unchanged.
CONC-3 ■	As a **short-term action**, the EBA will work on the development of exposure-based metrics for the quantification of environment-related concentration risks. Those exposure-based metrics should be implemented as part of supervisory reporting and should be disclosed where relevant. The EBA will conduct benchmarking analyses based on reported values for these concentration risk metrics across EU institutions. Due to the inherent limitations of those new metrics in the short-term, the developed exposure-

based metrics should be considered as part of Pillar 2 under SREP or as part of the Pillar 3 framework, possibly complementing the existing Pillar 3 disclosures on ESG risks. The EBA will amend its SREP Guidelines accordingly to provide guidance on how competent authorities should assess and treat environment-related concentration risks.

CONC-4

As a **medium- to long-term action**, as data quality and availability increase and institutions progressively become able to produce more refined environment-related concentration risk metrics, the EBA will consider the possible implementation of enhanced concentration risk metrics, taking into consideration the developments agreed to at the international level by the Basel Committee. The EBA considers as a good starting point for defining those metrics, the principles on which the SbM is built.

CONC-5

As a **medium- to long-term action**, based on the acquired experience and the results derived from the implementation of environment-related concentration risk metrics, the EBA will reassess the appropriateness of introducing environmental-related concentration risks under the Pillar 1 framework. The new framework would entail the design and calibration of possible limits and thresholds, add-ons or buffers, as well as the specification of possible consequences if there are breaches. The work should take into consideration the developments agreed to at the international level by the Basel Committee.

Capital Buffers and Macroprudential Framework

MACRO-1

The SyRB appears as the most relevant tool to address environmental risks within the current macroprudential framework. As a **short-term action**, the EBA will assess the need for changes to its guidelines on the appropriate subsets of sectoral exposures to which a SyRB may be applied.

MACRO-2

Considering the adjustments to the wider macroprudential framework needed for such a framework to be able to address environmental risks effectively, the EBA will, as a **medium- to long-term action**, coordinate with other ongoing initiatives and assess the most appropriate adjustments.

Investment Firms

IF-1

As a **short-term action**, the EBA recommends that the treatment of E&S risks for investment firms remain under the Pillar 2 framework for all K-factors including those related to RtC. Accordingly, the EBA does not recommend changing, in the short term, the prudential framework for investment firms independently from the CRR.

IF-2

However, as a **medium- to long-term action**, the EBA recommends extending the potential changes made to the CRR/CRD framework to the investment firms' prudential framework, where applicable. In particular, this would concern the parts of the investment firm framework that are directly or very closed related to the CRR. This includes the K-factors related to market risk, trading book concentration risk, CVA and counterparty credit risk. These should be replicated for investment firms, to ensure overall consistency while maintaining proportionality. Differences between the two frameworks, such

as the use of the K-CMG, could be addressed as originally recommended by the EBA in its 2017 report.

IF-3 Nonetheless, the EBA still recommends that the peculiarities of investment firms, including the overarching objective of having a simpler framework than credit institutions, be preserved also in the medium- to long term. This would apply, in particular, to the RtC key factors.

IF-4 At this stage, the EBA does not recommend introducing differentiating factors for commodity dealers in the scope of IFD/R as they currently apply the K-factors in line with the CRR and should apply the same requirements in case of any improvement in the CRR framework in the future for E&S risks. As a **medium- to long-term action**, the EBA will reassess, subject to further evidence and analysis, the appropriateness of introducing differentiating factors for commodity dealers to further reflect the concentration risk of those particular business models.

1. Background and rationale

1. Economies and societies are increasingly facing the complex and severe consequences of climate change, biodiversity loss, resource depletion, inequality, migration and other environmental and social concerns. The result will be a rise in the frequency and severity of physical risks, as well as increasingly apparent transition risks following from environmental and social policy implementation, technological developments and changing consumer preferences and market sentiment. This could lead to an increase in risks to individual banks as well as financial stability as a whole. The specific characteristics of these risks, in particular their multidimensional, non-linear, uncertain and forward-looking nature, could lead to their underestimation, at a time where the materialisation of these risks is likely to accelerate.

2. The features of environmental and social risks are changing the risk picture for the financial sector, which has an important role to play in terms of financing the transition and, more broadly, managing risks. Environmental and social risks have been identified as sources of financial risk that materialise through traditional categories of prudential risk[2]. This raises the question as to whether specific clarifications or adaptations of the prudential framework are required to account for environmental and social risk drivers.

3. The EBA is strongly committed to providing adequate regulatory and supervisory frameworks and tools which can support the European banking sector in the objectives of transitioning to a more sustainable economy and mitigating risks stemming from climate change and broader environmental, social and governance (ESG) factors. This transition should take place in a manner which continues to ensure the existence of a robust banking sector and overall financial stability.

4. The EBA is mandated under Article 501c of Regulation (EU) No 575/2013, i.e. the CRR, and Article 34 of Regulation (EU) 2019/2033, i.e. the IFR, to assess whether a dedicated prudential treatment of exposures substantially associated with environmental and/or social objectives and those subject to environmental and/or social impacts would be justified, and to provide reports on this topic.

5. To answer these mandates, the EBA published on 2 May 2022 a DP on The role of environmental risks in the prudential framework, which provided an initial analysis of the framework and identified areas for further work in this respect. It aimed at initiating the discussion and gathering a wide range of views and inputs to allow a comprehensive consideration of these complex issues. The feedback received on this DP, together with the findings of the Commission

[2] See EBA (2021), *Report on Management and Supervision of ESG Risks* (link).

High-Level Expert Group on Sustainable Finance[3] as well as the European Systemic Risk Board's (ESRB) work on this area have been used as inputs to this report.

6. This report explores the appropriateness and feasibility of possible clarifications and targeted enhancements to the prudential framework to better reflect the importance of environmental and social risk drivers for each of its elements. Short-term solutions, as well as possible medium- to longer-term actions, are explored. It builds on previous EBA publications in relation to sustainable finance and is part of the EBA's broader work on the topic as outlined in its Roadmap on Sustainable Finance[4], which includes: fostering transparency and market discipline on ESG issues, ensuring robust management of ESG risks by institutions and their adequate supervision, determining the relevance and content of ESG standards and labels, identifying possible measures to address greenwashing risks, and ESG-related stress testing and scenario analysis.

7. The prudential framework in the EU, which is based on the Basel framework, ensures the sound capitalisation of banks and fosters prudent risk management, with a view to avoiding or mitigating disruptions to the financial system that could impact the entire economy. While the overall design of the prudential framework has broadly remained unchanged, it has been adjusted over time to reflect the emergence of new risks, together with built-in flexibility for incorporating new risks, for instance in the IRB approach for credit risk, in which banks are expected to include new risk drivers in the setting of capital requirements.

8. Given the comprehensive nature of the topic, it should be clarified that this report does not cover all its different aspects. In particular:

    a. It does not aim to introduce new definitions of activities substantially contributing to the achievement of environmental or social objectives, or environmentally or socially harmful activities, which is deemed to be outside the scope of the EBA's remit. Instead, available definitions and categories from the EU regulatory framework or the literature are used, while recognising that some of these definitions and categories may need to be further developed. The EBA is mindful that the EU classification system for sustainable economic activities, i.e. the EU Taxonomy[5], is of importance. At this point, however, data available on the performance of Taxonomy-aligned economic activities are limited and the process of classifying institutions' exposures into Taxonomy criteria is ongoing[6]. The developments and changes in the classification system will, as they progress, be reflected in the assessment of the justification for changes in the prudential treatment of exposures. This

[3] See EU High-level expert group on sustainable finance (2018), *Financing a sustainable European economy – Final Report*, pp. 67-70 (link)

[4] See EBA (2022), *The EBA Roadmap on Sustainable Finance* (link).

[5] Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment (link).

[6] As per Article 8 of the Taxonomy Regulation (link) financial institutions subject to the Non-Financial Reporting Directive will disclose how and to what extent their activities are aligned with the Taxonomy. They should accordingly gradually be in a position to identify and monitor their Taxonomy-aligned exposures.

includes considerations that may arise if the Taxonomy is expanded to cover social and environmentally harmful activities.

b. The EBA has separately published considerations for ESG bonds for own funds and eligible liabilities instruments[7], providing an overview of the identified risks, as well as policy observations and recommendations on how the clauses used for issuances of such bonds and the eligibility criteria for own funds and eligible liabilities instruments interact, with the ultimate aim of identifying best practices or practices/clauses that should be avoided. The guidance provided by the EBA is not meant to address potential compliance issues of ESG bonds with ESG requirements. It aims to clarify the extent to which some provisions included in ESG bonds may raise regulatory concerns in the context of the eligibility criteria for own funds and liabilities instruments. In addition, the objective of the guidance is not to prevent or promote ESG issuances for capital/ loss absorbency purposes, but to clarify the interaction between ESG features and regulatory eligibility criteria. Finally, the EBA has announced that it will continue to monitor the developments of sustainability-linked bonds and possible related KPIs if issued for regulatory purposes.

c. Accounting values are the basis for applying prudential rules to derive risk-weighted exposure amounts. In principle, the Pillar 1 prudential requirements are designed to only cover the unexpected losses, which may arise under specific circumstances, while the expected losses should be covered by accounting provisions and impairment write offs. These – together with other substantial adjustments such as prudent valuation AVAs - are deducted from CET 1 own funds before the application of prudential rules to derive minimum own funds requirements. Due to the complementary nature of – and close interrelations between – the prudential and accounting frameworks, it is important to consider to what extent environmental risks are reflected in accounting exposure values, and specifically whether the accounting framework ensures adequate and timely recognition and consistent measurement of these risks – among other things through impairments, provisions and write-downs – which may in turn affect regulatory capital. Hence, it is important to monitor the evolution of the accounting rules and the sustainability reporting framework[8] in order to guarantee that developments on environmental issues are properly considered. In this regard, the EBA has recently commented to the IASB, in relation to the post-implementation review of IFRS 9 (classification and measurement phase), that guidance on the accounting treatment of instruments with ESG features and/or KPI targets would be useful, and that the topic of ESG instruments would deserve a broader discussion while not being limited to the accounting classification of financial asset[9]. Overall, the EBA reiterates the analysis

[7] See Section 4 of EBA (2020), *Report on the Monitoring of Additional Tier 1 (AT1) Instruments of European Union (EU) institutions – Update* (link).

[8] See, for example, the IFRS Foundation's Trustees Consultation Paper on Sustainability Reporting (for expanding the scope of IFRS to address sustainability issues) (link) and the EC Renewed Sustainable Finance Strategy (for collaboration with EFRAG, ESMA and the IASB to assess whether IFRS appropriately integrate sustainability risk) (link).

[9] See paragraphs 13 and 14 of EBA (2022), *Letter to the IASB* (link).

provided in Annex 3[10] of the DP published on 2 May 2022. The EBA will monitor, as part of its continuous dialogue with competent authorities, developments in this field and, in particular, the extent to which and how institutions incorporate environment-related forward-looking information into their ECL models, as well as the extent to which and how institutions incorporate environment-related forward-looking information into accounting, including fair value and corresponding prudent valuation requirements.

9. While this report has an EU focus, environmental and social risks are a global challenge. At the international level, the BCBS is investigating the extent to which climate-related financial risks can be adequately incorporated into the existing Basel framework, identifying potential gaps and considering possible enhancements. This assessment is being conducted across the regulatory, supervisory and disclosure dimensions. Considering the need to ensure consistency of the EBA's deliverables and recommendations with international standards and principles, the BCBS FAQs[11], findings and policy recommendations published to date have been considered in the preparation of this report. The EBA and its members will continue to participate in and monitor BCBS initiatives with a view to ensuring synergies.

10. Considering the above, this report explores the appropriateness and feasibility of possible clarifications and targeted enhancements to better reflect the importance of environmental and social risk drivers in the prudential framework, focusing on those elements of the framework which are most likely to be affected by environmental risk drivers and hence where the analysis is most relevant. Chapter 2 covers the principles, premises and challenges that underlie the analysis in this report. Chapters 3 (Credit risk), 4 (Market risk), 5 (Operational risk), 6 (Liquidity risk), and 7 (Concentration risk) cover the different elements of the prudential framework and how they interact with environmental and social risks. Given the potential systemic risk concerns driven by environmental and social risk drivers, Chapter 8 discusses how the capital buffer and macroprudential framework interacts with such risk drivers. Finally, Chapter 9 sets out how the prudential framework for investment firms interacts with environmental and social risk drivers.

11. The analysis presented in Chapters 3 to 6 is conducted on the basis of the expected future prudential framework rather than the current, taking into account the final Basel III standards and recent developments of the ongoing CRR3 legislative procedure[12].

12. Given that the report includes recommendations on both short- and medium- to longer-term options to pursue, more detailed work on these latter options will likely follow at later stages.

[10] See Annex 3 on Environmental risks in accounting and valuation in the EBA (2022) Discussion Paper on *The role of environmental risks in the prudential framework*, pp. 70-72 (link).

[11] Basel Committee (2022), *Frequently asked questions on climate-related financial risks* (link).

[12] This report was finalised before the end of the CRR3 legislative procedure. Hence, references to expected changes introduced by CRR3 should be verified against the final CRR3 text as published in the Official Journal of the EU.

2. Principles, premises and challenges

13. Chapters 3 to 9 cover the risk-specific dimensions to addressing environmental and social risk drivers in the prudential framework. A number of cross-cutting aspects and principles are being taken as given by the EBA in its work. These are explained in more detail in this chapter.

2.1 Principles and premises

2.1.1 Risk-based approach

14. The EBA is mandated to assess whether a dedicated prudential treatment of exposures associated with environmental and/or social objectives / subject to environmental and/or social impacts would be justified. The assessment of this justification depends on the approach taken and its underlying objective. In line with its overall approach to the prudential framework, the EBA is following a risk-based approach.

15. The risk-based approach seeks to ensure that prudential requirements reflect underlying risks and ultimately support institutions' resilience to all risks. This includes, from a microprudential perspective, making sure that prudential requirements reflect the underlying risk profiles of exposures associated with environmental objectives and/or social objectives / subject to environmental and/or social impacts, hence supporting the safety and soundness of individual financial institutions. From a macroprudential perspective, this would mean safeguarding financial stability, by ensuring the robustness of the banking and investment firm sectors, with a view to mitigating potential systemic vulnerabilities of the financial sector as a whole, stemming from environmental risks.

16. The focus of the EBA is therefore on exploring whether there are specificities in the risks (risk differential) of some exposures, e.g. environmentally and socially sustainable or unsustainable assets or assets subject to higher or lower physical risk, as such risk differential would be the key element to consider for adjusting the prudential treatment. This approach ensures that prudential regulation remains geared towards safety and soundness and is paramount for the credibility of the prudential framework, the resilience of financial institutions and financial stability. Furthermore, by ensuring that environmental and social risks are well-reflected in institutions' capital positions, a risk-based approach contributes to the robustness of the banking sector, which is a general precondition for the stable provision of financing, including for the transition towards a more sustainable economy.

17. The analysis presented in this report is not aimed at using prudential regulation to increase demand for environmentally and socially sustainable assets or penalise environmentally and socially harmful assets. While this could be the effect of the risk-based approach to the extent that the environmental or social profile of certain assets coincides with the underlying risks, the EBA is of the view that a dedicated prudential treatment which would explicitly aim to redirect

lending could have undesirable or unintended consequences, which could have an impact on financial stability:

a. It could undermine the credibility, suitability and efficiency of prudential tools, hindering the ability of these rules to meet their primary objectives of ensuring safety, soundness and financial stability. From a risk-based perspective, it is important to safeguard the reliability of capital requirements as indicators of risk for institutions. Deviations from international prudential standards could also weaken them and tilt the level playing field for international banking.

b. Directly pushing capital towards environmentally and socially sustainable activities could also cause financing risks to build up at counterparties that are still economically uncompetitive and lack credible long-term strategies[13].

c. If limitations were imposed on the financing of environmentally and socially unsustainable sectors, this could have unintended consequences such as impeding the financing of transition activities that would help these sectors to become more sustainable. In addition, such limitations could have unintended negative social consequences if they are implemented without sufficient time for making the necessary adjustments.

18. One fundamental challenge of environmental and social risks is the issue of negative externalities, where the harmful effect of buying an environmentally or socially unsustainable product is not felt by the buyer, but by society at large. This is not only a challenge for the prudential framework, as investment decisions may not consider the harmful effects on society as a whole, i.e. the pricing may not reflect the environmentally and socially driven costs to society. To rectify the issue, a greater recognition of environmental and social risks is needed in the pricing and capital allocation mechanisms.

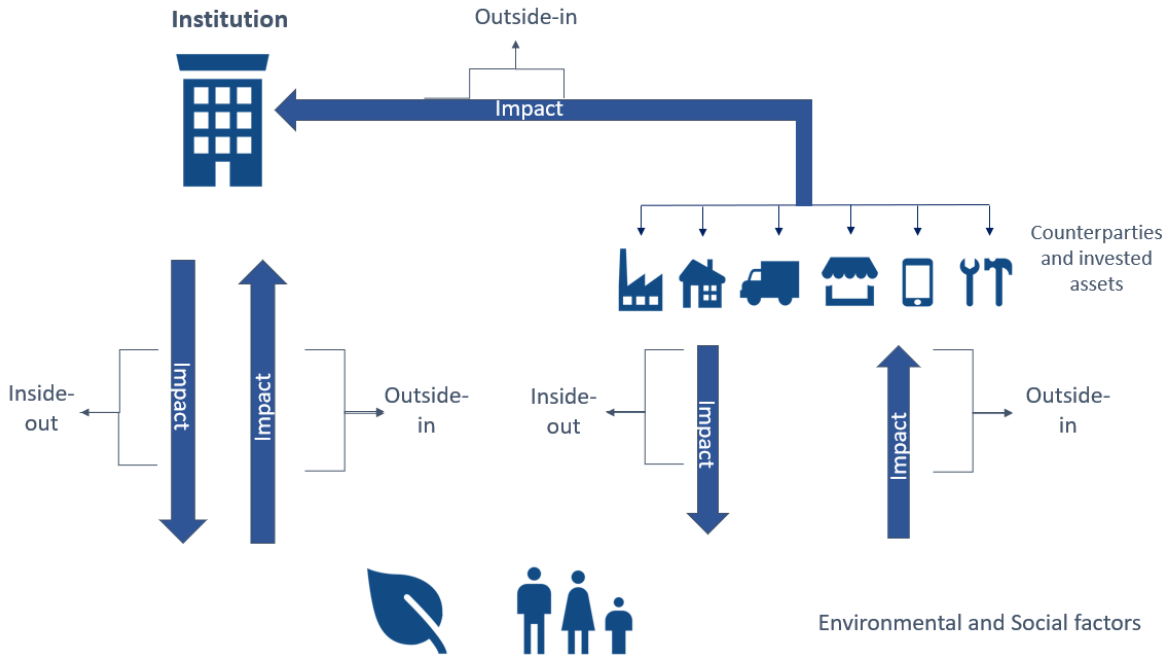
19. An important concept in this regard is that of double materiality[14]. Institutions can be *impacted by* (financial materiality) or have an *impact on* (environmental and social materiality) environmental and social risks at the company level, as shown on the left side of **Figure 1**. Although relevant for institutions from a financial perspective, these impacts stem from the institution's own fully controlled activities and related management arrangements and are thus less relevant from a prudential and risk-based perspective. More relevant from this perspective, is how institutions can be *impacted by* or have an *impact on* environmental and social risks through their core business activities, being their lending to counterparties and their investments in assets, as these impacts could be significant for their financial performance and solvency. This is shown on the right side of **Figure 1**.

[13] As mentioned in the NGFS (2020) *Guide for supervisors* (link), a 'brown' company that has sufficient capital, a strong management, and a credible long-term transition strategy might manage the transition well, while green companies can face transition risks, for instance because their business model might be based on new technologies that have yet to be proven at scale.

[14] The understanding of double materiality in this report, is based on the understanding of this concept and its application as outlined in EBA (2021), *Report on Management and Supervision of ESG Risks* (link).

20. On the financial materiality side, the economic and financial activities of counterparties or invested assets can be negatively impacted from the outside-in by environmental or social factors, affecting the value of such activities which might translate into a financial impact on the institution. On the environmental and social materiality side, the economic and financial activities of counterparties or invested assets can have a negative impact on environmental and social factors, which could in turn become financially material when this impact negatively affects the value of these activities and translate into financial impact on the institution. A risk-sensitive prudential frameworks should thus take both of these dimensions into account to the extent that they affect the different prudential risk categories.

Figure 1: Visualisation of the concept of double materiality as it applies to institutions



21. The primary responsibility and most effective tools for dealing with environmental and social risk-related externalities lie within the remit of political authorities. However, while acknowledging that prudential regulation should not serve as a substitute for needed public policies, a risk-sensitive prudential framework can contribute to facilitating the recognition of the impacts of environmental and social risks on financial risks, hence ensuring that these risks are adequately capitalised and are better reflected in pricing.

2.1.2 Environmental and social risks as drivers of traditional risk categories

22. As already highlighted above, institutions can be impacted by environmental and social factors through their core business activities, i.e. their exposures to counterparties and invested assets. Environmental and social risks[15] should not be understood as entirely new categories of risks,

[15] CRR3 is expected to define ESG risks in its Article 4(1)(52d): '"environmental, social or governance (ESG) risk" means the risk of losses arising from any negative financial impact on the institution stemming from the current or prospective impacts of environmental, social or governance (ESG) factors on the institution's counterparties or invested assets'.

but rather as risks that drive the traditional categories of financial risks through a variety of transmission channels. The main risk drivers of environmental risks are physical and transition risks, whereas social risks can be driven by environmental risks, changes in social policy and changes in market sentiment on social factors. This is depicted in **Figure 2** below. **Table 1** explains in more detail how social factors and social risks can be defined in the context of the prudential framework and elaborates on the different factors that drive these risks.

Figure 2: How environmental and social risks may affect financial risks through different (non-exhaustive) transmission channels

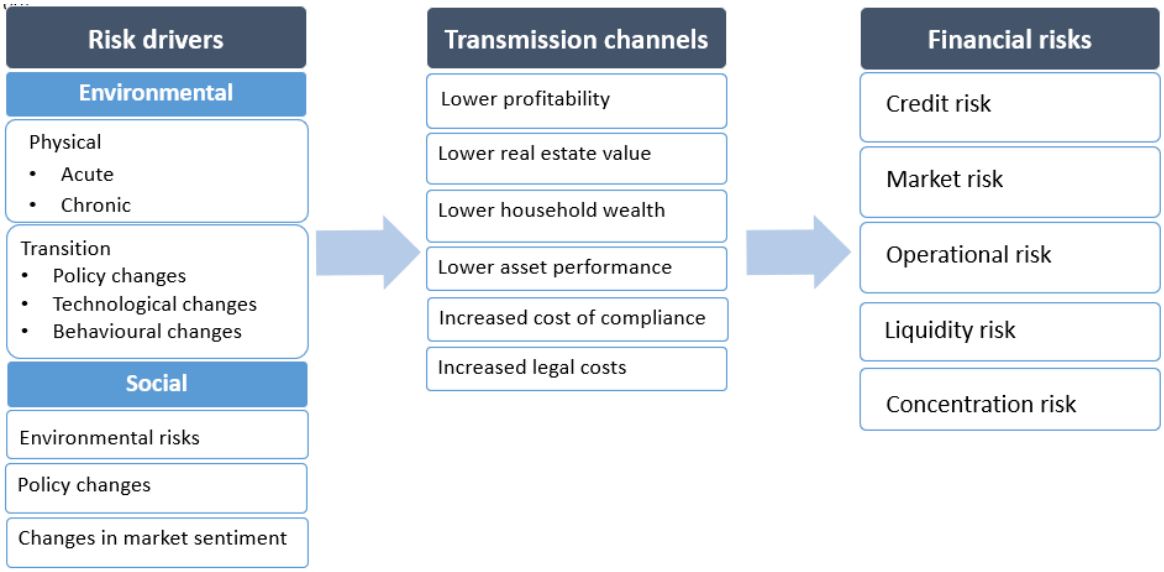


Table 1: Definition of social factors and social risks

Despite various efforts at the private and public sector level to define social factors, coherent definitions for such factors are generally more difficult to identify than for environmental factors. The following is an overview of the available definitions at the European Commission level. The European Commission's 'European Pillar of Social Rights'[16] provides a definition of social factors by outlining 20 principles that relate to equal opportunities and access to the labour market, fair working conditions, and social protection and inclusion. In 2021, the Commission published its 'European Pillar of Social Rights Action Plan'[17], which outlines concrete actions to further implement these 20 principles. The Corporate Sustainability Reporting Directive[18] defines social factors in that it requires companies within scope to disclose information on equal treatment and opportunities for all (including gender equality, equal pay for work of equal value, training and skills development, and employment and inclusion of people with disabilities), working conditions (including secure

[16] European Commission (2017), *European Pillar of Social Rights* (link).

[17] European Commission (2021), *European Pillar of Social Rights Action Plan* (link).

[18] European Commission (2022), *Corporate Sustainability Reporting Directive* (link).

employment, wages, social dialogue, collective bargaining and the involvement of workers), and respect for human rights.

While no EU Taxonomy currently exists for socially sustainable economic activities, the EU Taxonomy Regulation does refer to the social dimension of sustainability by defining the following key international instruments as minimum social safeguards for environmentally sustainable economic activities[19]: the Universal Declaration of Human Rights and the UN Covenants on Civil and Political Rights and on Economic, Social and Cultural Rights; the International Labour Organization Declaration on Fundamental Rights and Principles at Work; the UN Guiding Principles on Business and Human Rights and the OECD Guidelines for Multinational Enterprises.

Also, recently the European Commission's Platform on Sustainable Finance produced a report[20] in which it provides advice to the Commission on a potential future social taxonomy. It proposes three overarching social objectives with a non-exhaustive list of sub-objectives: (i) decent work (including wages sufficient for decent lives, eliminating forced labour and exploitation of work, eliminating child labour, no discrimination); (ii) adequate living standards and well-being for end users (including ensuring healthy and safe products and services); and (iii) inclusive and sustainable communities and societies (including improving access for target populations and/or areas to basic economic infrastructure like transport and telecommunication including the internet). These three objectives are structured by the type of stakeholder they affect: the entity's own workforce (including value chain workers), end users/consumers and affected communities (directly or through the value chain). As examples of socially harmful economic activities, the report identifies the involvement with certain kinds of weapons or the production and marketing of cigarettes. It proposes that the identification of activities as socially harmful could be based on internationally agreed conventions and on research on the detrimental social effects of certain activities to identify which of these activities are significantly harmful.

Based on the above definitions, the EBA considers social factors to be related to the rights, well-being and interests of people and communities, including factors such as decent work, adequate living standards, inclusive and sustainable communities and societies, and human rights. Social factors can translate into social risks for institutions when these factors have a negative financial impact on the economic and financial activities of their counterparties and/or invested assets, affecting the value of such activities, which might translate into a financial impact on the institution.

As mentioned before, several drivers of social risks can be identified. Firstly, they can be driven by environmental risks. On the physical risk side, deterioration of environmental conditions and degradation of ecosystem services imply heightened social risks, such as when climate-related physical changes affect (already disadvantaged) populations. An example is the quality and availability of drinking water or droughts that deteriorate the conditions of agricultural land. On the transition risk side, technological and regulatory changes to address climate change may impact labour markets in certain (non-green) industries, which could amplify social risks.

[19] See Article 18 of the EU Taxonomy Regulation (link).

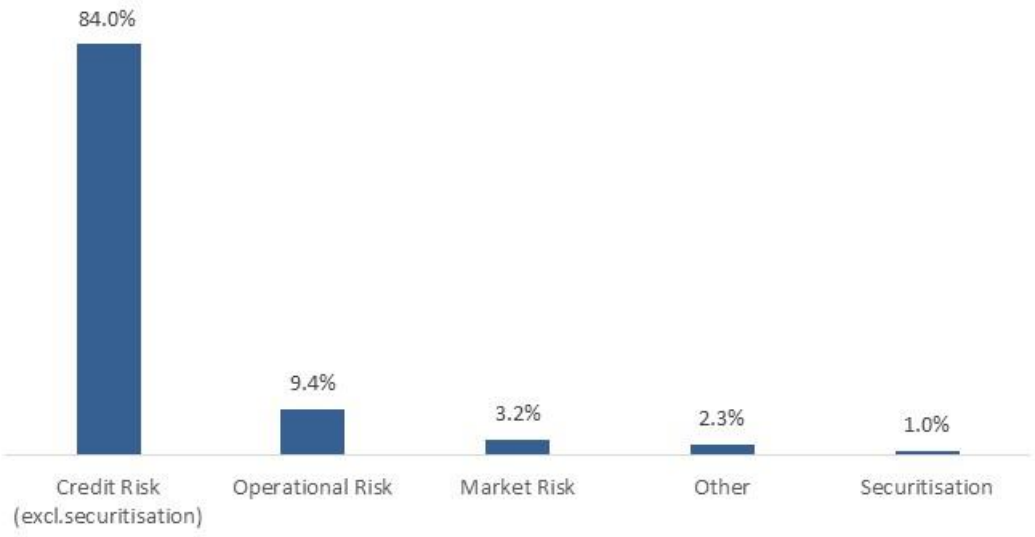
[20] Platform on Sustainable Finance (2022), *Final Report on Social Taxonomy* (link).

The second and third driver of social risks is the change in policies and market sentiment linked to the social transformation towards a more inclusive and equitable society. An increasing number of social actions are expected to be taken over the coming years to meet the social goals and targets set by the Sustainable Development Goals (SDGs) for 2030.

Counterparties' violations of social factors leading to legal and reputational risks, as well as the vulnerability and exposure of counterparties' business model to social risks leading to losses, can both in turn impact the balance sheets of institutions financing these counterparties.

23. When looking at the activities of credit institutions and the impacts of environmental and social risk drivers, credit risk is particularly relevant given that, on average, most institutions' own funds requirements reflect credit risk (see **Figure 3** below). Additionally, market risk, operational risk, liquidity risk and concentration risk are addressed in this report, given that these risk categories are also likely to be affected by environmental and social risk drivers and are therefore relevant to analyse.

Figure 3: RWA composition (EU/EEA) by risk type (credit institutions only)



Source: COREP supervisory data as of June 2023, covering all credit institutions

24. Due to this report focusing on most relevant risk categories, some aspects of the prudential framework are not covered in depth in this report. This is the case of the securitisation framework, which is, however, considered to be addressed through the considerations presented in Chapter 3, since by construction they also indirectly apply to the prudential treatment of securitisations[21].The EBA has also assessed whether leverage ratios should be included in the scope of the report and has found that as a non-risk-based measure which functions as a backstop, they do not specifically interact with environmental and social risks; hence, they are not covered in this report.

[21] On the non-prudential aspects of green securitisation, see EBA (2022) *Report on developing a framework for sustainable securitisation* (link).

25. Finally, the manner in which environmental and social risks translate into financial risks over time remains an area of much uncertainty, due in part to the likely non-linearity of environmental and social risks. This will have implications for the extent to which the Pillar 1 framework allows automatic capture of such risks, absent legislative amendments. On the one hand, a gradual build-up of environmental and social risks may allow for indirect channels in the Pillar 1 framework to partially translate such risks into higher financial risks over time, e.g. through increased expected losses, higher PD or LGD, or lower valuations. On the other hand, an environmental or social shock or greater inherent volatility in the estimation of the parameters used under the Pillar 1 framework may imply further increases in unexpected losses and therefore risks to institutions' capital.

26. Moreover, there remain fundamental questions over whether risks to the overall system are likely to grow as a result of increasing environmental and social risks, or if environmental and social risks instead imply the re-profiling of risk between sustainable and unsustainable firms and sectors in a way that is predominantly neutral to the overall system. Whereas the latter may imply the reallocation of capital requirements across sectors, the former may in addition challenge existing assumptions around the optimum capital level for the European banking system as a whole.

2.2 Challenges

27. This section describes the main challenges that should be considered when assessing environmental and social risks, or ESG risks more generally, and their incorporation into regulatory metrics. Where relevant, these challenges are referred to throughout the rest of this report.

2.2.1 Data availability and measurement challenges

28. The existence of data gaps and other challenges in the context of identifying and measuring ESG risks makes it difficult to properly discriminate exposures subject to higher ESG risks. The EBA acknowledges past and ongoing European and international initiatives (e.g. ISSB, EFRAG, NGFS and the ECB-ESRB Project Team on climate risk monitoring)[22] trying to bridge data gaps on sustainability-related data gaps and supports efforts to introduce common disclosure standards at international and European level as a response to the growing need for relevant, reliable and comparable data on sustainability-related matters[23]. Challenges exist both on the side of institutions in identifying the risks for counterparties, as well as on the side of supervisors and regulators in assessing and mapping ESG risks across institutions. The list below provides a (non-exhaustive) list of frequently observed challenges:

[22] See EBA (2022), *EBA response to the public consultations on sustainability-related disclosure standards launched by the International Sustainability Standards Boards and the European Financial Reporting Advisory Group* (link) and ECB-ESRB (2022), *The macroprudential challenge of climate risk* (link) and NGFS (2022), *Final report on bridging the data gaps* (link).

[23] See also the conclusions of NGSF (2022), *Final report on bridging the data gaps*, p.2 (link).

a. **Availability of relevant, high-quality and granular data:** this remains a challenge to risk classification and risk analysis. The various existing and forthcoming sustainability disclosure initiatives are expected to increase both the availability and quality of environmental data. Collection of information on ESG risks as part of supervisory reporting, as proposed under Article 430 of CRR3, is also expected to provide a valuable basis for meaningful analysis in this area.

b. **Lack of a common, standardised and complete classification system:** definitions of what can be considered environmentally and socially sustainable remain fragmented across exposure types and jurisdictions. Also, they are often binary, which is less helpful for risk differentiation, considering that there can be different 'shades' of environmentally and socially sustainable, which can affect the level of associated risk. In particular, corporates currently pursuing unsustainable activities may have credible plans and the required resources to transition to a more sustainable business model in the future, which would lead them to have a different risk profile than companies without such plans and resources.

c. **Challenges in linking non-financial forward-looking ESG information to prudential parameters:** estimating the probability of materialisation of physical risks poses significant challenges[24]. There is evidence on the financial losses stemming from physical risks, especially in the historical databases of the insurance sector[25]. However, estimating the probability of materialisation of physical risks requires forward-looking information. While scientific evidence on the realisation of physical risks exists, making a clear and robust link between the forward-looking dimension of these risks and the prudential parameters used in the regulatory framework remains a challenge[26].

d. **Challenges in the use of ESG ratings or scores:** these can suffer from poor quality, a limited and varying scope, and lack of transparency on underlying methodologies used[27].

e. **Complexity of analysis:** as mentioned, the granularity of classifications for what can be considered environmentally and socially sustainable may vary across different exposure classes. Complexity is further increased by the difficulties around defining common forward-looking indicators.

[24] For the challenges associated with the estimation of physical risks, see also ECB (2021), October Macroprudential bulletin – *The challenge of capturing climate risks in the banking regulatory framework: is there a need for a macroprudential response?* (link).

[25] See ECB - ESRB Joint Project Team on climate risk monitoring (2022), *The macroprudential challenge of climate change* (link).

[26] However, some institutions have started integrating forward-looking aspects of physical risks in their risk management framework.

[27] Discrepancies have been documented in the EBA (2021), *Report on Management and Supervision of ESG Risks*, Chapter 3.2.3 (link). In order to address these discrepancies and more particularly to increase the transparency and integrity of ESG rating activities in the EU, the Commission introduced a regulatory proposal in June 2023.

2.2.2 Challenges in the estimation of losses due to environmental and social risks

29. The prudential framework is calibrated on the basis of historical data, including market prices and expert judgement complementing the empirical results. Historical data, as well as current market prices, are unlikely to fully reflect environmental and social risks, which are more forward-looking in nature. Beyond institutions' increased efforts needed to appropriately map financial losses to respective climate-related events or transition trends, difficulties remain to quantify the extent to which the impact of environmental and social risks is currently reflected in capital levels.

30. Although some studies of specific aspects of environmental risks already illustrate the effect that environmental risks have on some risk metrics (see Section 3.1. and Section 4.2.2), identifying how and to what extent environmental and social risks translate into traditional financial risks remains difficult, hence making the calibration of any capital requirements to prudently account for environmental and social risks challenging. While there is generally a level of conservativeness embedded in the Pillar 1 framework, questions can be raised as to whether historical data are sufficient for the measurement of future, potentially unprecedented changes driven by the peculiar features of environmental and social risks. Environmental risk drivers are expected to become more prominent going forward, with an increase in the frequency and severity of physical risks and more acute transition risks, with potential tipping points and non-linear effects[28]. The data stemming from stressed or downturn periods in financial markets already observed during the past macroeconomic or financial crises may not be appropriate to capture environmental risks.

31. From the Pillar 1 perspective, the use of historical data represents a structural feature of the prudential framework. However, due to the structural shifts created by environmental risks, the dependency on historical data and historical relationships between risk factors may by construction not adequately capture environmental risk dynamics. Estimation techniques still need to overcome significant challenges related to measuring the contribution of potential future financial impacts driven by (more frequent and extreme) physical events or by (sudden) transition tipping points, making the translation of environmental risks into financial risks and potential losses more difficult. To estimate those impacts, the use of other data, based on scientific evidence about climate change, biodiversity loss and broader environmental degradation, needs to be considered. Compared to environmental risks, the estimation of financial impacts stemming from social risks presents additional challenges in terms of data availability and how social risks may affect the price of financial assets. Therefore, the capture of social risks – beyond the impact they already have on traditional risk categories – under the Pillar 1 framework would appear at this stage to be premature.

32. Nevertheless, while institutions operate in constantly changing circumstances, the prudential framework is designed in a way that it allows for these changes to be mechanically captured. The prudential framework is designed to remain stable over time. It can be noticed that while

[28] See, for example, IPCC (2021) *Climate Change 2021: The Physical Science Basis. Working Group I Contribution to the IPCC Sixth Assessment Report* (link).

environmental risk factors are getting more prominent and have specific features such as their non-cyclicality and incremental nature, they are not the only new risk drivers that institutions are currently facing. The adaptive nature of the prudential framework to some extent allows these changes to be captured through the inputs to the prescribed calculation of own funds requirements. Therefore, this raises a need to clarify which aspects of the Pillar 1 framework will capture changes driven by environmental risks over time, as risks materialise and data evolve, and what further amendments may be needed to maintain a prudent calibration in a situation where environmental risks have become much more prominent. It is also necessary to analyse the already existing tools making it possible to capture the forward-looking perspective, while keeping in mind that such tools exist not only in the Pillar 1 own funds requirements, but also in other parts of the prudential framework.

2.3 Time horizon considerations

33. The characteristics of environmental risks (i.e. forward-looking, long-term, uncertain timing and magnitude) also raise challenges that question the ability and/or relevance of the Pillar 1 framework to fully capture such risks. One fundamental challenge is the potential mismatch between the time horizon of the Pillar 1 framework and the long-term time horizon over which environmental risks are likely to fully materialise.

34. Although there is uncertainty as to the exact time horizons that should be applied to environmental risks, some acute physical and transition risks will possibly materialise in short to medium time horizons (e.g. one to a few years), while most chronic physical risks are expected to materialise over a relatively longer time horizon. At the same time, the Pillar 1 framework has not been designed to align with the manifestation of long-term environmental risks, but rather to capture the possible extent of cyclical economic fluctuations. In addition, environmental risks are also characterised by the uncertainty on their exact manifestation and magnitude, with a potential to create structural shifts (non-linearity) and to cause losses over an extended period of time. As a consequence, it is unclear if the business cycle concepts and assumptions that are used in estimating risk weights and capital requirements are sufficient to capture the emergence of these risks. It could therefore imply that the existing Pillar 1 framework may not be able or well-founded to capture the full loss potential stemming from environmental risks, especially over long-time horizons.

35. However, in the context of these challenges linked to the nature of environmental risks, conceptual issues should also be considered with regard to the relevant time horizon which should be reflected in the prudential framework. For this purpose, the role of the Pillar 1 own funds requirements should be recalled, considering that other parts of the regulatory and prudential framework can also contribute to address the forward-looking and long-term

aspects of environmental risks[29]. In particular, the following main principles of the current prudential framework should be recalled:

a. The losses that the institution expects to bear due to the materialisation of known risks are not covered by own funds requirements. Instead, it is mostly the role of the accounting framework to capture expected losses through provisions, impairments, write-downs and appropriate valuation of financial assets. Under the IRB approach for credit risk, expected losses are estimated based on the IRB risk parameters. In all cases, however, the expected losses, including the losses expected over long-term forward-looking horizons, are directly deducted from CET 1 own funds. In contrast, own funds requirements are intended to address the potential additional, unexpected losses, which may materialise with a certain confidence level, for instance due to changes in economic and/or market conditions.

b. Under the IRB approach, the PD of an obligor is estimated in a 1-year time horizon based on long-run average 1-year default rates. However, the risk differentiating factors may be defined in a way that reflects longer-term characteristics of the obligor. The LGD does not have a limited time horizon but extends to the full lifetime of the exposure or the full length of the collection process. The CCF estimates potential additional drawdowns on the exposure before it defaults, under the assumption that it experiences a default event within one year. In addition, both the LGD and CCF are estimated in a way that reflects the situation of an economic downturn.

c. Own funds requirements are mostly related to current exposures of institutions and do not reflect possible changes in the balance sheets of institutions, which would result from specific business strategies or risk mitigating actions. The relevance of a long-time horizon within the Pillar 1 framework can therefore be questioned, especially if such long-term considerations were to be applied to exposures with much shorter maturities, and without considering possible management actions over such a time horizon. The purpose of own funds requirements is to ensure resilience of the institution to unexpected adverse circumstances, before appropriate mitigation actions and strategy adjustments can be implemented, pointing rather to short and medium time horizons. Therefore, those environmental factors that affect institutions in the short- to medium term are expected to be reflected in the prudential framework. Instead, for environmental factors with a long-term impact, institutions would rather be expected to take appropriate mitigating actions in their strategies, for example through the development of transition plans.

d. Pillar 1 requirements are designed to protect institutions from risks with high confidence levels that may not be achieved if longer-term horizons were to be considered. Therefore,

[29] For accounting, see Annex 3 on Environmental risks in accounting and valuation in the EBA (2022) Discussion Paper on *The role of environmental risks in the prudential framework*, pp. 70-72 (link). For Pillar 2, see the EBA (2022) Report on *Management and Supervision of ESG Risks for credit institutions and investment firms* (link), which in particular highlights that institutions should adopt a longer than usual time horizon, *inter alia* by extending the time horizon for strategic planning to at least 10 years, at least qualitatively. Climate and environment-related stress testing and scenario analysis is another key element in light of the need to integrate a dynamic forward-looking perspective, both by institutions and supervisory authorities.

any consideration of the time horizon to be embedded in the Pillar 1 framework would have to be coupled with the consideration of an acceptable and feasible confidence level.

e. The Pillar 1 own funds requirements are complemented by additional Pillar 2 requirements, which address risks and elements of risks that are not covered or not sufficiently covered by Pillar 1 requirements, based on institution-specific assessments and considerations by the competent authority. To the extent that institutions are exposed to environmental risks in relation to their specific business model, strategy and risk management framework, Pillar 2 considerations are warranted.

f. The Pillar 2 additional own funds requirements are further complemented by Pillar 2 guidance, which is based on the results of stress tests and aims to ensure resilience of institutions in stressed conditions. A typical time horizon for stress tests is 3 years, and for Pillar 2 guidance, the year with the highest impact is taken into account. Although, as opposed to own funds requirements, the Pillar 2 guidance is not binding, competent authorities may take appropriate steps should institutions repeatedly fail to meet such guidance.

36. While the above elements are beyond the scope of this report, they must be taken into account in the overall considerations of the relevant time horizon for the Pillar 1 framework. In addition, ongoing developments of accounting, risk management, supervisory and disclosure requirements should also be considered to design the most appropriate prudential response to environmental risks.

3. Credit risk

3.1 Literature review

37. A conspicuous strand of literature has analysed how a firm's ESG standing can affect its credit rating and attractiveness to investors, with mixed results (Chodnicka, 2021)[30]. Early studies tended to exclude that a significant link between the two existed. However, more recent studies have instead outlined how environmental and social risks – and more specifically environmental factors – can affect creditworthiness. This section, therefore, aims to provide an overview of this evidence. It has been built by leveraging the ongoing work at Basel level in relation to climate-related financial risks.

38. The fact that research around the topic is chequered with patches of lights and shadows is linked to the challenges and difficulties inherent to the quantification of the effects of environmental risks – both in the form of physical risk and transition risk – on credit risk exposures. First, difficulties arise with respect to the modelling of the phenomena themselves: the transition towards a greener economy and physical events[31]. In addition, determining the probability at which a given environmental risk materialises remains difficult. For example, Lenton et al. (2019)[32] highlights the uncertainty in determining how many ice sheets will melt as a result of a given scenario of rise in global temperature. Again, Pindyck (2020)[33] provides a comprehensive overview of the high level of uncertainty linked to climate-related phenomena. That being said, a growing number of research papers (see Stern, 2013)[34] show that not considering environmental risk would de facto lead to underestimation of the risk, to which banks are also exposed. All in all, evidence has been found by researchers about the effects of environmental risk on credit risk exposures. The impact on credit risk has been assessed both in the context of physical and transition risk.

39. In relation to physical risk, focus has been on extreme weather events, including floods, rising sea levels, rising global temperatures leading to droughts. For example, Kousky et al. (2020)[35] show that following a flood the probability of default of non-insured borrowers more than

[30] Chodnicka, Patrycja, *ESG as a Measure of Credit Ratings* (2021), Risks, Vol. 9, No. 12. Available at: Link

[31] As a matter of fact, in the context of market risk, in accordance with Article 370(f) CRR banks are already required to model event risk, which, from a modelling point of view, is similar to physical risk. However, supervisory experience brought to light that banks face significant challenges to meet the requirement to model event risk in a meaningful way.

[32] Lenton, Timothy M. and Rockström, Johan and Gaffney, Owen and Rahmstorf, Stefan and Richardson, Katherine and Steffen, Will and Schellnhuber, Hans Joachim, *Climate tipping points – too risky to bet against* (2019), Nature, Vol. 575, Vol. 7785. Available at: Link

[33] Pindyck, Robert S., *What We Know and Don't Know about Climate Change, and Implications for Policy* (2020), NBER Working Paper, No. 27304. Available at: Link

[34] Stern, Nicholas, *Potential Impacts of Climate Change: Grafting Gross Underestimation of Risk onto Already Narrow Science Models*, Journal of Economic Literature, Vol. 51, No. 3. Available at: Link

[35] Kousky, Carolyn and Kunreuther, Howards and LaCour-Little, Michael and Wachter, Susan, *Flood Risk and the U.S. Housing Market* (2020), Journal of Housing Research, Vol. 29, Issue sup 1. Available at: Link

doubles. Furthermore, Correa et al. (2022)[36] shows that some banks are already charging higher spreads to those borrowers that have been recently exposed to floods. This is consistent with the study made by Do et al. (2021)[37], as well as by Javadi and Masum (2021)[38], where it is showed that borrowers located in areas subject to droughts are charged higher spreads to account for the higher default risk. Some sectors are naturally more affected than others, for example, Brar et al. (2021)[39] shows the potentially material impact that environmental risk can have on credit risk of agricultural loans in Canada. Similarly, Nguyen et al. (2022)[40] show that mortgages on properties exposed to sea level rise risk are charged higher spreads. This evidence does not, however, alleviate the risk that environmental risk is underpriced, which is one of the main concerns raised by the NGSF in 2019 call for action[41], which states that there is a 'strong risk that climate-related financial risks are not fully reflected in asset valuations'.

40. In relation to transition risk, there are numerous studies as well, aiming to assess the impact of transition risk on loan pricing, as well as on credit risk parameters, such as probabilities of default. For example, Delis et al. (2018)[42] study whether banks price the climate exposure of borrowers in their loans. They study the impact of fossil fuel reserves on loan interest rates, and how such an impact changes depending on the climate policy/transition policy of different jurisdictions. Among others, they conclude that banks price in their loans the environmental exposure of their borrowers, and that the impact of fossil fuel reserves on loan spread is more pronounced in those jurisdictions where stringent climate policies have been adopted. Furthermore, Ehlers et al. (2022)[43] show that carbon intense companies are usually subject to a risk premium, i.e. those companies pay a premium when accessing credit, although a relatively small one. In addition, studies also assessed whether the credit risk of residential mortgages depend on the energy efficiency of the property (to which the mortgage refers). For example, Guin et al. (2020)[44] shows that mortgages for energy-efficient properties are less prone to payment arrears than non-efficient properties. Finally, there are also studies linking the environmental sustainability of a given firm to its credit risk – for example, a wide range of

[36] Correa, Ricardo and He, Ai and Herpfer, Christoph and Lel, Ugur, *The Rising Tide Lifts Some Interest rates: Climate Change, Natural Disasters and Loan Pricing* (2023), International Finance Discussion Paper No. 1345. Available at: Link.

[37] Do, Viet and Nguyen Thu Ha and Truong, Cameron, *Is drought risk priced in private debt contracts?* (2020), International Review of Finance, Vol. 21, Issue 2. Available at: Link.

[38] Javadi, Simark and Masum, Abdullah-Al, *The Impact of Climate Change on the Cost of Bank Loans* (2021), Journal of Corporate Finance, Forthcoming. Available at: Link.

[39] Brar, Jagdeep Kaur and Kornprobst, Antoine and Braum, Wiliard John and Davison, Matt, *A Case Study of the Impact of Climate Change on Agricultural Loan Credit Risk* (2021), Mathematics, Vol. 9, No. 23. Available at: Link.

[40] Nguyen, Duc Duy and Ongena, Steven and Qi, Shusen and Sila, Vathunyoo, *Climate Change Risk and the Cost of Mortgage Credit* (2020), Swiss Finance Institute Research Paper No. 20-97. Available at: Link.

[41] NGFS Publications, *First Comprehensive Report – A call for action* (2019). Available at: Link.

[42] Delis, Mathos and de Greiff, Katrin and Iosifidi, Maria and Ongena, Steven, *Being Stranded with Fossil Fuel Reserves? Climate Policy Risk and the Pricing of Bank Loans*, Swiss Finance Institute Research paper No. 18-10. Available at: Link.

[43] Ehlers, Torsten and Packer, Frank and de Grieff, Kathrin, *The pricing of Carbon Risk in Syndicated Loans: Which Risks are Priced and Why?* (2022), Journal of banking and Finance, Vol. 136. Available at: Link.

[44] Guin, Benjamin and Korhonen, Perttu, *Does energy efficiency predict mortgage performance?* (2020), Bank of England Working Paper No. 852. Available at: Link.

studies (see Li et al., 2022[45]; Carbone et al., 2022[46]; Höck et al., 2020[47]; Capasso et al., 2020[48]) show that low ESG ratings lead to higher probabilities of default.

3.2 Standardised Approach

3.2.1 Overview of the framework

41. The SA is the simplest of the approaches to credit risk, whereby risk-weighted exposure amounts are calculated as the product of the exposure amounts (net of specific credit risk adjustments) and supervisory determined risk weights, which depend on the exposure class and, in some cases, may be determined through external credit assessments. This approach aims to strike a balance between simplicity and risk sensitivity and it does not distinguish between potential differences in the creditworthiness of each individual borrower, otherwise than through external credit assessments, where these are available.

42. The SA represents on average around 54% of all credit-risk-weighted exposure amounts in the European Union, although this percentage differs markedly by country (see **Figure 4**). Smaller banks tend to calculate regulatory capital based on this approach, which does not require sophisticated risk management and measurement practices. Avoiding introducing excessive complexity is therefore particularly relevant to this framework.

43. Going forward, the SA is set to be relevant also for credit risk exposures under the IRB approach, as CRR3 is expected to include the output floor introduced in the Basel III reforms, whereby institutions' capital requirements calculated using internal models are constrained by a lower bound based on a percentage of the risk-weighted exposure amounts that would have resulted using the SA. Therefore, the calibration of the SA will also have an impact on the adequate recognition of environmental and social risks in the IRB Approach.

[45] Li, Hao and Zhang, Xuan and Zhao, Yang, *ESG and Firm's Default Risk* (2022), Finance Research Letters, Vol. 47. Available at: Link.

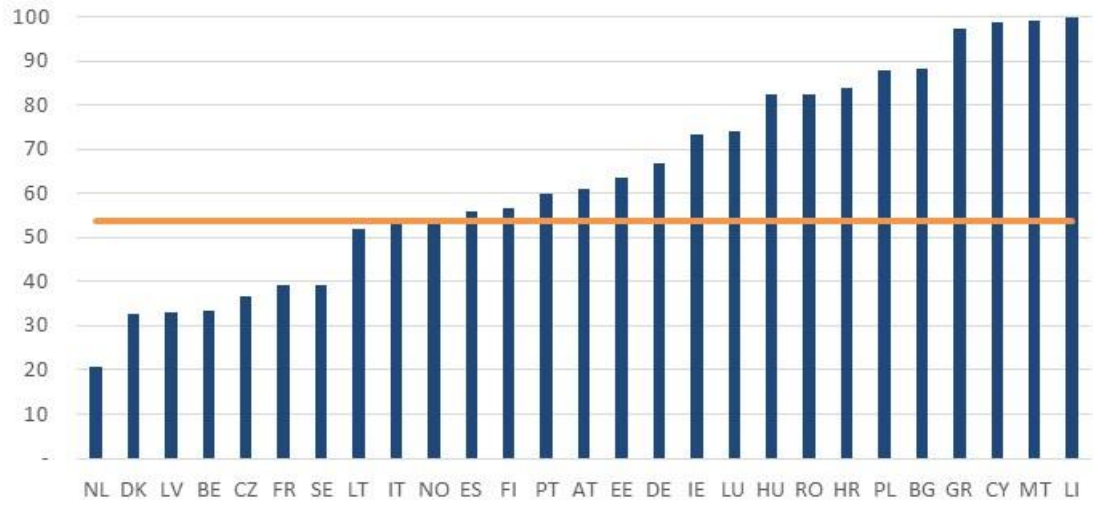
[46] Carbone, Sante and Giuzio, Margherita and Kapadia, Sujit and Kramer, Sebastian Johannes and Nyholm, Ken and Vozian, Katia, *The low-carbon transition, climate commitments and firm credit risk*, ECB Working Paper Series No. 2631. Available at: Link.

[47] Höck, Andre and Klein, Christian and Landau, Alexander and Zwergel, Bernhard, *The effect of environmental sustainability on credit risk* (2020), Journal of Asset Management, Vol. 21, No.2. Available at: Link.

[48] Capasso, Giusy and Gianfrate, Gianfranco and Spinelli, Marco, *Climate Change and Credit Risk* (2020), Journal of Cleaner Production, Vol. 266, No. 1. Available at: Link.

Figure 4: Use of the Standardised Approach in the credit risk framework across EU countries

Share of total credit risk-weighted exposure amounts derived through the Standardised Approach



Note: Data displayed as percentages.
Source: COREP supervisory data as of June 2023, covering all credit institutions

3.2.2 Interaction between E&S risks and the standardised approach

44. Supervisory determined risk weights are prescribed under the SA. The CRR allows the use of external credit ratings, when available, to determine risk weights for certain exposure classes, while otherwise it prescribes flat risk weights per exposure class, which in some instances can be further broken down into more granular risk weights depending on specific characteristics of the exposure.

External Credit Assessment

45. Environmental and social factors seem to be captured unevenly across credit rating agencies and sectors at this stage, according to research by ESMA on the level of consideration of E&S factors across credit assessments[49]. Based on a survey of industry practices[50], challenges arise in developing a common understanding on what constitutes an environmental factor and its relevance for a credit assessment. CRAs' possible further integration of environmental considerations into their credit rating methodologies over time must be accompanied by adequate disclosures and transparency on the rating methodologies. CRAs in the EU are required to provide environmental disclosures[51], which is improving transparency around whether E&S factors were a key driver of the credit rating action. However, although the overall

[49] For the purposes of investigating the role of environmental risks in the prudential framework under credit risk, the relevant aspect to capture under external credit assessments is how environmental risks are embedded into credit ratings. The separate growing field of ratings that solely measure sustainability components, without any indication of creditworthiness, is hence not of direct application in this chapter.

[50] See ESMA (2019), *Technical Advice to the European Commission on Sustainability Considerations in the credit rating market* (link).

[51] See ESMA (2019), *Final Report on Guidelines on Disclosure Requirements Applicable to Credit Ratings* (link).

level of disclosure has improved, a high level of divergence in disclosure of E&S factors is observed[52]. Going forward, disclosures should be enhanced to further facilitate the understanding of users of ratings on where E&S factors are affecting credit rating actions.

46. The prudential framework has room to incorporate environmental and social risks through the use of external credit assessments, as ECAIs are set over time to further incorporate environmental and social aspects into their underlying methodologies, as shown by industry surveys. In this regard, it would be important to duly consider the inclusion of environmental and social factors as drivers of credit risk, whenever relevant, in external credit assessments as well as the disclosures of such methodologies to the public in order to enhance the comparability of ECAIs, assess the robustness of the methodologies and facilitate due diligence. At this stage where evidence is still being collected on the robustness of the ECAI's methodology, corrections to the prudential framework do not seem, however, to be warranted.

47. The correspondence between external credit assessments of ECAIs and the prudential scale of credit quality steps set out in the prudential framework is established through the mapping tables provided in Commission Implementing Regulation (EU) 2016/1799[53]. The calibration analysis is based on a set of objective quantitative criteria to benchmark the performance of credit assessments, together with qualitative elements to ensure a level playing field across ECAIs, e.g. considering varying levels of strictness in the definition of default and stability of the ratings. The mappings are monitored over time and regularly reviewed to ensure that the underlying performance of credit assessments remains aligned with prudential considerations. Environmental risks are currently not explicitly factored into the methodology underlying the mapping assignment. Integration is expected to occur implicitly through the natural incorporation over time of environmental risks in the credit assessments of ECAIs. At this stage, it would be premature to include explicit adjustments to the qualitative factors calibrating the ECAI mappings given the lack of sufficient evidence, and potential risks of double counting, once environmental risks are better captured at the level of external credit assessments.

Due Diligence

48. The current prudential framework includes due diligence requirements as a safeguard when using external credit assessments for own funds calculation, as set out in Article 79(b) of Directive 2013/36/EU i.e. the CRD, which does not exempt institutions from additionally considering other relevant information when assessing their allocation of internal capital. This due diligence applies both to exposures externally rated and to unrated exposures.

49. CRR3 is expected to further strengthen this safeguard by enhancing due diligence requirements with a view to further mitigating mechanistic reliance on external credit assessments. This is proposed to be implemented through Article 113(1) CRR3, according to which, where the due diligence assessment conducted in accordance with Article 79(b) CRD reflects higher risk

[52] See ESMA (2019), *Text mining disclosures in rating agency press releases,* (link) and ECB (2022), *Disclosure of climate change risk in credit ratings* (link).

[53] Commission Implementing Regulation (EU) 2016/1799 (link).

characteristics than implied by the external credit assessment, a risk weight penalty is applied by assigning a risk weight at least one credit quality step higher than that implied by the external credit assessment[54].

50. There is room to broaden due diligence requirements to explicitly integrate environmental aspects, to ensure that environmental risks are appropriately captured and reflected in the prudential framework. This is in line with the BCBS clarifications issued in December 2022, where FAQ 1 noted that banks should give proper consideration to the climate-related financial risks as part of counterparty due diligence, to the extent that the risk profile of the counterparty is affected by climate-related financial risks[55, 56]. However, this should not replace the role of ECAIs in appropriately considering environmental risks in their credit assessments. The inclusion of ESG disclosures for credit rating agencies in the EU may support institutions in their due diligence assessments, which are expected to strengthen going forward as availability of ESG-related information for market participants will improve over time, backed by policy initiatives, such as the EU CSRD, and regulatory developments, like the Pillar 3 disclosures on ESG risks for institutions.

Credit risk mitigation techniques

51. The SA allows for recognition of CRM techniques, while avoiding excessive complexity. The CRR makes a distinction between funded and unfunded credit protection, as they follow different dynamics and are recognised based on different methods.

52. By using UFCP, the institution relies on a payment from the protection provider upon default of the obligor. The UFCP may be recognised when calculating capital requirements by applying a substitution approach, where institutions replace the risk weight of the counterparty with the risk weight of the guarantor or the protection provider for the protected portion of the exposure, while the unprotected portion remains with the risk weight of the counterparty. Institutions are required[57] to have in place systems to manage potential concentration of risk arising from the use of guarantees and credit derivatives. Environmental due diligence considerations presented in the previous section apply to the resulting risk weights when using external credit assessments for own funds requirements calculation.

53. The framework for FCP refers to financial collateral, which may deteriorate in value over time, potentially exacerbated by environmental risks[58]. For financial collateral, two approaches are available: either the simple or the comprehensive approach, with partial collateralisation

[54] The following exposure classes are exempted from the enhanced due diligence requirements: central governments or central banks, regional governments or local authorities, public sector entities, multilateral development banks and international organisations.

[55] See BCBS (2022), FAQs on climate-related financial risks (link).

[56] For full reference, the BCBS issued a further clarification under due diligence, FAQ 2, to clarify that banks should also give proper consideration of climate-related financial risks in connection with covered bonds as part of due diligence (link).

[57] Article 213(2) CRR.

[58] Funded credit protection is also available through on-balance-sheet netting and in the form of credit-linked notes issued by the lending institution.

recognised. Under the simple approach, institutions replace the risk weight of the counterparty with the risk weight that the institution would assign if it had direct exposure to the market value of the collateral instrument for the secured part of the exposure, where the environmental due diligence considerations presented in the previous section apply to the resulting risk weights. The comprehensive approach allows the exposure amount to a counterparty to be reduced by the market value of any eligible collateral, subject to haircuts to take into account potential value fluctuations due to market movements, currency mismatch or maturity mismatch. Furthermore, the current prudential framework requires[59] institutions using financial collateral as a CRM technique to check for concentration risks to particular types of collateral assets, with room to potentially control for concentration risks to collateral with significant exposures to environmental risks.

54. Regarding physical collateral, exposures secured by immovable property are the only type of physical collateral recognised under the SA, which is dealt with in the CRR outside of the CRM framework and discussed separately in Section 3.4.

55. Collateral re-evaluation requirements set out minimum frequencies at which collateral is to be monitored, although more regular assessments are warranted if there is any evidence that the market value may have significantly decreased. For financial collateral this is performed at least every 6 months, which gives room to incorporate the evolving nature of environmental risks over time as market values are expected to increasingly embed environmental risks[60].

56. To conclude, environmental risks may already be embedded in the current CRM framework through market prices used for the valuation and re-evaluation of financial collateral. Where market prices used for financial collateral valuations do not yet fully reflect environmental risks, it is expected that they will improve over time with the development of data, standards, tools and methodologies used by market participants for their calculations. Amendments to the prudential framework at this stage are therefore not deemed appropriate, although monitoring of valuation and valuation methodologies could more explicitly integrate environmental aspects, backed by policy and regulatory initiatives outside of the Pillar 1 framework to ensure that accounting standards, ICAAP and credit risk management under Pillar 2 increasingly capture environmental factors.

[59] Article 207(4) points (b) and (g)(ii) CRR.

[60] Article 207(4)(d) CRR.

Prescribed risk weights

57. This section focuses on corporate and retail exposures, as these are considered the most relevant from the perspective of environmental risk-related considerations. No specific analysis on sovereign exposures was performed due to the specific treatment of sovereign exposures to Member States granted in the CRR, which goes beyond the discussion of only environmental aspects. Nevertheless, for sovereign exposures that are risk-weighted based on external credit ratings, the discussion presented above on the use of credit ratings applies, noting that due diligence is not applicable for sovereign exposures. Similarly, further analysis on exposures to institutions was not considered necessary due to broader reliance on external ratings in this exposure class[61].

58. Exposures to corporates may be risk-weighted based on an external credit assessment issued by a nominated ECAI, with current supervisory data showing a limited share of externally rated corporate exposures, at around 15% as reported in the EBA DP on *The role of environmental risks in the prudential framework* (2022)[62].

59. Widening the availability of external credit assessments for corporates may increase the risk sensitivity of the framework and allow the capturing of environmental risks, to the extent that ECAIs are capable over time of integrating environmental aspects to a greater degree into their methodologies. CRR3 is expected to include a mandate to analyse impediments to the availability of external credit ratings by ECAIs, in particular for corporates, and possible measures to address them. Recent policy initiatives such as the proposal for a CSRD will promote the collection of environmental data for large corporates[63], hence supporting the information set available for ECAIs to conduct assessments, as well as facilitating the possibility to broaden the due diligence scope to cover environmental aspects.

60. The prudential framework includes considerations around environmental criteria with respect to the corporate exposures subject to the ISF, which is further described in Section 3.6. Assessment of these environmental elements is to be performed by the obligor, and although no positive assessment of the contribution to environmental objectives is currently required under Article 501a(1)(o) CRR to qualify for the supporting factor, CRR3 is expected to strengthen the weight of environmental considerations by requiring a positive or neutral contribution to one or more environmental objectives.

61. In the medium- to long-term it could be considered whether high-quality specialised lending corporate exposures newly introduced in CRR3 could mirror similar environmental provisions as under the ISF, given the similarities across exposures. Any such requirement should be strictly based on credit risk considerations, to exposures, as the availability of environment-

[61] The BCBS issued a related clarification on climate-related financial risks under FAQ 3, noting that climate-related financial risks should be considered when determining the Grade A classification (link).

[62] See Table 1 of the EBA (2022) Discussion Paper on *The role of environmental risks in the prudential framework*, p. 30 (link).

[63] Companies with securities listed on regulated markets (except micro-enterprises) are also covered by the proposed directive.

related risk assessments improve, and once experience is gained on the newly introduced exposure class[64].

62. Environmental and social risks may affect corporate exposures through physical and transition risk drivers, which may affect their profitability, for instance through expenses for lowering the environmental footprint of industrial processes to stay in line with transition policies, and the potential depreciation of physical assets due to physical environmental events. Against the background of the transition to a more sustainable economy, it could be argued that emission-intensive corporates or corporates relying on emission-intensive products or commodities will face higher transition risks than comparable corporates that are aligned with the transition trajectory. However, the link between higher transition risks and lower creditworthiness cannot be fully established at the moment based on available evidence. In this regard, the ultimate impact of transition risk would require further consideration and analysis[65].

63. The EU Taxonomy, as a classification system for environmentally sustainable economic activities, gives potential for further differentiation of corporate exposures. However, the prudential treatment should be anchored in a risk-based assessment, while the EU Taxonomy does not provide an indication on the riskiness and associated credit quality of exposures. Criteria that would be useful in this regard would need to correctly differentiate credit risk, and at the same time would need to be objective and easily available, to ensure appropriate application of the prudential framework. Furthermore, the use of such criteria would require a fine level of granularity, and their ease of use should be carefully assessed, so that they can be applied by smaller institutions that may have less statistical and operational capacity.

64. It can also be noted that the current SA framework treats all unrated corporate exposures equally, and provides an overall calibration at a portfolio level, without differentiating risk profiles of individual exposures. In order to maintain the robustness of the framework, any considerations of the risk differentiation between such corporate exposures would have to take into account not only the environmental risks, but also other, potentially more prominent, credit risk drivers.

65. Retail exposures cover around 20% of overall SA exposures in the EU. This exposure class is assigned a flat risk weight of 75%, except for the case of loans granted to pensioners or employees with a permanent contract against the unconditional transfer of part of the borrower's pension or salary to that credit institution, which, subject to some conditions, are assigned a preferential risk weight of 35%. CRR3 is expected to introduce enhanced risk sensitivity through introducing a sub-exposure class of 'transactors', which refers to obligors in

[64] The BCBS issued a related clarification on climate-related financial risks under FAQ 5, noting that climate-related financial risks should be considered when assessing the ability of a project finance entity to meet its financial commitments in a timely manner (link).

[65] The BCBS issued a related clarification on climate-related financial risks under FAQ 4, noting that institutions in jurisdictions that do not allow the use of external ratings for regulatory purposes (hence, not the EU) should consider and evaluate how material climate-related financial risks might impact the capacity of the corporate to meet its financial commitments in a timely manner even under adverse changes in the economic cycle and business conditions when determining whether a given corporate meets the investment grade definition (link).

relation to facilities such as credit cards and charge cards, where the balance has been repaid in full at each scheduled repayment date for the previous 12 months and which attract a risk weight of 45%.

66. Any adaptation of the risk weight for retail exposures to account for environmental risk would be particularly challenging. As compared to corporate exposures, it is far less clear to determine which of the retail exposures could be considered green or environmentally harmful. Furthermore, the scope of information available to institutions as well as access to potential additional information about the retail clients is much more limited. Finally, existing research on risk differentials does not appear to be sufficient at this stage to warrant changes to the framework. Should further evidence emerge, the EBA would reassess the appropriateness of amendments to the framework accordingly.

67. Further, in relation to the supervisory prescribed risk weights assigned to real estate exposures, and in line with the clarification issued by the BCBS under FAQ 6, the EBA will reassess whether environmental risks should be considered in evaluating the appropriateness of those risk weights. This will be done in the context of the EBA mandate under Article 124 CRR, which requires specifying the types of factors to be considered for the assessment of the appropriateness of the risk weights for exposures secured by mortgages on residential and commercial immovable property.

68. Finally, the current framework provides specific risk weights for exposures in default in Article 127 CRR. The scope of application of this Article is defined in Article 178 CRR, which is part of Chapter 3 on the IRB Approach. Consequently, further considerations on the definition of default are provided in Section 0 of this report.

3.2.3 Conclusions

69. The SA is designed to balance simplicity and risk sensitivity and tends to be used by smaller institutions for capital determination purposes, as it requires less sophisticated risk management measurement and management practices. However, the SA will become relevant also for larger institutions as a result of the output floor that is introduced by CRR3.

70. E&S risks should be better reflected in the framework, while avoiding excessive complexity. This may be achieved through the following tools:

    a. Verification by competent authorities that due diligence requirements explicitly integrate environmental aspects.

    b. Monitoring that financial collateral valuations increasingly reflect environmental factors, both through market values under Pillar 1 and through valuation and valuation methodologies under Pillar 2.

    c. Assessment - as environment-related risk assessments improve and once experience is gained on the newly introduced exposure class – of whether high-quality specialised

lending corporate exposures introduced in CRR3 could be subject to similar environmental provisions as under the ISF, where only those exposures meeting strong environmental standards may benefit from the ISF.

d. Reassessment of whether environmental risks should be considered in evaluating the appropriateness of risk weights assigned to real estate exposures.

e. Reassessment of how E&S risks can be reflected in prescribed risk weights in the SA, keeping in mind the intended simplicity of the approach and taking into consideration the developments agreed to at the international level by the Basel Committee.

POLICY RECOMMENDATIONS ON CREDIT RISK – STANDARDISED APPROACH

1. EXTERNAL CREDIT ASSESSMENTS

CR-SA-1: As a **short-term action**, the EBA recommends that external credit assessments integrate environmental and/or social factors as drivers of credit risk whenever relevant. Although at the moment the degree of integration varies across rating agencies, with further assessment needed on the robustness of the methodologies and the level of transparency and disclosure to the public, external credit assessments have the flexibility to integrate environmental and/or social risks and should be encouraged to progressively do so.

2. DUE DILIGENCE

CR-SA-2: As a **short-term action**, the EBA recommends that competent authorities verify that due diligence requirements explicitly integrate environmental aspects, to ensure that environmental risks are appropriately captured and reflected in the prudential framework whenever relevant.

3. CREDIT RISK MITIGATION TECHNIQUES

CR-SA-3: As a **medium- to long-term action**, the EBA will monitor that financial collateral valuations increasingly reflect environmental factors, both through market values under Pillar 1 and through valuation and valuation methodologies under Pillar 2.

4. PRESCRIBED RISK WEIGHTS

CR-SA-4: As a **medium- to long-term action**, as environment-related risk assessments improve and once experience is gained on the newly introduced exposure class, the EBA will assess whether high-quality specialised lending corporate exposures introduced in CRR3 could be subject to similar environmental provisions as under the ISF, where only exposures meeting strong environmental standards may benefit from the ISF.

CR-SA-5: As a **medium- to long-term action**, the EBA will reassess whether environmental risks should be considered in evaluating the appropriateness of risk weights assigned to real estate exposures.

CR-SA-6: As a **medium- to long-term action**, the EBA will reassess how E&S risks can be reflected in prescribed risk weights in the SA keeping in mind the intended simplicity of the approach and taking into consideration the developments agreed to at the international level by the Basel Committee.

3.3 Internal Ratings Based Approach

3.3.1 Overview of the framework

71. To assess how environmental and social risk drivers interact with the credit risk framework when IRB models are used, it is useful to recall first the key features of the IRB approach. Under this approach, institutions calculate own funds requirements by determining four regulatory parameters: the PD, the LGD, the CCF and the Maturity (M). The PD, LGD and M parameters are then plugged into the regulatory risk weight function, whereas the CCF is used to determine the exposure value. The relevant parameters are determined in the following manner:

    a. For all IRB exposure classes, with the exception of the specialised lending exposures under the slotting approach[66], institutions estimate PDs by grade or pool from long-run averages of 1-year default rates[67]. The slotting approach is discussed in a specific subsection below.

    b. For retail exposures and other exposures for which the institution has the permission of the competent authority to estimate LGDs and CCFs, these should be estimated by facility grade or pool and should be appropriate for an economic downturn (if more conservative than the long-run average)[68]. For non-retail exposures, where the institution does not have the permission to use own estimates, regulatory values of LGD and CCF parameters should be used[69].

    c. M is calculated directly for the non-retail exposures and does not need a dedicated model. The M factor in the risk weight function for non-retail exposures recognises the potential for reductions in the obligor's credit quality over the lifetime of the exposure. Where the institution does not have permission to use own estimates of LGDs and CCFs or has not received the permission referred to in Article 143 CRR, regulatory values of M should be used[70]. For retail exposures, M is not used in the risk weight function, but the average duration of exposures is to some extent reflected in the calibration of the applicable correlation coefficients[71].

72. Where own estimates of risk parameters are used, the following steps can be identified in the IRB framework for the estimation process and determination of own funds requirements:

    a. **Step 0 – Establishing the RDS:** the institution should collect all necessary data, i.e. it should be in a position to identify all historical defaults and calculate realised credit losses and

[66] Other approaches not relying on PDs are also available for the equity exposures. However, these exposures are no longer in the possible scope of IRB models in the final Basel III framework and are hence left out of this section.

[67] Article 180(1)(a) and (2)(a) CRR.

[68] Articles 181(1)(a), (b) and 182(1)(a), (b) CRR.

[69] For the rest of the report, unless specified otherwise, the requirements for the LGD and CCF models apply only to institutions allowed to use own estimates. The cases where regulatory values are used (the 'F-IRB Approach') are discussed in a specific subsection.

[70] Article 162(1) CRR.

[71] See BCBS (2005), *Explanatory Note on the Basel II IRB Risk Weight Functions* (link).

their components (i.e. economic loss and realised LGDs, and realised CCFs), as well as collect data on all relevant risk drivers that will be necessary in the model development (in particular under step 1a).

b. **Step 1a – Developing the rating system using historical data, risk differentiation**: the model[72] should allow for a meaningful differentiation of risk[73] (i.e. appropriate discriminatory power) in order to ensure the grouping of sufficiently homogenous exposures (i.e. obligors or facilities) into the same grade or pool.

c. **Step 1b – Developing the rating system using historical data, risk quantification**: institutions estimate PDs by grade or pool (determined in step 1a) from long-run averages of 1-year default rates, whereas LGD and CCF estimates are produced by facility grade or pool (determined in step 1a) from the long-run average of realised LGDs and CCFs, and institutions have to use downturn LGD or CCF estimates where these are more conservative than the corresponding long-run average. During this quantification step, the estimates of risk parameters may be increased by a MoC.

d. **Step 2a – Applying the rating system to the current portfolio**: based on the implemented models (step 1), the risk estimates are assigned to each exposure in the application portfolio.

e. **Step 2b – Calculating own funds requirements**: the risk parameters are plugged into the applicable RW formula[74] and the exposure value of certain off-balance-sheet items is calculated using the CCF parameters to eventually derive the own funds requirement for the exposures. Where institutions do not have permission to estimate certain risk parameters, e.g. using the IRB approach without using own estimates of LGDs and CCFs (F-IRB approach), the regulatory values are used.

73. It should also be recalled that the use of the IRB approach is subject to a number of other requirements, and in particular some linked with risk management processes and corporate governance, such as:

a. use test, introduced in the IRB approach to ensure a high quality of risk parameters, under the assumption that institutions would not use the estimates of risk parameters for internal risk management if they did not have confidence that these estimates appropriately reflect the actual level of risk[75];

b. independence of the model development function (the credit risk control unit) from the business functions responsible for originating or renewing exposures[76];

[72] In this section, a model refers to either expert-based model or statistical model.

[73] Article 170(1) and (3) CRR.

[74] Articles 153 and 154 CRR.

[75] Articles 144(1)(b) and 145 CRR.

[76] Article 190 CRR.

c. regular reviews of the performance of the model and independent assessments by an independent validation function and the internal audit[77];

d. involvement of the management body and senior management in the implementation and maintenance of rating systems, as well as robust management information systems[78];

e. appropriate implementation of capital adequacy stress testing programmes.

3.3.2 Interaction between E&S risks and the internal ratings based approach

74. This section uses the different steps identified in the previous section to identify areas where environmental risks are or could be better integrated into the IRB framework, in particular when own estimates are used.

RDS – defaults, realised LGDs and CCFs, risk drivers

75. As a first observation, E&S risks may appear not to be directly linked with the mere identification of the defaults nor with the actual calculation of realised LGDs and CCFs. It could, however, be further assessed if the materialisation of some E&S risks could be considered as additional indications of unlikeliness to pay. At this stage, the EBA does not see the need for the introduction under Article 178(3) CRR of additional unlikeliness to pay criteria related to E&S risks which justify a general application to all exposures. Instead, the EBA believes E&S risks can be assessed indirectly under the current criteria and in particular by the means of the criteria provided in paragraphs 59 and 60 of the EBA Guidelines on the application of the definition of default[79]. In this regard, institutions shall have a process to obtain and update relevant and material E&S-related information on the borrowers' financial condition and facility characteristics, as part of due diligence during the onboarding process and ongoing monitoring of borrowers' risk profile (e.g. acute or chronic physical risks, physical climate-related financial events, borrower-specific information related such as vulnerability to policy and technological shocks).

76. As discussed in Section 2.2.1 on data availability and measurement challenges, the identification of materially relevant E&S risk drivers is not trivial, and institutions may not ensure the comprehensiveness of the RDS. This is particularly relevant for dated exposures for which information on E&S-related dimensions was not necessarily collected. Any retrospective assessment of non-collected E&S-related information (i.e. database completion) is challenging. In fact, in the case that E&S-related information has been recorded (for instance, geographical location, value and nature of the collateral or sector of the corporates), relevant residual data gaps may still exist. Furthermore, even if E&S risk drivers can be identified and data has been collected, the frequency and impact of E&S-related events is likely to increase in the future in a way that has not been observed in the past. In this context, the EBA has been reflecting on

[77] Articles 185 and 191 CRR.

[78] Article 189 CRR.

[79] EBA/GL/2016/07 (link).

whether further guidance on data collection on potential risk drivers could be beneficial to institutions in terms of relevance for the design of the rating system. In this regard, EBA will further investigate and assess whether relevant E&S risk drivers across different types of exposures shall be added to the corresponding lists of risk drivers referred to in paragraphs 57 (PD estimation), 121 (LGD estimation) and 177 (ELBE and LGD in-default estimation) of the EBA Guidelines on PD estimation, LGD estimation and treatment of defaulted assets[80]. However, it is worth outlining that the reference to additional E&S risk drivers represents a non-binding and non-exhaustive list. Further, the institutions shall continue to regularly assess whether other E&S risk drivers are relevant for their types of exposures and shall document the subject and the results of such regular assessments.

77. One specific element of the RDS used to derive LGD is the valuation of the collateral. The prudential requirements for the SA and F-IRB approach include some principles for valuation, based on market values, but they do not specify detailed valuation standards for identifying the correct market value, and under CRR3 for assessing whether and to what extent the current market value of immovable properties is sustainable over the life of the exposure. In order to avoid fragmentation of practices, the prudential framework refers to market values, where independent valuers are expected to follow comprehensive valuation standards applicable to a given type of assets, including immovable and movable properties. Already now valuations often include certain elements of E&S risks under the SA and F-IRB approach as far as distinguished by different market values (for instance, factors such as energy efficiency and location in areas affected by floods are taken into account in valuations of immovable properties). It can be expected that valuation standards will further develop over time to include more explicitly and comprehensively E&S-related considerations, under the SA and F-IRB approach as far as distinguished by different market values. So far, under the A-IRB approach, the framework requires institutions to establish internal requirements for collateral management, legal certainty and risk management that are generally consistent with the ones applicable under the F-IRB approach and SA. Nevertheless, the EBA believes that additional requirements could be specified in Article 52 of Commission Delegated Regulation (EU) 2022/439 on assessment methodology[81] and Section 5.1 of the EBA Guidelines on credit risk mitigation for institutions applying the IRB approach with own estimates of LGDs[82] for the valuation principles to explicitly reflect E&S-related aspects (e.g. as clarified in BCBS FAQ 7)[83].

Development of the rating system, risk differentiation

78. With respect to the development of the model, it is useful to recall that all relevant information should be taken into account when assigning obligors or facilities to grades or pools.

[80] EBA/GL/2017/16 (link).

[81] Commission Delegated Regulation (EU) 2022/439 (link).

[82] EBA/GL/2020/05 (link).

[83] BCBS FAQ 7: 'Banks should determine whether the current market value incorporates the potential changes in the value of properties emerging from climate-related financial risks (e.g potential damage related to weather hazards, the implementation of climate-policy standards or changes in investment and consumption patterns derived from transition policies). National supervisors should consider jurisdiction-specific features that account for climate-related financial risks when setting out prudent valuation criteria' (link).

Information should be current and should enable the institution to forecast the future performance of the exposure. In this context, E&S risks may already be factored in, to the extent that they are part of the RDS and have led to a materialisation of defaults, realised losses or drawdowns (and hence potentially lower than that expected to occur in the future). In addition, the design of the model leaves some room for human judgement, including the possibility to have subjective input data via expert judgement. Hence, even if E&S risks could not be translated into observable metrics or the observed metrics do not accurately reflect the future performance of exposures, they could still be captured in the rating system via expert-based qualitative variables. This is of particular importance with regard to the expected increase in the frequency and impact of E&S risks. Lastly, where E&S risks have led to a materialisation of credit risk in the past, this will already be captured in the performance metric of the rating system, and a failure to capture them would be considered as a deficiency of the rating system under the current rules of the framework. In this respect, the clarifications brought by the international standard (BCBS FAQ 10 for the PD parameter[84] and BCBS FAQ 14 for the LGD parameter[85]) could be further integrated into Chapter 7 of Commission Delegated Regulation (EU) 2022/439 on assessment methodology[86] and in Section 5.2 of the EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures[87].

79. For E&S risks which have not led to historical credit losses, but are expected to do so, another question arises based on which information and assumptions the expectation in terms of the materialisation of additional future credit losses caused by E&S risks could be built into the model. The rationale for this inclusion would be that models built solely on historical data may not be well-suited for predicting future defaults/losses, when the frequency and magnitude of environmental risks is likely to increase with respect to past observations. In this regard however, it is worth recalling that the current rating system development is based on historical observed data, as well as the model performance evaluation (e.g. a Gini test can only be applied on past observed defaults). Thus, it will be challenging to assess the performance of the rating assignment function when the E&S risk factors have not yet materialised. Further, an unintended consequence could be the risk of authorising models with lower predictive power,

[84] BCBS FAQ 10: 'Banks should use a time horizon longer than one year in assigning ratings. The range of economic conditions or unexpected events that should be considered when making the assessment of a borrower's ability to perform should include climate-related financial risks, both physical and transition risks, if these materialise as credit risks. Banks should assess whether climate-related financial risks will have an impact on obligors' ability to perform and this information should be integrated into rating assignments. In particular, if some data (e.g. counterparty location data, which is a particular risk driver for physical risk) have been already collected, banks should assess the granularity of the data and which additional data relevant to climate-related financial risks needs to be collected' (link).

[85] BCBS FAQ 14: 'When assigning ratings to facilities, banks should take into consideration material and relevant information on the impact of climate-related financial risks on the facility characteristics. Banks should establish an effective process to obtain and update relevant and material climate-related information on the facility characteristics. Where the bank is of the view that an exposure is materially exposed to climate-related financial risks but has insufficient information to estimate the extent to which the facility characteristics would be impacted, the bank should consider if it would be appropriate to take a more conservative approach in the assignment of exposures to facility grades or pools in the application of the rating model. It is recognised that data used to analyse these risks may not be immediately available and hence, banks may rely to some extent on a conservative application of expert judgment for the purpose of the assignment of ratings to facility grades or pools. Banks are reminded of the requirements in CRE36.85 in respect of grounding LGD estimates in historical recovery rates and not solely on the collateral's estimated market value' (link).

[86] Commission Delegated Regulation (EU) 2022/439 (link).

[87] EBA/GL/2017/16 (link).

under the assumption that poorer observed performance is mainly due to the lack of historical observations of E&S risks (hence being in conflict with Article 174(a) CRR). The integration of E&S risks beyond what is supported by observations would likely result in a deterioration of model performance.

80. Following the latter argument, it should be kept in mind that the design of an IRB model is not solely based on optimisation of quantitative performance metrics, but also includes expert judgement: the adequacy of the selected risk drivers and rating criteria is assessed both in terms of consistency with the results of statistical tests and with business expectations. In fact, restricting the model design to the use of historical data only that do not enable accounting for the expected future changes, such as increased impact of E&S risk drivers on credit risk, would not be desirable from a prudential point of view. Nevertheless, this flexibility is not expected to be used to allow models to continuously underperform from a quantitative point of view, and as such E&S risks should only be incorporated to the extent that they are expected to translate into credit risk in a relative short term. However, it cannot be excluded that E&S-related risks, that are expected to materialise beyond the time horizon on which the prudential framework is calibrated and within the contractual maturity of the exposures being rated with the respective rating system, have an impact on credit risk even in a short-term time horizon. Notwithstanding, for missing relevant E&S risk drivers, as soon as the related defaults and losses start to materialise, the deterioration of the model performance would be assessed in an early phase through the existing mechanism of annual review of estimates (as discussed below). In this case the rating system may need to be redesigned.

81. It is also worth noting that the uncertainty on the risk differentiation part of the model cannot easily be tackled by ad hoc conservatism, as this would break the homogeneity within grades or pools (with therefore unpredictable effects on final own funds requirements, i.e. a conservatism implemented in the risk differentiation does not necessarily lead to more conservative own funds requirements). At this stage, E&S risks should therefore only be taken into account in the risk differentiation step via additional risk drivers under the existing requirements and under the condition that sufficient information is available without materially decreasing the overall performance of the model. It is important to note that any model assumption, particularly expert judgement, should be regularly assessed and challenged as per existing requirements.

Development of the rating system, risk quantification

82. With respect to the risk quantification, there are several ways in which E&S risks could potentially be factored in under the framework.

83. As an introductory remark, it is useful to recall that estimates are rarely associated with a particular exposure, but rather apply at a more aggregated level, such as to a specific grade or pool. Therefore, any change related to E&S risks in the estimates (e.g. add-ons or additional MoC) would apply subsequently to all exposures falling into that grade or pool, including exposures not particularly impacted by these environmental risks. This means that a change in

the quantification of risk parameters would need to reflect a change in the risk at the grade or pool level, otherwise, any adjustment to the risk estimates would have to be complemented by the representativeness analysis of the sample used for risk quantification vis-à-vis the application sample, with potential unintended consequences such as frequent recalibration needed and lack of stability of risk parameters. A potential way to circumvent this particular issue would be to introduce some calibration segments, where the risk quantification would be performed separately between exposures impacted or not by E&S-related financial risks. While, similar to what was discussed in the previous section, the difficulty of this approach would be to identify risk drivers able to discriminate between positions exposed and not exposed to E&S risk. In any case, this approach would have the advantage of not distorting the risk differentiation.

84. When quantifying the PD based on the default rate long-run averages, institutions should ensure that these are 'representative of the likely range of variability of default rates for that type of exposure' and adjust the estimates if they are not. According to paragraph 83(c) of the EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures[88], institutions need to take into account 'significant changes in the economic, legal or business environment within the historical observation period' when assessing the representativeness of the historical data. Hence, E&S risks may in principle be reflected in the PD estimates as long as they lead to changes in the business within the historical observation period and as long as reliable data on the impact of such E&S risks on defaults are available.

85. To the extent that an institution associates or maps its internal grades to the scale used by an ECAI or similar organisation and then attributes the default rate observed for the external organisation's grades to the institution's grades, it should consider whether the scale used by the external institution reflects material climate-related financial risks, in line with BCBS FAQ 13[89]. This clarification could be provided in Chapter 8 of Commission Delegated Regulation (EU) 2022/439 on assessment methodology[90] and in Section 5.3 of the EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures[91].

86. The LGD and CCF estimates must be adequate for downturn conditions. The details associated with these estimations have been clarified by two products: RTS[92], which define the nature, severity and duration of the economic downturn, and Guidelines[93], which clarify how the

[88] EBA/GL/2017/16 (link).

[89] BCBS FAQ 13: 'Where banks associate or map their internal grades to a scale used by an external credit assessment institution, they should consider whether the scale used by the external institution reflects material climate-related financial risks. Where the scale used by the external institution incorporates consideration of material climate-related financial risks, banks should critically review the models and methods used by the external credit assessment institution to judge climate-related financial risks given the challenges with data sources, data granularity and historical time series that often apply to data on climate-related financial risks. Where the scale used by the external institution does not incorporate consideration of climate- related financial risks, banks should consider whether adjustments are appropriate to mitigate this limitation' (link).

[90] Commission Delegated Regulation (EU) 2022/439 (link).

[91] EBA/GL/2017/16 (link).

[92] Commission Delegated Regulation (EU) 2021/930 (link).

[93] EBA/GL/2017/16 (link).

estimation of the LGD appropriate for an economic downturn should be performed. One may argue that the downturn nature of the estimates should theoretically already include any E&S-related deterioration of conditions, at least to the extent that E&S risks have contributed to an economic downturn affecting aggregate macroeconomic and credit-related indicators. However, although market conditions caused by E&S risks might resemble those of an economic downturn, they significantly differ in nature. The economic downturn is expected to have some cyclicality, while an E&S downturn may be unprecedented (in particular if it is due to the materialisation of a non-cyclical transition risk, but also to some extent for physical risk as the previous realisations were more local than a potential future global 'physical risk downturn'). Therefore, the E&S downturn may be difficult to validate given that empirical data are likely to be insufficient to assess its robustness. For these reasons, the EBA does not consider that the nature of the economic downturn should be amended to incorporate additional dedicated E&S angle in the form of specific additional E&S set of indicators in Article 2 of Commission Delegated Regulation (EU) 2021/930 on the economic downturn[94]. Consequently, environmental and social risks could only be considered to the extent those risks have an impact on the economic indicators list provided in the above-mentioned Article 2 (including any other relevant economic indicator considered in accordance with Article 2(1)(c) of the above-mentioned Commission Delegated Regulation).

87. With regard to the estimates of all risk parameters, the CRR requires institutions to apply a MoC to address any deficiencies and uncertainties in the data or modelling methodologies, as further explained in Section 4.4 of the EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures[95]. In principle, missing data on E&S risks may call for additional margins of conservatism, both under current category A (e.g. missing or outdated data on risk drivers and future recoveries and missing information for reflecting economic downturn in LGD estimates) and category B (e.g. changes to the market or legal environment or forward-looking expectations). However, under the current framework, the additional MoC is quantified based on existing data, and a departure from this principle may then increase the non-risk-based variability and in turn hinder the comparability of solvency ratios. Thus, it is the EBA's view that any deficiencies resulting from E&S risks have to be treated in a similar manner to all other deficiencies, in accordance with the criteria in the Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures[96], for which the MoC quantification is based on observed data, appropriate methods, and it shall be reviewed regularly by institutions. In conclusion, at this stage, MoC A&B may only be introduced related to E&S risks, if they fulfil the criteria in the Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures[97].

[94] Commission Delegated Regulation (EU) 2021/930 (link).

[95] EBA/GL/2017/16 (link).

[96] EBA/GL/2017/16 (link).

[97] EBA/GL/2017/16 (link).

Application of the rating system

88. With respect to the application of the model, while the assignment of exposures to grades or pools should generally use the model developed in the previous steps, the CRR mentions the possibility of further adjustments, either in the form of ad hoc conservatism, for instance in the case of a lack of information, or in the form of overrides, for instance in the form of a rating upgrade or downgrade. These ad hoc exposure-specific adjustments, if applied solely in the application phase, do not require changes in the risk quantification and have the benefit of not impeding the quality of the model or impacting the risk estimates of other exposures. However, the override policy would in any case have to be well justified and should not be used excessively, such that the model itself would be undermined. In some ways, setting up a comprehensive E&S risk-related overrides policy to some extent faces similar challenges to the ones mentioned in the development of the model (i.e. difficulty in selecting relevant E&S risk drivers and E&S information in general, as well as in the possibility to integrate forward-looking drivers that will not materialise in the short term). While the overrides are not intended to be a substitute for the model in general, they could address some specific, individual cases, where only a limited and well-justified number of the exposures within the range of application of a rating system is affected by environmental risks or broader E&S risks until the relevant drivers are incorporated into the model to apply more broadly to the whole portfolio of exposures. In this regard, as set out in BCBS FAQ 9[98].

89. The CRR explicitly mentions the need for conservatism in the estimates in some specific cases. The EBA does not believe that similar provisions in relation to E&S risks are necessary at this stage. Further, these considerations may, however, only partially address the recognition of E&S risks in the Pillar 1 framework considering that its use is largely anchored in historical data. The emergence of unprecedented economic fluctuations driven by E&S risks may limit the usefulness of these areas of flexibility to capture E&S risks.

[98] BCBS FAQ 9: 'Banks may rely to some extent on a conservative application of expert judgment for the purpose of the rating assignment. Banks are reminded of the requirements in CRE36.44 in respect of rating assignments where overrides are applied based on expert judgments, as well as CRE36.32 in cases where available data are limited or where projected information is used' (link).

Calculation of own funds requirements

90. With respect to the calculation of own funds requirements, while the RW formula does not explicitly refer to E&S risks, it includes elements, which to some extent may indirectly capture certain E&S aspects.

91. On the PD side, the Basel risk weight function is already using different correlation coefficients between the retail and non-retail exposure classes but also within the retail exposure class via different fixed values for qualifying revolving and real estate exposures. In addition, a specific adjustment is performed for small and medium-sized enterprises based on the value of the annual sales for the consolidated groups the firm is part of, as well as for large and unregulated financial entities. The EBA started the reflection on whether further differentiation could be introduced in the RW formula based on E&S risks, and in particular on the relationship between the capital requirements and the systemic risk. Theoretically, such differentiation could be justified if the status of the economy impacts E&S harmful assets or assets subject to E&S impacts to a different degree from other exposures, i.e. if the risks faced by such assets are less idiosyncratic and more systematic in nature. For example, exposures subject to transition risk are likely to be all affected by sudden public policy changes. This would, however, come with difficulties similar to the ones previously mentioned in the development and application of the model:

    a. It would be difficult at this stage to find common and objective differentiating factors (for instance, exposures subject to transition risk may not be equally affected by policy changes depending on their transition plans).

    b. It would also be difficult to determine appropriate levels of any adjustment, given the lack of evidence supporting the calibration.

    c. This regulatory adjustment could potentially take various forms and hence the exact functional form of the adjustment would have to be carefully considered in order to ensure the overall consistency and robustness of the framework.

    d. Double counting should be avoided between the potential adjustment and the estimates used as inputs to the formula (in particular, the downturn estimates).

    Against this backdrop, the EBA does not consider that further differentiation in the RW supervisory formula based on E&S risks is a feasible option at this stage.

92. The maturity adjustment factor is solely based on the PD and maturity of the exposures, with the latter being capped and floored at 5 and 1 year(s) respectively. It can be argued that exposures with longer maturities are more exposed to E&S risks, which can materialise over longer time horizons. While this is already captured by the maturity adjustment factor, the fact that M is capped at 5 years allows efficient long-term financing, which is particularly needed in the context of the transition to a sustainable economy.

Simplified approaches – slotting approach and F-IRB

Slotting approach

93. Institutions have the option to apply a specific approach for the specialised lending exposures, where they are not able to estimate PDs for those exposures. Under this approach, institutions solely develop the assignment methodology of exposures into five categories, using a set of prescribed factors, and do not need to perform the risk quantification step described above. The risk weight for each risk category is prescribed in the regulation. The use of the factors has been further specified in Commission Delegated Regulation (EU) 2021/598 (RTS on slotting approach)[99], which leverages Annex 6 of Basel II standards.

94. As such, the slotting approach makes extensive use of human judgement in the form of subjective input data (such as qualitative variables derived from an expert-based assessment and weights applied for their aggregation). While environmental risk drivers are not directly mentioned in the set of sub-factors to be considered in the RTS on the slotting approach, they are nonetheless indirectly captured by some of the sub-factors (for instance, 'stress analysis on the basis of the income being generated during the tenor of the loan', 'insurance against damage', 'political and legal environment' as well as 'security package') and can nevertheless be added as additional sub-factor components. For real estate, the LTV also plays a role in the assignment of the risk weight category (sub-factor of financial strength). The EBA assessed whether the regulation could be more explicit on where to incorporate E&S risks (i.e. into which sub-factor and the resulting risk category) exactly and considers that it is relevant to bring the clarifications provided by BCBS FAQ 8[100] directly into the RTS on slotting approach[101].

95. Another element is the general calibration of the risk weight associated with each category, along with the related expected losses. In the absence of empirical data on E&S risk-related losses on specialised lending exposures, any recalibration would necessarily be highly speculative, with a risk of double counting if E&S risks are already taken into consideration in the risk category assignment. Thus, changes to the RW calibration do not appear to be a feasible option at this stage.

F-IRB Approach

96. Under the F-IRB approach, which is available for all non-retail exposures, institutions have to use regulatory values for the LGD and CCF parameters, without building a specific model or

[99] Commission Delegated Regulation (EU) 2021/598 (link).

[100] BCBS FAQ 8: 'When performing the assessment of the category of the subfactor components, banks should analyse how climate-related financial risks could negatively impact the assignment into a category. This includes any potential impact on the financial strength (e.g. estimations of the future demand, economic assumption and stressed economic conditions used for stress analysis), the political and legal environment (e.g. transition risk into "stability of legal and regulatory environment (risk of change in law)", physical risk into "Force majeure risk (war, civil unrest, etc.)" and the asset characteristic in the case of object finance. When performing this assessment, banks should take into consideration whether climate-related financial risks have been adequately mitigated (e.g. improving adaptation or taking insurance coverage against physical climate risks)' (link).

[101] Commission Delegated Regulation (EU) 2021/598 (link).

performing risk quantification as described above. Leaving aside the CCF, for which the impact of E&S risks would be expected to be generally more limited, on the LGD side it is worth noting that the drivers used for the differentiation in this approach indirectly and partially capture E&S risks. This is because, apart from the seniority of the exposures and their exposure class, the LGD values depend on the credit risk mitigation associated with each exposure, which factors in E&S risks indirectly (e.g. via the value and haircuts used for funded credit protection, and via the credit risk of the guarantor for unfunded credit protection).

97. However, in a similar way to the case of the slotting approach, the general calibration of risk parameters, including the ones related to the credit risk mitigation, could be reassessed in light of future E&S risks. Yet, at this stage, such an assessment would not be possible due to lack of evidence on risks differential and the respective levels of losses. For reasons similar to the ones mentioned in the previous section, the EBA considers that it would also not be feasible at this stage to find common and objective new differentiating factors to be added in the F-IRB approach.

General considerations on stress tests

98. Finally, in accordance with Article 177 CRR, institutions using an IRB approach to determine their own funds requirements for credit risk are required to have in place sound stress testing processes and regularly perform a credit risk stress test to assess the effect of certain specific conditions on their total capital requirements for credit risk.

99. The exact design of the stress test is currently left to the institution, though subject to a supervisory assessment. The test should be meaningful and consider the effects of severe, but plausible, recession scenarios. While there is no impediment under the current framework to incorporating E&S components in their stress test scenarios, CRR3 is expected to explicitly require institutions to include ESG risks – in particular physical and transition risks stemming from climate change – in their stress test scenarios, when considering severe but plausible recession scenarios. This would be in line with FAQ 11 of the BCBS.[102]

3.3.3 Conclusions

100. The IRB approach is by design more risk sensitive than the SA, and as such is able to better capture any (new) risk that could result in credit losses. A prerequisite for good modelling is availability of adequate data. Therefore, ensuring appropriate data gathering and RDS completeness is of crucial importance.

101. However, given that most environmental risks have likely not fully materialised yet, or not in the expected frequency or with the expected impact on credit risk, this raises the question

[102] BCBS FAQ 11: 'Climate-related financial risks have the potential to impact banks' credit exposures and banks' assessment of credit risk, asset impairment and expected credit losses. Banks should iteratively and progressively consider climate-related financial risks that affect the range of possible future economic conditions in their stress testing processes. A bank that uses the IRB approach should consider climate-related financial risks that may significantly impact the bank´s credit exposures within the assessment period' (link).

based on which information and assumptions the expectation in terms of the materialisation of additional future credit losses caused by environmental risks could be built. Against this backdrop, the EBA has reached the following conclusions:

a. In the short term, E&S risks should be taken into account in the rating assignment (i.e. risk differentiation step), the risk quantification (through for example margin of conservativism, downturn component, calibration segments) and in the application (e.g. via use of human judgement and overrides) in accordance with the existing requirements and under the condition that sufficient information is available to apply corresponding adjustments to the rating function without materially decreasing the overall performance of the model. In the case where E&S risks increase in frequency and impact, they could still be captured in the model via expert-based qualitative variables. In this regard, the existing regulatory framework should be clarified by incorporating BCBS FAQs on climate-related financial risks.

b. The EBA recognises the need for further guidance on data collection regarding potential E&S risk drivers to benefit institutions in designing their rating models. In the medium- to long term, the EBA will investigate and assess whether relevant E&S risk drivers should be added to the existing lists of risk drivers mentioned in the EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures[103], specifically paragraphs 57 (PD estimation), 121 (LGD estimation) and 177 (ELBE and LGD in-default estimation). However, it is important to note that the reference to additional E&S risk drivers is non-binding and non-exhaustive.

c. As the impact of E&S risks on defaults and loss rates becomes available, institutions should reflect these risks in their PD and LGD estimates through a re-development or recalibration of their rating systems in the long term. This would enable banks to better account for and manage E&S risks in their portfolios.

d. At this stage, the EBA currently views it premature to make immediate changes to the RW formulas, risk weights for specialised lending and LGD/CCF values to address E&S risks in own funds requirements. Nonetheless, the EBA suggests incorporating BCBS clarifications into Commission Delegated Regulation (EU) 2021/598 on slotting approach. In the medium- to long term, the EBA will reassess the need for revisions in light of evolving E&S risks, keeping in mind that revisions of such a magnitude would require international agreement in Basel.

e. The EBA suggests incorporating E&S risk considerations into banks' stress testing programmes as a short-term action, with additional details to be outlined through the mandate for the EBA to issue Guidelines included in Article 177 CRR3.

102. The aim of any adjustments in the IRB framework should be to increase the accuracy of credit risk measurement and therefore they should not lead to an undue decrease in the model

[103] EBA/GL/2017/16 (link).

performance, despite potentially higher reliance on expert judgement. As such, further incorporation of forward-looking elements in the Pillar 1 framework for credit risk, for which there is limited room under the current framework, should be anchored in available empirical evidence on the impact of climate change and environmental degradation. Thus, one key aspect is to find the appropriate balance between the need for accurate model predictions and undue variability among institutions created in the case of too much reliance on subjective assessment of the forward-looking elements. This might require increased scrutiny by competent authorities in their review processes.

POLICY RECOMMENDATIONS ON CREDIT RISK – INTERNAL RATINGS BASED APPROACH

1. APPLICATION OF THE IRB FRAMEWORK BY INSTITUTIONS

CR-IRB-1: As a **short-term action**, the EBA recommends that E&S risks be taken into account in the rating assignment (i.e. risk differentiation step), the risk quantification (through for example margin of conservativism, downturn component, calibration segments) and in the application (e.g. via use of human judgement and overrides) in accordance with the existing requirements. In particular, sufficient information should be available, such that:

- the incorporation of new risk drivers in the risk differentiation step does not materially decrease the overall performance of the rating system;
- the adjustment of estimates during the risk quantification step are based on a sufficient number of observed and reliable data;
- the application of overrides should be used in a conservative manner only in relation to some specific, individual cases, in particular where the institution is of the view that exposures are materially exposed to environmental risks or broader E&S risks, but has insufficient information to estimate the extent to which the borrowers' financial condition or facility characteristics would be impacted and only in relation to a well-justified number of the exposures within the range of application of a rating system affected by environmental risks or broader E&S risks[104].

In this context, the EBA recommends clarifying the existing regulatory framework by incorporating BCBS FAQs 8 to 15 in the relevant regulatory products (i.e. RTS and Guidelines) of the IRB repair programme.

CR-IRB-2: As a **medium- to long-term action**, the EBA will further investigate and reassess whether E&S risk drivers of a broader relevance across different types of exposures should be added to the corresponding non-exhaustive lists of risk drivers referred to in paragraphs 57 (PD estimation), 121 (LGD

[104] As a large number of overrides of the results of the model might be the indication of a model weakness as per Article 24 of the Commission Delegated Regulation on assessment methodology (and recital 20), and the situation where the input data have actually been adjusted should be limited, as per Article 39 of the Commission Delegated Regulation on assessment methodology. These requirements have been further specified in Section 8.2 of the Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures (in particular, paragraph 205).

estimation) and 177 (ELBE and LGD in-default estimation) of EBA Guidelines on PD estimation, LGD estimation and the treatment of defaulted exposures[105].

CR-IRB-3: As a **medium- to long-term action**, as the impact of E&S risks on defaults and loss rates become available, the EBA recommends that institutions reflect E&S risks in PD and LGD estimates respectively, via a redevelopment or recalibration of the rating system.

2. STANDARD PARAMETERS IN THE IRB FRAMEWORK

CR-IRB-4: The EBA considers it, at this stage, premature to consider further differentiation in the RW supervisory formula, the risk weights applied to the specialised lending under the slotting approach and the LGD and CCF values used for under the F-IRB approach for the purpose of taking into account E&S risks in own funds requirements.

However, the EBA recommends bringing the clarifications provided by BCBS FAQ 8 directly in Commission Delegated Regulation (EU) 2021/598 on slotting approach.

CR-IRB-5: As a **medium- to long-term action**, the EBA will reassess the appropriateness of revising the RW supervisory formula, the risk weights applied to the specialised lending under the slotting approach and the LGD and CCF values used for under the F-IRB approach in light of evolving E&S risks and taking into consideration the developments agreed to at the international level by the Basel Committee.

3. GENERAL CONSIDERATION ON STRESS TESTING

CR-IRB-6: As a **short-term action**, in line with BCBS FAQ 11, the EBA recommends that institutions be required to consider E&S risk as part of their stress testing programmes referred to in Article 177 CRR. Further specifications could be provided via the mandate set out in CRR3.

[105] EBA/GL/2017/16 (link).

3.4 Collateral valuation

3.4.1 Interaction between E&S risks and collateral valuation

103. The valuation of immovable property collateral under the SA and the IRB approach is expected to be carried out by a professional (and independent) valuer. Typically, such valuation is based on internationally recognised valuation standards, in particular those developed by the International Valuation Standards Committee, the European Group of Valuers' Associations or the Royal Institution of Chartered Surveyors (RICS).

104. A recent RICS survey[106] shows evidence of the incorporation of environmental aspects in immovable property collateral valuation. The survey highlights three points: (i) demand for green commercial buildings continues to rise both for investors and occupiers; (ii) increasing demand for green commercial buildings has an impact on rents and sale prices; and (iii) investment for climate risk assessment by investors on their built assets is on the rise.

105. Increasing trend in demand for green commercial buildings has an impact on both rent and prices where non-green real estate assets are subject to a brown discount and/or green real estate assets are subject to a market premium. One important question across practitioners is whether green buildings have higher market values and are therefore subject to greater financial returns in terms of both rent and prices. The survey results indicate the presence of a market premium for green buildings, and similarly, buildings that are not classified as green/sustainable are subject to a reduction in rent and prices compared to green/sustainable buildings[107]. Most survey participants also suggest that the discount is up to 10%, with some believing that the discount could be higher. Some survey participants state that even if there is no brown discount, green/sustainable buildings are subject to a premium on rent or a price premium. In Europe, only a small number of practitioners (approximately 11% of the survey participants in the EU) report no brown discount nor a green premium.

106. These initial findings also suggest that adding green or sustainability features to buildings leads to shifts in asset values to some extent. A large number of practitioners (about 58% of the survey participants in the EU) report that the gap in rent between buildings classed as green/sustainable buildings and those that are not classified as such has risen in the 12 months preceding the survey[108]. A similar trend is observed in prices. Most of the practitioners (61% of the survey participants in the EU) report that the gap in prices between buildings classified as green/sustainable buildings and those that are not classified as such, has risen in the 12 months preceding the survey[109].

[106] See RICS Sustainability Report (2022) focusing on commercial real estate and covering 679 practitioners as respondents across 16 EU Member States.

[107] See Figure A1 and Figure A2 in Annex 2.

[108] See Figure A3 in Annex 2.

[109] See Figure A4 in Annex 2.

107. These statistics suggest that market practices and valuation standards are increasingly accounting for environmental aspects in the valuation of immovable property collateral.

108. The prudential framework also accounts for environmental aspects in the valuation of immovable property collateral.

109. Currently, Article 208(3) CRR sets out minimum requirements on monitoring immovable property collateral where institutions may take into account environmental factors in assessing if the property value may have declined materially compared to general market prices. The current requirements do not refer to environmental considerations in collateral valuation explicitly. Relevant environmental factors can be included in the assessment of potential relative material decline in the property value relative to general market values, triggering re-valuation only if the market differentiates immovable property prices in relation to such environmental factors, e.g. immovable properties with high energy efficiency and immovable properties with lower energy efficiency.

110. Furthermore, Article 208(5) CRR requires institutions to hold adequate insurance against the risk of damage to the immovable property and have in place procedures to monitor the adequacy of the insurance.

111. Regarding the monitoring and revaluation of the immovable property collateral, CRR3 is expected to explicitly require institutions to consider modifications made to the property that unequivocally increase its value, such as improvements in energy efficiency or improvements to the resilience, protection and adaptation to physical risks of the property.

112. Regarding the immovable property valuation at origination and re-valuation, when triggered by the monitoring mechanism, of immovable property collateral, CRR3 is expected to introduce the requirement that the value of the immovable property takes into account the potential for the current market price to be significantly above the value that would be sustainable over the life of the loan, in accordance with prudently conservative valuation criteria. These criteria to assess the sustainable value of the immovable property over the life of the loan are expected to reflect, among others, environmental factors, where relevant and applicable. To this end, institutions can assess to what extent current environmental factors would be relevant in the future and adjust the market value of the immovable property downward, where such market value does not reflect these environmental factors. In addition, CRR3 is expected to make the link between the immovable property value and upward adjustment that can be justified by modifications made to the property that unequivocally increase its value such as improvements in energy efficiency, i.e. allowing upward adjustment to the property market value on this basis.

113. In addition to the CRR requirements, paragraph 208 of the EBA Guidelines on loan origination and monitoring[110] state that, when applicable, credit institutions should take into

[110] EBA/GL/2020/06 (link)

account ESG factors affecting the value of the collateral, for example the energy efficiency of buildings, at origination.

114. These considerations are aligned with the BCBS clarification issued in December 2022 on determining immovable property value in the context of the frequently asked questions on climate-related financial risks[111].

3.4.2 Conclusions

POLICY RECOMMENDATIONS ON COLLATERAL VALUATION

CR-COL-1: As a **short-term action**, the EBA recommends that institutions account for relevant environmental factors in the prudent valuation of immovable property collateral. In particular, institutions should consider making necessary adjustments when the current market value of the collateral does not adequately address relevant risks associated with environmental factors that could affect the sustainability of the market value of the property over the life of the exposure. These considerations should include climate-related transition risk and physical risk, as well as other environmental risks, and should cover valuation at origination, re-valuation and monitoring, whenever relevant for current market values and sustainable market values over the life of the exposure.

CR-COL-2: As a **short-term action**, the EBA will continue monitoring how environmental factors and broader ESG factors are reflected in the value of collateral, with due consideration of national specificities that may exacerbate environmental risks.

[111]BCBS FAQ 7: 'Banks should determine whether the current market value incorporates the potential changes in the value of properties emerging from climate-related financial risks (e.g. potential damage related to weather hazards, the implementation of climate-policy standards or changes in investment and consumption patterns derived from transition policies). National supervisors should consider jurisdiction-specific features that account for climate-related financial risks when setting out prudent valuation criteria' (link).

3.5 Adjustment factors

115. Capital requirements can be adjusted upwards or downwards to limit or support lending to certain sectors. The current credit risk prudential framework includes two such non-risk-based supporting factors, tailored to SMEs and infrastructure projects. In addition, environment-related adjustment factors, which would increase capital requirements for environmentally harmful exposures or decrease capital requirements for environmentally sustainable or transitioning exposures, have been suggested by stakeholders.

3.5.1 Current supporting factors in the regulation

116. The factors supporting SMEs and infrastructure projects are EU-specific departures from the Basel standards. The mechanism is to provide a downward adjustment in risk-weighted exposures by applying a discount factor to exposures meeting certain eligibility criteria. Both the SA and the IRB approach are within the scope of these supporting factors. The EBA has advocated their removal from the prudential framework[112] on the basis that adjustments should be grounded on risk-based considerations.

117. The EBA maintains its view that from a prudential perspective the continued application of the SME supporting factor and the ISF[113] could be questioned[114]. However, in a situation where the ISF remains part of the framework, strengthening the environmental criterion[115] so that only projects with lower environmental transition risk would be eligible, while projects with higher transition risk would be prevented from being eligible to the ISF is considered particularly relevant. In addition, limiting the ISF only to projects meeting strong environmental criterion has the benefit of limiting the deviation from the Basel standards as fewer exposures would qualify for the favourable treatment. That being said, the EBA would consider it more appropriate not to rely on supporting factors to address environmental risks, and it instead advocates for a more risk-based solution.

3.5.2 Environmental adjustment factors

118. Several stakeholders have raised the prospect of introducing environment-related adjustment factors in prudential rules, mostly in the form of ‘green supporting’ or ‘brown penalising’ factors[116].

[112] See, for instance, the EBA (2019) reply to the Commission’s Call for Advice on the finalisation of the Basel III framework (link).

[113] The ISF attracts a discount of 25% of risk-weighted exposure amounts, subject to meeting certain criteria.

[114] EBA (2022), *Report on the application of the infrastructure supporting factor* (link).

[115] The criterion requires the obligor to have assessed whether the project in question contributes to environmental objectives: Climate change mitigation, climate change adaptation, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems, as outlined in Article 501a(1)(o) CRR. CRR3 is expected to strengthen this environmental criterion by requiring a positive or neutral contribution to one or more environmental objectives.

[116] A GSF would reduce prudential capital requirements for environmentally sustainable / ‘green’ exposures (e.g. energy-efficient mortgages) and/or those that are transitioning towards sustainability, by either lowering risk weights for relevant

119. There are several arguments for and against adjustment factors related to environmental risk drivers, from a prudential perspective and a public policy perspective. The latter perspective is included for the sake of completeness, but is not the approach taken and supported by the EBA to determine prudential requirements.

Table 2: Pros and cons of adjustment factors

Prudential perspective

Pros	Cons
Theoretically better risk profile of sustainable activities in a transition to a more sustainable economy: On a theoretical level, environmentally sustainable activities should on average be better placed to perform well than unsustainable activities as the transition unfolds, due to better positioning in relation to environmental risk drivers (environmental and social policies, market and consumer expectations etc.). Hence (ceteris paribus), environmentally sustainable activities might carry a lower risk going forward. Therefore, adjustment factors could reflect an anticipated risk differential associated with the transition to a more sustainable economy.	**Adjustment factors lack risk sensitivity, leading to miscalibrated capital requirements:** Applying a factor which is not grounded on actual risk differential carries the risk of dissociating RWAs from actual riskiness of exposures. In particular, reduced capital requirements without a correspondingly lower risk of the exposures to which they apply would compromise the reliability of capital requirements as indicators of risk and could lead to weakened resilience of institutions, potentially undermining prudential objectives. Besides, adjustment factors are crude instruments that could not accurately reflect lower (or higher) riskiness of an exposure driven by environmental risk drivers. Overall, the risk of underestimating or overstating riskiness of exposures seems high.

asset categories or by flat out application of an adjustment factor below 1 to RWA. A BPF, by contrast, would increase capital requirements for environmentally harmful assets (e.g. fossil fuel entities or activities) either by increasing risk weights for certain asset categories or by applying an adjustment factor greater than 1 to RWAs. The term 'brown' is used here for simplicity purposes and can be understood in this context as an approximation for 'environmentally harmful exposures'.

Prudential perspective

Safety first: Increased capital requirements for exposures that are associated with (expected) higher environmental risks would strengthen the resilience of institutions by accounting for environmental risks even though they have not fully materialised yet.	**Risk of double counting:** The Pillar 1 framework to a certain extent already recognises environmental risk drivers in capital requirements through certain mechanisms (e.g. internal or external ratings). Adjustment factors would lead to double counting of environmental risk drivers if and to the extent they are already factored into risk weights, hence amending capital requirements beyond what is justified from a risk perspective. This is in particular the case for capital requirements that are calibrated using internal models which aim to quantify the individual risk of an exposure; this risk sensitivity would be overruled by an adjustment factor. Moreover, should adjustment factors be introduced on top of already existing SME and ISFs, the issue of double counting could be multiplied by an overlap not only with the Pillar 1 risk weighting but also with the other supporting factors.
Available tool: The framework, through Article 459 CRR, could contain a readily available option to address environmental risks through stricter requirements for a subset of (environmentally harmful) exposures.	**Significant shortcomings:** Activating a tool such as Article 459 CRR to override the outcome of prudentially calibrated RWAs may appear premature in the absence of conclusive evidence on risk differentials. Besides, this tool would only allow for a solution limited to 1 year, meaning that a cliff effect would arise at the end of that period.
A precautionary forward-looking approach: introducing a capital requirement penalty for most carbon-emitting / environmentally harmful activities would reflect the risk that these assets become stranded in the future as well as recognise the systemic risk posed by the financing of activities that contribute to building up environmental risks and thus endanger financial stability in the medium- to long term.	**From a microprudential perspective, capital requirements should be influenced by risks of individual assets** which cannot be fully determined in advance especially for long-time horizons: Even though higher capital requirements seem more acceptable from a prudential point of view, strong penalties on environmentally harmful exposures would overshoot the traditional risk-based approach driven by the economic viability of the assets within the maturity of exposures.
Adjustment factors could correct overreliance on historical data: Given that the forward-looking and long-term horizons of environmental risks are not appropriately reflected in observed loss events which form the basis for capital requirements, adjustment factors could reflect expected changes to the risk picture arising in the medium- to long	**Rigid instruments**: The exact economic transformations driven by environmental risks are uncertain and adjustment factors may crystallise sectoral or geographic constraints, depending on their design. Adjustment factors may misrepresent the dynamic of environmental risks and fail to take into account developments within industrial sectors

Prudential perspective

term without waiting for full materialisation of risks and capture by traditional Pillar 1 mechanisms.	or for companies undergoing a transition towards a more sustainable business model.
Establishing a simple and common instrument: By implementing adjustment factors into Pillar 1, there would be a homogeneous application throughout the EU, whereas other instruments such as Pillar 2 recommendations or guidance are more discretionary for supervisors. Moreover, given the urgency to address environmental risks, adjustment factors represent a simple tool that would more easily bring a prudential answer to such risks than an approach depending on detailed modelling exercises.	**Overstretching use of Pillar 1 and international level playing field concerns:** The Pillar 1 framework may have limitations in terms of fully accounting for environment risk drivers due to its evidence-based nature and embedded time horizon. However, it is complemented by other instruments in the prudential framework which might be more appropriate to cater for medium to long-term and mostly future risks without a historical track record, also allowing for combining the level of risks to which institutions are exposed with a judgement on how the institutions are managing such risks. Besides, adjustment factors introduced in the EU would deviate from international standards and offer opportunities for regulatory arbitrage at the international level.
A supporting factor for transitioning exposures: a 'transition-supporting factor' could be designed to support financing of specific transition programmes or sustainability-linked loans, where they are assessed to be sufficiently reliable and in effect leading to decreased transition risks of the obligors. This would be consistent with sound risk management and incentivise counterparties to develop transition-resilient business models/activities. Given the underlying objective of supporting the transition, this could potentially be applied temporarily, until the economy reaches its sustainable state.	**Operational and conceptual challenges** complicate introducing adjustment factors for transitioning exposures: Challenges include, first, the definition of the scope of exposures in a consistent and objective manner and the determination of prudentially accepted sustainability conditions or targets that would be required to lower environmental risks; second, the concerns of potential double counting would remain valid depending on how the transition risk would already be captured through other Pillar 1 mechanisms.
Improving analytical capacities: Adjustment factors would stimulate institutions to develop screening criteria and methodologies to distinguish 'green', 'transitioning', 'sustainability-linked' or 'environmentally harmful' in order to be able to apply any adjustment factor(s).	**Worsening credit standards:** Adjustment factors could lead to reduced lending scrutiny and, in the case of supporting factors, disproportionate risk taking. This could eventually damage the reputation of sustainable finance if it led to a large amount of non-performing 'green' loans.

Public policy perspective

Pros:	Cons:
Alignment with public policy: the transition towards a sustainable economy necessitates substantial investment needs. The public sector will not be able to provide all this financing and the private sector has an important role to play. Given the weight of the banking sector in the EU, adjustment factors would directly incentivise banks to provide financing according to environmental impact and contribute to reorient capital flows away from environmentally harmful activities towards green and/or sustainability-linked investments.	**Suboptimal policy measure:** The purpose of prudential regulation should not be tweaked, nor should it serve as a substitute for other changes in public policy. To finance the transition and to tackle environmental risks to the economy, a range of fiscal, industrial, energy and financial policies should be considered. These policies should also contribute to better pricing of environmental risks, which would then be reflected in the inputs to the prudential framework.
Signal to economic agents: Adjustment factors would incentivise institutions to acknowledge the potentially different risk profiles of lending or investment decisions depending on their (mis)alignment with the environmental objectives of the EU. This would further indirectly incentivise corporates or households to undertake environmentally sustainable activities as they would expect to benefit from better priced loans, or conversely to avoid pursuing environmentally harmful activities due to expected higher funding costs.	**May not support effective and just transition:** considering that all economic activities need to transition towards sustainability regardless of their starting point, adjustment factors may fail to support the transition especially if they apply to already green exposures and disregard the transition finance needs of companies active in currently high-emitting sectors. Conversely, increased capital requirements could constrain the flow of capital required to enable the transition towards sustainability of e.g. hard-to-abate sectors and regions. This could in turn lead to significant negative social consequences in certain industry sectors and geographical regions.
	Shifting to non-bank-based finance: Increased capital requirements could lead to a shift in financing of currently less-sustainable borrowers to non-bank financial intermediaries (shadow banking), in the worst case to firms outside the scope of prudential regulation.
	Questionable effect: The EU already has experience with adjustment factors, namely the SME supporting factor and the ISF. However, so far there is no clear indication that these supporting factors have significantly stimulated lending[117].

[117] See EBA (2016), *Report on SMEs and SME Supporting Factor* (link) and EBA (2022), *Report on the application of the infrastructure supporting factor* (link).

120. Considering the balance of arguments presented above, the EBA does not recommend introducing environment-related adjustment factors at this point. From a prudential point of view, challenging conditions should be met before adjustment factors could be justified, which is not the case at this stage. These conditions include (i) acquiring clear evidence that certain assets display distinct risk profiles due to environmental risk drivers, (ii) establishing that the framework cannot capture these risk drivers, (iii) overcoming classification challenges which currently hinder the identification of exposures to which adjustment factors could apply[118], and (iv) benefitting from a high-enough degree of comfort on impacts and potential unintended effects.

121. Adjustment factors face both conceptual (e.g. overlap with existing Pillar 1 mechanisms) and operational challenges (e.g. calibration, need for international cooperation, granularity needed to differentiate exposures and capture forward-looking aspects such as individual transition plans) that complicate their design and implementation. The lack of strong evidence, data and methodologies for identifying and quantifying environmental risk drivers at this point in time would likely make the determination of the scope and size of adjustment factors uncertain.

122. Overall, it is key to ensure that the calculation of RWAs is not distorted and to maintain risk-based capital requirements which fulfil their function as safeguards against unexpected losses. The most consistent way forward from a prudential risk-based perspective is therefore to address environmental risk drivers through effective use of and targeted amendments to the existing prudential regime rather than through dedicated treatments such as supporting or penalising factors.

123. Acknowledging the possible challenges posed by environmental risks for the safety and resilience of institutions, potential further progress to overcome the challenges described above could be taken into account where appropriate, with the view to designing prudentially sound and risk-based adjustments to the prudential treatment of individual exposures as well as to ensure that the overall level of capital requirements will remain adequate to respond to new risks.

POLICY RECOMMENDATIONS ON ADJUSTMENT FACTORS

CR-ADJ-1: At this stage, the EBA does not recommend introducing environment-related adjustment factors.

[118] In order to apply adjustment factors, the classification of exposures based on relevant indicators and accounting for different factors e.g. geographies, sectors and counterparty-specific factors, is a prerequisite. The current lack of a risk-oriented taxonomy, or the inability to match green taxonomies with the related financial risks, hinders such identification. In addition, some granularity would be needed as, for example, not all companies active in high climate impact sectors actually carry out environmentally harmful activities with high transition risks. Furthermore, capital adjustments are often discussed at the level of specific assets (e.g. coal-fired power plant or wind farm) or activities. However, much bank lending and investment is made to companies rather than to specific assets or projects and there are few companies that are 'pure green' or 'pure brown' along the entire value chain.

CR-ADJ-2: As a **medium- to long-term action**, the EBA will reassess if and how environment-related adjustment factors could be taken into account as part of a prudentially sound and risk-based prudential treatment of individual exposures.

4. Market risk

4.1 Overview of the framework

4.1.1 Introduction

124. Market risk is the risk of losses arising from movements in market prices. In prudential terms, it captures:

a. the risk of losses related to instruments that are allocated to the trading book; and

b. the risk of losses due to foreign-exchange risk or commodity risk in the banking book items.

125. The regulatory treatment of market risk is set out in the CRR and in the subsequent delegated regulations, technical standards and guidelines adopted on this basis. In particular, the CRR already implemented in the EU in 2019 – as reporting requirements only – the main building blocks of the FRTB as agreed to at the international level. These reporting requirements are expected to be transformed into capital requirements as of 2025.

126. An overview of the SA and the IMA under the FRTB rules is provided below. Focus is placed on those aspects on which the considerations presented in the section 'Interaction between E&S risks and the market risk framework' are built. In particular, in that section, the links between market risk and E&S risks are investigated, and recommendations on the inclusion of E&S risks in the market risk Pillar 1 framework are put forward.

127. It should be noted that institutions with a small business subject to market risk will have the option to continue using the current (non-FRTB) standardised approach (referred to as 'simplified standardised approach'). Due to its nature, the simplified standardised approach does not capture in an accurate and risk-sensitive way all market risks to which an institution is exposed. Because of that, it has been recalibrated under the Basel III reforms to be particularly conservative. Considering that not even classical market risks are accurately captured by those institutions, it would not be proportionate at this stage to consider reforming that approach to cater for environmental risks. Accordingly, the sections below do not specifically deal with the simplified standardised approach. In the future, and only if environmental risks prove to be a strong driver of market risk, recalibrating this approach could be considered, preferably with minimal implementation changes[119].

[119] For example, the multipliers referred to in Article 325(2) CRR3 could be revised to ensure that they cater for environmental risks.

4.1.2 The FRTB SA

128. The own funds requirements for market risk under the SA are computed by summing up three separate own funds requirements: (i) the own funds requirements resulting from the application of a SbM; (ii) the own funds requirements resulting from default risk; (iii) the own funds requirements for residual risk.

129. The capital requirements under the SbM are calculated separately for each of these risk classes without diversification effects being recognised across them:

a. equity risk;

b. interest rate risk;

c. credit-spread risk for non-securitisations;

d. credit-spread risk for securitisations not included in the correlation trading portfolio;

e. credit-spread risk for securitisations included in the correlation trading portfolio;

f. foreign-exchange risk;

g. commodity risk.

130. The own funds requirements under the SbM for each risk class are obtained by aggregating three risk measures:

a. Delta: a risk measure based on the sensitivities of an instrument to regulatory delta risk factors.

b. Vega: a risk measure based on the sensitivities to regulatory Vega risk factors.

c. Curvature: a risk measure which captures the incremental risk not captured by the delta risk measure for price changes in instruments with optionality. Curvature risk is based on two stress scenarios involving an upward shock and a downward shock to regulatory risk factors.

131. It should be stressed that regulatory risk factors are predefined, i.e. defined in the regulation. Institutions are required to calculate sensitivities of their positions to the predefined risk factors and apply shocks in the form of risk weights accordingly.

132. For example, in the context of equity risk, institutions are required under Article 325ap CRR, to identify the market capitalisation, the economy and sector of an equity name to which they are exposed, and identify the appropriate risk weight accordingly. In the context of credit-spread risk for non-securitisation, institutions are required under Article 325ah CRR to identify the credit quality and the sector of a given issuer to which they have an exposure and identify risk weights accordingly. For these two risk classes therefore, the SA framework was designed

to replicate a factor model; in other words, the three systematic components of an equity name (market caps, economy and sector), and the two systematic components of a credit spread single name (credit quality step and sector) are considered the risk drivers.

133. For all risk classes, risk weights were calibrated on historical data reflecting a period of stress that covers the 2007-2008 global financial crisis. Furthermore, the liquidity horizon on which the risk weights were calibrated ranges from 10 days to 120 days – 10 days being assigned to most liquid risk factors, and 120 days to the least liquid ones.

134. Weighted sensitivities for the different risk factors are then aggregated to obtain the risk measure. Such aggregation of sensitivities is done by means of predefined correlation parameters. Most importantly, institutions have to repeat all calculations three times, i.e. under a baseline scenario, a high and low correlation scenario. The aggregation is finally done by means of the correlation leading to the worst scenario, i.e. the scenario leading to highest own funds requirements.

135. For default risk instead, institutions are required to compute a DRC. This charge is computed only for positions subject to equity and credit-spread risk, as these are the positions subject to default risk. For non-securitisation, among others, the DRC depends on the credit quality step of the issuer, as well as on the sector of the issuer (corporate, sovereign or municipalities). Risk weights have been calibrated on a 1-year horizon, hence, similar to credit risk, the objective is to capture the losses resulting from defaults that could occur within a 1-year horizon.

136. Finally, the residual risk add-on (RRAO) is a charge introduced to cover for risks that are not captured in the SbM. It amounts to 1% or 0.1% of the gross notional amount of the instrument, depending on whether the instrument is referencing an exotic underlying or an instrument bearing other residual risks, respectively. In this context, it should be noted that:

a. Weather, natural disasters are considered exotic underlyings. Hence, instruments with those underlying exposures are subject to a 1% charge.

b. Options with a complex pay-off but on a non-exotic underlying (e.g. a barrier option on an equity name) are considered to bear residual risk and are therefore subject to a 0.1% charge.

4.1.3 Internal model approach

137. Under the FRTB IMA, unlike the SA where risk factors are provided by the regulation, institutions have to establish their own risk-factor set-up. Once the risk factors have been defined, institutions have to perform a risk-factor eligibility test (RFET) resulting in a risk factor being determined either modellable or non-modellable.

138. For modellable risk factors, institutions have to compute expected shortfall measures at 97.5% confidence level, for each risk class, and at the level of the whole portfolio capitalised

with the IMA. When computing those expected shortfall measures, diversification effects are recognised between modellable risk factors.

139. Instead, for NMRF, institutions have to compute a stress scenario risk measure on a stand-alone basis. Correlation among NMRFs is recognised only via a prescribed aggregation formula.

140. The expected shortfall measure and the stress scenario risk measure are then aggregated to obtain the capital requirements[120]. Furthermore, a DRC to capture default risk in equity and debt positions is to be computed by means of an internal default risk model. In this report, we refer to 'internal risk measurement model' to refer to the model used to determine the expected shortfall measures for modellable risk factors and the stress risk measure for non-modellable risk factors, and we refer to 'internal default risk model' to refer to the model used to compute the default risk charge.

141. In the context of the internal risk measurement model, it is important to note that:

a. The expected shortfall measures for modellable risk factors and the stress scenario risk measure reflect liquidity horizon varying from 10 days to 120 days, depending on the liquidity assigned to a given risk factor type, in accordance with Article 325be CRR.

b. The stress scenario risk measure for NMRF is calibrated on a stress period while the expected shortfall measure for modellable risk factors combines two drivers, the main driver being calibrated based on a stress period and a second driver calibrated on a period corresponding to the last 12 months[121].

c. Given that it is up to the bank to establish its risk factor set-up, a bank is de facto free to decide how to model risks. For example, the risk in a cash-equity position could be modelled by means of a single risk factor modelling the changes in the equity price, or by means of two risk factors, one reflecting a systematic component (e.g. modelled on the basis of an index), and one reflecting an idiosyncratic component to reflect the specific risk of the name compared to that of the index.

d. In the expected shortfall measures for modellable risk factors, institutions have to model the correlation between risk factors based on historical data. However, institutions also need to test alternative correlation pattern to those observed.

e. Institutions may use proxy data where own risk factors' data are not available. However, when they do so, institutions have to prove that the proxy keeps track of the actual position held and that the proxy is conservative.

[120] As it is not relevant for the discussion, the aggregation formula used to obtain the capital requirements, outlining the various relevant terms (e.g. the 60-business-day average of the risk measures, and the multiplier resulting from the back-testing results) is not displayed here. However, more details can be found in Article 325ba CRR.

[121] The second component of the ES calibrated based on the current period corresponds to a ratio of partial expected shortfall measures calibrated at the numerator on a full dataset of modellable RF and at the denominator, on a reduced dataset as referred to in Article 325bb CRR.

f. Institutions must run an appropriate capital adequacy stress testing programme for internal model purposes. These tests are meant, among others, to detect new risks that could not be identified by means of historical data only.

142. The internal default risk model captures the default risk linked to trading book positions subject to equity or credit-spread risk – hence, the nature of the risk captured by the internal default risk is that of credit risk. The CRR requires banks to use a VaR model with a 99.9% confidence level, over a 1-year time horizon[122], and with a calibration period spanning 10 years including a period of stress.

143. In practice, default risk is modelled by simulating the default of individual issuers as well as the simultaneous default of multiple issuers using two types of systematic factors. While the choice of the types of systematic factors remains with the institution, it could be expected that institutions will opt for traditional factors, e.g. the region and sector of the issuer. Copula assumptions modelling the correlations between instruments in institutions' portfolio are also part of the modelling choice of the institution. In addition, the internal default risk model has to appropriately reflect issuer concentrations and concentrations that can arise within and across product classes under stressed conditions. In contrast, the credit risk framework is based on a single systematic factor, reflects a copula assumption, which is de facto prescribed via the IRB formula, and assumes perfect granularity of the loan portfolio (i.e. perfect diversification of idiosyncratic risk).

144. As regards the estimation of PDs and LGDs that are the main input parameters in the internal default risk model, the FRTB specifies that where those parameters are available under the IRB approach, then those must be used. When instead PDs and/or LGDs are not available under the IRB approach, institutions are required, in accordance with the EBA RTS on PD and LGD[123], to obtain the PDs/LGDs either by a methodology meeting the requirements applicable to the IRB approach, or by employing external sources (or as a last resort solution, by using a fallback approach).

145. Both for their internal risk measurement models and in their internal default risk models, the CRR requires institutions to capture all material risks and to have accurate models. However, this does not prevent institutions from excluding some risks that cannot be accurately modelled from their model engine. For example, a bank materially exposed to a pegged currency pair (e.g. EUR/DKK) is exposed to unpegging risk; however, using data referencing the EUR/DKK exchange rate from the stress period would not enable reflecting such risk.

146. Under the current framework, i.e. previous to FRTB, the European Central Bank has developed a RNIME framework aiming, among others, to capture those risks that are not fully reflected in the data, and more generally, monitoring those risks and possibly aiming to capitalise them under a separate charge – i.e. outside the model engine – all those risks that

[122] For equity positions the liquidity horizon can be reduced to 60 days.

[123] Commission Delegated Regulation (EU) 2023/1578 of 20 April 2023 (link).

the model does not adequately reflect as long as they remain non-material. Section 7.2 of the ECB Guide to internal models (2019)[124] set out the ECB expectations in that regard.

4.2 Interaction between E&S risks and the market risk framework

4.2.1 Overview of the framework

147. Environmental risks can materialise through market risk via multiple channels. For instance, the transition to a low-carbon economy can impact commodity markets, especially fossil fuels which are prone to transition risks or the credit rating of traded bonds. Physical risks emerging from climate change can also cause market price fluctuations, such as more frequent and severe extreme weather events causing losses in equity prices due to destruction of firms' assets or capacity to produce.

148. In the context of environmental risks, and more specifically in relation to physical and transition risk in the market risk framework, the focus is put on equity, credit spread as well as commodity risk, as these market segments are expected to be more impacted by environmental risks than interest rate and foreign-exchange risk segments. The general spirit behind this approach is in line with the recommendations stated in the Platform Usability Report[125] of the EU Platform on Sustainable Finance, which discusses how institutions should take the environmental dimension into account in relation to the reporting obligations applicable to their trading book positions.

149. In this section, the interactions between E&S risks and the Pillar 1 market risk framework as outlined in the previous section are identified and investigated. First, a literature review investigating the impact of climate-related risk drivers on market risk factors is presented. Then, some common elements to the SA and the IMA are discussed. Finally, elements that are relevant for one of the two approaches only are discussed separately following the structure proposed in the previous section.

4.2.2 Literature review

150. Over the last few years, a growing body of academic literature has been devoted to studying the impact of broadly defined ESG-related risk drivers on market risk factors. The different streams of research are presented below:

- The seminal work of Bansal et al. (2016)[126] provides the theoretical rationales to understand how capital markets are expected to price climate-related risk. Based on the well-known

[124] See ECB (2019), ECB Guide to internal models (link).

[125] See Platform on Sustainable Finance (2022), *Platform recommendations on Data and Usability,* Sections 3.1.3 and 3.1.5 (link).

[126] Bansal, Ravi and Kiku, Dana and Ochoa, Marcelo, *Price of Long-Run Temperature Shifts in Capital Markets* (2016), NBER Working Paper No. 22529, available at: Link.

long-run risks theory (Bansal and Yaron, 2004)[127], the authors develop a structural model for asset pricing that allows for the interaction between climate change, economic growth and risk. The model predicts that climate-related risks carry a positive premium, which is reflected in prices of forward-looking assets such as equity. The authors confirm their theoretical prediction based on US market data between 1934 and 2014. They show that temperature-related risks carry a positive premium in equity markets since positive shifts in temperature trends are expected to reduce equity valuations.

- The findings presented by Bansal et al. (2016) are consistent with the empirical results of papers addressing the ability of markets to capture environment-related risks. Bolton et al. (2021)[128] find that carbon emission intensity is reflected in stock returns, meaning that the stocks of companies with higher CO_2 emissions earn higher returns. Bonagura et al. (2021)[129] show that green stocks are more liquid, while Ilhan et al. (2021)[130] find that the cost of option protection against tail risk is more expensive for carbon-intensive firms.

- There exists limited empirical evidence quantifying the extent to which markets are already able to price environmental-related risk factors. To the extent of our knowledge, Goldsmith-Pinkham et al. (2022)[131] are the first to isolate an environment-related risk factor in market data. Based on the US municipal bond market, the authors exploit the exogenous exposure of US municipalities to sea-level rise (SLR) in order to quantify the pricing effects of near-term pricing risks. The paper shows that municipalities exposed to near-term flood risks present SLR premiums that diverge over time when compared to those of municipalities far from coastal areas.

- An additional stream of research has been assessing the possibility of integrating financial risk measures with ESG considerations in order to forecast the volatility of financial assets. Lööf and Stephan (2019)[132] identify that higher ESG scores are associated with reduced downside risk of stock returns for European listed firms over the period 2005-2017. This result is confirmed by Viviani et al. (2019)[133] based on a VaR approach and by Burger et al.

[127] Bansal, Ravi and Yaron, Amir, *Risks for the Long Run: A Potential Resolution of Asset Pricing Puzzles* (2004), The Journal of Finance, Volume 59, Issue 4, available at: Link.

[128] Bolton, Patrick and Macperczyk, Marcin, *Do Investors Care about Carbon Risks?* (2021), Journal of Financial Economics, Volume 142, Issue 2, available at: Link.

[129] Bonagura, Gianmaria and D'Amico, Luca and Iacopino, Carmelo and Prosperi, Lorenzo and Zicchino, Lea, *Stocks' liquidity and Environmental Performance* (2021), Bancaria, No. 6, available at: Link.

[130] Ilhan, Emirhan and Sautner, Zacharias and Vilkov, Grigory, *Carbon Tail Risk* (2021), The Review of Financial Studies, Volume 34, Issue 3, available at: Link.

[131] Goldsmith-Pinkham, Paul and Gustafson, Matthew T. and Lewis, Ryan C. and Schwert, Michael, *Sea Level Rise Exposure and Municipal Bond Yields* (2022), NBER Working Paper No. 30660, available at: Link.

[132] Lööf, Hans and Stephan, Andreas, *The Impact of ESG on Stocks' Downside Risk and Risk Adjusted Return* (2019), CESIS Working Paper No. 477, available at: Link.

[133] Viviani, Jean-Laurent and Fall, Malick and Revelli, Christophe, *The Effects of Socially Responsible Dimensions on Risk Dynamics and Risk Predictability: A Value-at-Risk Perspective* (2019), Journal of International Management, Volume 23, Issue 3, available at: Link.

(2022)[134] based on a regression approach. Capelli et al. (2021)[135], Morelli and D'Ecclesia (2021)[136], Olofsson et al. (2021)[137] and Bax et al. (2023)[138] implement econometric analyses to quantify differences between the volatility of ESG-compliant investment and non-ESG-compliant investment returns. The papers show that ESG-related considerations can be regarded as a relevant risk dimension in predicting the volatility of financial assets.

- Recent research by Capelli, Ielasi and Russo (2023)[139] addresses regulatory requests for sustainability-related risk integration into traditional financial risk measures. The authors propose a new risk metric that combines the traditional market risk measure expressed in terms of VaR and ESG factors. The pilot empirical application shows that the new risk metric has predictive power to reduce unexpected losses and it can be used to increase the level of accuracy of the VaR estimations.

4.2.3 Common elements: liquidity horizon and environmental risks as risk factors and risk drivers

151. As explained in the previous section, the SbM in the SA as well as the expected shortfall measure and the stress scenario risk measure in the IMA are calibrated on a liquidity horizon that is shorter than the one used in the context of credit risk. However, this does not mean that environmental risks are not relevant for those measures. In particular:

a. Physical risk usually materialises instantaneously. Hence, a shorter liquidity horizon does not imply that the risk is automatically scoped out from the framework. Eventually, it only implies that the probability of that event occurring within the prescribed time horizon is lower than the probability of the same event occurring within a longer time horizon.

b. The transition towards a low-carbon economy is instead a process that is far from being instantaneous, as it is expected to occur gradually over time. Hence, it is less obvious whether transition risk affects those measures. However, it becomes more evident by considering a simplified example.

   Consider two 30-year maturity bonds that differ only in their transition risk, i.e. one bond is more prone to default because it is more exposed to transition risk than the other. Let us

[134] Burger, Eric and Grba, Fabian and Heidorn, Thomas, *The impact of ESG ratings on implied and historical volatilites* (2022), Frankfurt School Working Paper, available at: Link.

[135] Capelli, Paolo and Ielasi, Federica and Russo, Angeloantonio, *Forecasting volatility by integrating financial risk with environmental, social and governance risk* (2021), Corporate Social Responsibility and Environmental Management, Volume 28, Issue 5, available at: Link.

[136] Morelli, Giacomo and D'Ecclesia, Rita, *Responsible investments reduce market risks* (2021), Decisions in Economics and Finance No. 44, available at: Link.

[137] Olofsson, Petter and Raholm, Anna and Uddin, Gazi Salah and Troster, Victor and Kang, Sang Hoon, *Ethical and unethical investments under extreme market conditions* (2021), International Review of Financial Analysis, Volume 78, available at: Link.

[138] Bax, Caroline and Sahin, Ozge and Czado, Claudia and Paterlini, Sandra, *ESG, risk and (tail) dependence* (2023), International Review of Financial Analysis, Volume 87, available at: Link.

[139] Capelli, Paolo and Ielasi, Federica and Russo, Angeloantonio, *Integrating ESG risks into Value-at-Risk* (2023), Finance Research Letters No. 103875, available at: Link.

assume that, because of the difference in their transition risk, the riskier bond has a credit rating, over a 1-year time horizon that is one notch below the other, say BB+ and BBB-.

The 1-year probability of default affects short-term volatilities. This is generally accepted, and it is, for example, reflected by Table 3 under paragraph 21.51 of the FRTB standards, where the credit rating of a bond clearly affects the risk weights. The riskier the bond from a credit risk perspective is (as reflected in the rating), the more volatile it is considered to be in the market risk framework. The two bonds in our example would therefore be subject to a different risk weight.

It results from this that transition risk in the market risk framework is at least as relevant as it is in the credit risk framework. If indeed, the credit risk of an issuer is impacted by transition risk, then this is expected to affect the short-term volatilities of its credit spread.

152. As a matter of fact, a growing body of research – such as that laid down in Section 4.2.2 – analyses the potential impact of ESG risks on the market risk of financial instruments. Authors tend to find that issuers with a better ESG standing are generally associated with lower observed historical volatility or market risk. A common feature of this research is that it relies on ESG information in the form of ESG ratings or ESG scores as a means of enhancing traditional market risk measures such as value at risk.

153. As outlined in more detail in the previous section, a risk factor is a clearly defined object. It is an input to the pricing function, which may be shocked by the institution when calculating the risk measures (see, for example, Article 325bh(1)(a) CRR setting out the risk factor granularity for internal models). In general, environmental risks are not expected to lead to introducing new risk factors per se. Instead, they are expected to act as risk drivers for classical risk factors (e.g. an equity price or a credit spread), i.e. they are expected to render a risk factor more volatile than historically observed or be subject to severe jumps. Therefore, it is important to distinguish between environmental risks as risk drivers, and environmental risks as risk factors.

154. In general, environmental risks should not be regarded as risk factors per se. Rather, they should be considered risk drivers of traditional risk factors, meaning that they do affect, albeit indirectly, the prices of financial instruments. In financial theory, prices are the expected values, under a risk-neutral measure, of the realisation of future cash flows. If risk factors in a financial instrument are affected by environmental risk drivers, then this will be reflected in the price, assuming that the market is aware of that risk driver. The conclusion is supported by empirical evidence as discussed in the literature review section (see Section 4.2.2). Goldsmith-Pickam et al. (2021) show that market participants price the exposure to sea level rise in the credit spread of some municipal bonds. They also show that this affects the volatility of those credit spreads when compared to identical bonds not exposed to sea level rise risk and that a basis (driven by environmental risk) between those bonds can be identified. Accordingly, the exposure to sea level rise risk explains part of the volatility to which those bonds are subject. Similarly, an effect on stock prices has been found in that stocks of companies with higher carbon emissions earn

higher returns, suggesting the existence of a carbon premium demanded by investors as compensation for the risk of carbon emissions (Bolton and Kacperczyk, 2020). There is also evidence of an impact on derivative prices, for example in the form of a long-lasting increase in the implied volatilities of stocks located in the landfall region of hurricanes (Kruttli et al., 2023).

155. The idea of ESG risks as risk drivers does not exclude in principle the idea of an ESG risk factor. For instance, there is a growing market in ESG-linked products (i.e. products whose pay-off depends on achieving an ESG target) where environmental risks may take the form of a risk factor, for example bonds with coupon rates depending on whether the bond issuer meets environmental goals within a given deadline. Hence, having a specific risk factor capturing an environmental risk is not to be excluded in all cases.

4.2.4 Interaction between E&S risks and the standardised approach

156. In the SbM, as mentioned in previous section, risk weights are directly prescribed in the regulation, and they have been calibrated based on historical data reflecting a fixed period of stress that covers the global financial crisis. As environmental events are expected to occur with increasing frequency and severity, market risk own funds requirements calibrated on historical data may – especially in a situation where environmental risks increasingly materialise – not adequately reflect the impact of environmental risk drivers.

157. In order to better reflect environmental risks that may materialise in the future, despite not being fully reflected in prices, the current applicable risk weights could be complemented by using projections based on forward-looking climate and other environmental-risk-related scenarios. However, the inclusion of forward-looking scenarios, on top of risks calibrated with historical data, would be a significant divergence from the existing approach. In particular, it would reduce the risk sensitivity of the approach and loosen the link to the IMA established with the FRTB.

158. In contrast, a suitable alternative would be to include a dimension reflecting environmental or even broader E&S risks when defining the buckets into which a risk factor falls. As outlined in paragraph 132, the SbM rules for equity and credit-spread risk classes replicate a factor model. Furthermore, the growing literature on the topic, such as that mentioned in paragraph 154, shows that environmental risk drivers can explain part of the volatility in risk factors in a rather analogous manner (at least in nature, if not in magnitude) to how the region/economy and the sector of an equity name explains the volatility level.

159. For example, the risk weight applicable to capture equity risk depends on the economy (advanced vs emerging) and the sector. An additional dimension distinguishing between equity positions that are more subject to environmental risks and those that are less subject to such risks could be introduced. A similar approach could be used for the credit-spread risk class. Introducing a new dimension should follow a risk-based approach, i.e. it should be pursued once evidence is obtained and the data driven calibration can be performed.

160. An alternative approach could be to introduce a new environmental risk class. This risk class would include the traditional FRTB SA equity and credit-spread risk factors and, for simplicity, the scope could be limited to the delta risk component for those positions deemed to be exposed to environmental risk. The bucket structure, risk weights and correlations of this new risk class would need to be defined. Compared to the approach of adding an additional dimension to existing risk classes, this would have the advantage that the existing FRTB SA risk classes would not need to be amended and that the diversification of market risk driven by environmental risk from different types of risk factors would be possible, but limited to this additional risk class, thereby avoiding offsetting with risk classes driven by traditional market risk. In addition, the market risk requirements driven by exposures to environmental risk would be clearly identifiable in regulatory reporting.

161. A necessary condition for introducing such approaches is the meaningful assignment of issuers to buckets according to their riskiness in terms of environmental risk, based on a set of factors to be defined. The assignment of issuers and the corresponding risk weights should provide sufficient explanatory power for the observed market risk of the position. An arbitrary assignment in the form of a flat penalty factor would risk compromising the risk sensitivity of the SA, which is arguably the most important feature of the new framework. At this stage, both the aspect of distinguishing issuers or risk factors, respectively, which are more exposed to environmental risks from those that are less exposed, and the calibration of the corresponding risk weights, are major challenges that should be addressed with appropriate data and agreed modelling approaches.

162. In addition, in the SbM, banks are already required to apply a high and low correlation scenario, to also reflect patterns that are different from those observed. Hence, the correlation framework already incorporates a degree of conservatism to protect against different correlation scenarios, including those that have not been historically observed. While it could be envisaged to assess whether these scenarios sufficiently cover the effect that environmental risks may have on correlation patterns, this does not seem to be suitable at this stage. This could eventually be a step to pursue, following introducing a new dimension in the risk-weight framework, which would require the calibration of new correlation parameters in any case.

163. The considerations made so far are relevant for those cases where environmental risks take the form of a risk driver. However, there may be products that are linked to environmental initiatives, and that attract a new risk factor, i.e. an environmental risk factor is used in the pricing function, and may potentially attract a RRAO charge. In the medium- to long term, and only where those risk factors become material in banks' portfolio and where banks start hedging environmental risk more actively (via trading book instruments also), creating a new risk class capturing the risk in a more risk-sensitive manner could be considered.

164. Finally, as noted above, the SA also entails the calculation of own funds requirements for default risk in the trading book in the form of a jump-to-default. While this falls within the prudential framework of market risk, the nature of the risk captured is that of credit risk. Hence, the considerations set out in the previous chapter, especially in relation to internal or external

credit ratings assigned to positions, are applicable to and relevant also for default risk. Accordingly, any solution envisaged in the context of credit risk should potentially be replicated when capturing default risk in the trading book.

4.2.5 Interaction between E&S risks and the IMA

165. As environmental risks increasingly materialise, one would expect banks' internal models to automatically capture environmental risk drivers. In particular, banks are required to capture material risks in their model. Hence, where environmental risk drivers are material, they are expected to be captured in the model either implicitly, by means of time series of classical risk factors reflecting environmental risk drivers in full or more explicitly. For example, similarly to what has been discussed in the SA section, and what is presented in Goldsmith-Pinkham et al. (2022), one could expect a factor model used in an internal model to also account for an environmental dimension, on top of the classical market factors capturing for example, region and sector of an equity name/credit-spread single name. However, this is possible only to the extent that the market prices those risks, and only if banks are able to identify the discriminant factor (in the form of a basis for example) in the pricing.

166. As mentioned in paragraph 141(b), the risk measures driving the capital requirements are to be calibrated on a stress period for the stress scenario risk measure for non-modellable risk factors, and both on the stress period and a recent period for the expected shortfall measure for modellable risk factors (the part calibrated on the stress period being the main driver).

167. For the part of the expected shortfall measure calibrated on the last 12 months, it is expected that emerging risks such as environmental risks will be progressively embedded in the calibration. For the stressed component, the calibration depends on the identified period of stress, determined at portfolio level for the expected shortfall risk measure and at risk-class level for the stress scenario risk measure.

168. Usually, for well-diversified portfolios the period maximising the own funds requirements that is accordingly used as a stress period is the period covering the 2007-2008 global financial crisis[140]. However, the stress period is updated on a regular basis and may not permanently rely on the global financial crisis.

169. For the stress scenario risk measure for which the stress periods are determined at risk class level, it is likely that different stress periods will be considered in the calibration. Therefore, the most sensitive risk classes (e.g. commodity risk class) to emerging risks such as environmental risks may be characterised by regular updates of their stress period towards more recent periods, for which data may better embed these emerging risks.

[140] In the context of some portfolios, the COVID-19 period may have been identified as the stress period more severe than the global financial crisis period. Similarly, for portfolios mainly exposed to European rates and credit spreads, the European debt crisis of 2011-2012 could correspond to the identified period of stress.

170. Generally, the older the stress period, the less it could be expected that data in that stress period reflect environmental risks, as those risks started to be priced only more recently. For example, in Goldsmith-Pinkham et al. (2022), the authors show that the basis between the credit spread of municipal bonds subject to sea level rise risk and those that are not can be attributed primarily to environmental risk only from 2012 onwards. Accordingly, a bank would not be able to capture that basis using 2007-2008 stress period data.

171. Furthermore, it is acknowledged that even current data may not yet reflect environmental risks in full, due to data unavailability, or lack of relevant information, despite as mentioned, growing literature showing that some environmental risks are already priced in. To capture environmental risks that are not yet priced in (or that were not yet priced in in the stress period), banks could be required to adjust their historical data to account for potential future (non-historically observed) dynamics. However, adjusting data could affect the accuracy with which non-environmental-risk-related financial risk is captured and may also lead to double counting effects, if the effect of environmental risk is already (even partially) covered in the volatility. Hence, doing this appropriately would be intrinsically difficult, and would represent a deviation from the current market risk framework.

172. In the medium term, a more pragmatic approach would be to consider environmental risk outside the internal model.

173. As mentioned, the European Central Bank, in the ECB Guide to internal models[141], has developed in the area of market risk a 'risk not in the model engine' framework that, among others, provides the incentives for institutions to identify and monitor those risks that could not be included in the model engine, for example, because no suitable historical data are available. For instance, an institution that fully relies on a historical approach for calculating its VaR (or expected shortfall) is not able to capture risks linked to the jump of prices that did not occur within the calibration period, despite being exposed to this risk. Accordingly, the institution could capture outside its internal models some jump risks that cannot be captured by just using historical data[142]. These additional elements of risk should be monitored as part of the RNIME framework and possibly covered by an add-on – RNIME add-on – to the risk measure resulting from an internal model, until these risks become material.

174. The RNIME framework as designed by the ECB is built on high-level principles that still leave significant freedom to institutions on how to capture those risks that could not be included in the model. This de facto means that the regulatory requirements on the RNIME framework implemented by the institution are not as stringent as those applicable to the internal risk measurement model. A similar treatment could be extended to also capture environmental

[141] See ECB (2019), ECB Guide to internal models (link).

[142] For instance, where a currency peg exists, the historical volatility will be low. That volatility, however, does not capture the risk of potential jump risk that such a currency will be unpegged. Such an event cannot be captured just using historical data as they typically do not show any unpegging event for the given currency pair. The unpegging event can indeed lead to much higher shocks than those historically observed (during the time in which the currency was pegged).

risk, in particular considering that a growing body of literature shows that ESG information can enhance traditional market risk measures. This would have the following advantages:

a. Historical data would not need to be adjusted to embed environmental risk. Hence, the traditional market risk measures would not be impacted in terms of accuracy.

b. It allows banks to leverage existing practices.

c. A separate explicit recognition of environmental risk based on a dedicated add-on – determined based on the consideration of a specific environmental event scenario – to the risk measure resulting from an internal model would facilitate monitoring and enable transparency.

d. The framework would not need to be further complexified. Given that environmental risks would be captured outside of the model engines, the regulatory tests (e.g. the risk factor eligibility test) would not need to be adapted.

175. In the short term, institutions could be required as part of their stress testing programmes under the IMA to explicitly consider environmental risk, both in the form of physical and transition risk – this would be consistent with BCBS FAQ 17[143] on climate-related financial risks according to which institutions should consider material climate-related risk drivers in their stress testing programme as well as in their ICAAPs, so that the methodologies and data used to analyse these risks mature over time and analytical gaps are addressed. In addition, introducing validation requirements for modelling environmental risk may be considered, for example, when analysing the drivers of back-testing overshootings, which could – in theory – be due to the materialisation of physical or transition risks or more broadly affect the modelling performance of portfolios exposed to environmental risk.

176. In this regard, the EBA proposed in its Consultation Paper on draft RTS on the assessment methodology under which competent authorities verify an institution's compliance with the IMA[144] that institutions should consider environmental risk scenarios as part of their stress testing programmes under the IMA and the effect that those scenarios can have on the institutions' portfolio in terms of losses. Given the novelty of this requirement, the draft RTS propose that this aspect be assessed by the competent authority only from 1 January 2025, hence implying that institutions should have those scenarios in place from that date.

177. As regards products that are linked to environmental initiatives, competent authorities could be required to assess, as part of their investigations of institutions' internal models, how institutions model the environmental component in the product. This would add to supervisory knowledge in this area and possibly inform policy solutions, including in the context of the SA,

[143] See BCBS (2022), FAQs on climate-related financial risks (link).

[144] See EBA (2023) Consultation Paper *on draft RTS on the assessment methodology under which competent authorities verify an institution's compliance with the internal model approach* (link). The Final draft RTS on assessment methodology are expected to be published by the end of 2023.

but should be done in a proportionate manner to avoid losing focus on the modelling of material traditional market risks.

178. As noted, similar to the SA where institutions are to calculate a jump-to-default charge, in the IMA banks are to capitalise the default risk via the DRC. Analogously to the considerations set out for JTD, any solution envisaged in the context of credit risk should potentially be replicated when capturing default risk in the trading book via the DRC. However, differently from the credit risk framework, banks directly model default risk by simulating the default of individual issuers as well as the simultaneous default of multiple issuers using two types of systematic factors. In principle, an environmental dimension could be considered in the selection of the risk factor types. However, this should be done where there is sufficient information to infer that correlation between default of issuers can be explained by that additional dimension.

4.2.6 Additional prudential aspects related to Market Risk

179. Other prudential areas that relate to market risk are the following:

a. CCR aims to capture the potential loss in the event of default of a counterparty to a transaction before the settlement of the transaction's cash flows. The CCR framework applies to derivatives and security financing transactions (SFTs).

b. CVA risk aims to capture the risk of an adverse change in the credit spreads for the counterparty to a transaction. The CVA framework applies to non-cleared OTC derivatives and SFTs.

c. The prudent valuation framework aims to capture the uncertainty surrounding the valuation of fair-valued instruments, especially those related to non-liquid market data inputs. Additional valuation adjustments resulting from the application of the prudent valuation framework are deducted from CET 1.

180. CCR and CVA risk are not specifically investigated as they build on similar concepts to those on which the credit and market risk prudential frameworks are built. Hence, any potential adjustment to reflect environmental risks in those areas could be replicated (and eventually adjusted) to also fit into the context of, for example, CVA risk.

181. For prudent valuation (see also Annex 3[145] of the DP published on 2 May 2022 for a more detailed discussion of the issue of environmental risks in accounting and valuation), where environmental risks affect the pricing of fair-valued financial instruments, the assessment of the prudent value of such instruments performed under Commission Delegated Regulation (EU) 2016/101 is expected to mechanically reflect the valuation uncertainty stemming from those environmental risks. More specifically, in line with the considerations for the market risk

[145] See Annex 3 on Environmental risks in accounting and valuation in the EBA Discussion Paper on *The role of environmental risks in the prudential framework*, 2022 pp. 70-72 (link).

framework, it is expected that environmental risk would emerge as a driver of valuation uncertainty for existing valuation inputs, rather than being considered as a new valuation input or even a new type of valuation uncertainty. Sustainability-linked products may be an exception to this expectation, as they could lead to the emergence of new valuation inputs, which in turn would need to be considered as part of the current prudent valuation framework, e.g. as a valuation input for the market price uncertainty AVA or the close-out cost AVA, or as a new type of instrument in the consideration of the model risk AVA. In order for the valuation uncertainty arising from environmental risks to be appropriately reflected as a risk driver of traditional valuation inputs, institutions would need to ensure that the granularity of the calibration of the uncertainty permits capturing a distinction in the level of uncertainty that may be present for valuation inputs differently exposed to environmental risks or ensure the immateriality of this aspect through appropriate validation analysis. By analogy with the considerations for the market risk framework, this distinction may be most important for valuation inputs that have a name-specific dimension (e.g. equity prices, credit spreads and related volatilities). However, since the prudent valuation framework will mechanically capture this once there is concrete evidence that environmental risk influences the valuation uncertainty addressed by the prudent valuation framework, no specific action appears necessary at this stage. As also stated in Annex 3 of the DP published on 2 May 2022, the EBA intends to monitor future developments in this respect and reassess whether a change in prudential valuation rules could be warranted in the future to better reflect the valuation uncertainty stemming from environmental risks.

4.3 Conclusions

182. Environmental risks are expected to increase in magnitude over time and to contribute to the risk held in the trading book by institutions. Both transition risk and physical risks can affect the short-term volatility of market risk factors.

183. In the SA, two suitable solutions have been identified. One relies on introducing a new dimension in the bucketing approach used in the equity and credit-spread risk classes to reflect an environmental risk dimension. The other relies on introducing an environmental risk class, where equity and credit-spread risk factors would be bucketed on the basis of their exposure to environmental risks. Such long-term solutions should follow a risk-based approach, i.e. they should be pursued only once evidence is obtained, and the data driven calibration can be performed.

184. In the IMA, institutions could already be required to consider environmental risks in their stress testing programmes that are performed to obtain the internal model approval. Furthermore, in the medium term, institutions could be required to investigate whether their portfolio is subject to environmental risks, and capture that risk as part of their risk not in the model engine set-up. A risk not in the model engine charge appears to be a good tool for a potential transition to a fully-fledged model set-up as it takes into account the objective difficulties that institutions currently face in detecting and modelling these risks.

185. With the exception of the inclusion of environmental risk in the stress testing programme, the proposals above are of a medium- to long-term nature, and they mostly rely on the ability of institutions to detect those risks, and the availability of data to model them/calibrate new risk weights. In the short term, it is therefore important that institutions start considering environmental risks in relation to their trading book risk appetites, internal trading limits and in the context of the new product approval. Competent authorities would then be required to check that this is done in an appropriate manner, for example, taking into account the result of the stress testing programmes. This should be applicable in the same manner by all institutions (i.e. including those employing a standardised and a simplified approach) to ensure a level playing field.

POLICY RECOMMENDATIONS ON MARKET RISK

MR-1: As a **short-term action**, the EBA recommends that all institutions, regardless of whether they use the simplified standardised approach, the SA or the IMA, be more explicitly required to consider environmental risks in relation to their trading book risk appetites, internal trading limits and in the context of the new product approval.

MR-2: As a **short-term action**, the EBA recommends that institutions employing an IMA for some of their desks be required to consider environmental risks as part of their stress testing programmes referred to in Article 325bi CRR in line with BCBS FAQ 17.

MR-3: As a **medium- to long-term action**, the EBA recommends that competent authorities assess how ESG-linked products are treated in relation to the risk-residual add-on to ensure that there is harmonised treatment across institutions.

MR-4: As a **medium- to long-term action**, the EBA recommends that competent authorities assess how ESG-linked products are treated in the internal risk measurement model.

MR-5: As a **medium- to long-term action**, the EBA recommends that institutions specifically consider environmental or even broader ESG risks when monitoring their risks that are not included in the model. To this end, the RNIME framework developed by the ECB could be used as a basis.

MR-6: As a **medium- to long-term action**, taking into consideration the developments agreed to at the international level by the Basel Committee, the EBA will reassess the appropriateness of including under the SbM a dimension, in the equity and credit-spread risk classes, reflecting environmental or even broader ESG risks to establish the buckets into which a risk factor falls, or of including an environmental risk class. A necessary condition for this long-term fix is the meaningful assignment of issuers to buckets according to their riskiness in terms of environmental risk, based on a set of factors to be defined. The assignment of issuers and the corresponding risk weights should provide sufficient explanatory power for the observed market risk of the position.

MR-7: With the increasing materialisation of environmental risks, internal models are expected to automatically capture environmental risk drivers either implicitly, by means of time series of classical risk factors reflecting environmental risk drivers in full, or more explicitly. However, to ensure that this is the case, as a **medium- to long-term action,** the EBA will reassess the appropriateness of introducing regulatory provisions explicitly requiring institutions to capture material environmental risk drivers in their internal models.

5. Operational risk

5.1 Overview of the framework

186. The Basel III Accord sets out the methodology for the calculation of own funds requirements against operational risks[146]. The transposition of the Accord for operational risk is planned to be implemented in the EU by 2025[147]. The Commission proposal is partially based on the policy recommendations provided by the EBA[148] in response to the Commission Call for Advice on the revised Basel III framework[149].

187. Operational risk is defined as the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events. This definition includes legal risk, but excludes strategic and reputational risk. Operational risk is inherent in all banking products, activities, processes and systems[150], which can lead to a large variety of losses with different natures and causes. Thus, the effective management of operational risk is a fundamental element of institutions' risk management. Basel III establishes that institutions can be required by their supervisors to map their internal losses into seven regulatory operational risk event types[151]. Although the general event types are already included in the CRR[152], the EBA has recommended that legislators include a more granular taxonomy of operational risk loss types in the regulation[153].

188. In accordance with Basel III, the capital requirements on account of operational risk should be calculated using the new SA (BCBS SA), and the use of the current approaches (the BIA, the Standardised Approach (TSA), ASA and the Advanced Measurement Approach) will not be allowed any more.

189. The calculation of the capital requirements in the context of Basel III requires the following elements:

a. The BI, an improved indicator which builds upon the current proxy indicator of an institution's business volume (the relevant indicator under the CRR) by amending some of its components.

[146] BCBS (2017), Basel III finalisation announcement (link).

[147] European Commission (2021), Review of EU banking rules (link).

[148] EBA (2019), *Policy advice on the Basel III reforms: operational risk* (link).

[149] European Commission (2018), Call for Advice on the finalised Basel III framework (link).

[150] BCBS (2021), *Revisions to the Principles for the Sound Management of Operational Risk* (link).

[151] Internal fraud; external fraud; employment practices and workplace safety; clients, products, and business practice; damage to physical assets; business disruption and systems failures; execution, delivery, and process management.

[152] See Article 324 CRR.

[153] See EBA (2017), *Policy advice on the Basel III reforms: operational risk*, Recommendation OR16 and Annex II, p. 66 (link).

b. The BIC, which is obtained by applying fixed marginal coefficients to the BI based on an institution's business volume.

c. The LC, which includes an institution's average annual historical losses over the preceding 10 years.

d. The ILM, which is calculated as a smoothing function of the ratio between LC and BIC.

e. The formula for the operational risk capital requirements under the BCBS SA is then the following: operational risk capital = BIC × ILM.

190. Furthermore, the BCBS SA includes several discretions that a jurisdiction can exercise to adapt the methodology. For example, in the European Commission's proposal the ILM is set equal to one for all institutions, using a national discretion, instead of being bank-specific and based on historical loss data of each institution.

5.2 Interaction between E&S risks and the operational risk framework

191. Operational risk is present in all banking activities, and thus the definition of operational risk encompasses losses of a diverse nature. In relation to the various operational risk loss types, it can be recognised that environmental factors and more broadly E&S factors could function as a driver of any of the loss type categories, because they can materialise and impact institutions in very different ways, from damage to physical properties or interruptions of the institutions' services and communications resulting from environmental factors, to liabilities arising from environmental or social factors and resulting in legal and conduct risks. Environmental and social factors appear most relevant in the case of losses related to this latter risk type, for example in claims emerging from the institution's failure to address its negative impacts on the environment, claims arising from a mis-selling of products as 'green' whereas they do not comply with the standards for such products or in claims arising from alleged violations of social factors. Additionally, 'damage to physical assets' (which, among other things, lists 'natural disasters' in its definition) and 'business disruption and systems failures' could be driven by environmental factors, for example in cases where physical climate-related events impact the institution's offices or lead to a disruption in its service provision.

192. With regard to the liability-related event type, initial litigation cases against institutions are currently already underway, such as in the context of (alleged) greenwashing, and such cases could increase in the future[154]. Going forward, claimants could also increasingly try to hold institutions liable for environmental damages caused by the non-financial corporates they are funding.

[154] See EBA (2023), *Progress report on greenwashing monitoring and supervision* (link).

193. The current loss event types in the EBA Taxonomy[155] do not map the triggers for the losses, for example when an environmental event causes losses that would be allocated to different operational risk types. Thus, while the loss event type taxonomy remains valid for operational risk management and measurement, institutions could also be asked to label losses to allow them and supervisory authorities to track the causes, especially those related to environmental risk factors as drivers of the loss type categories.[156] Work on the operational risk taxonomy is ongoing as part of the policy work on operational risk mandates expected from CRR3. In the context of this work, the structure of the taxonomy is specifically under review and one of the elements under consideration is introducing the notion of 'flag', potentially in a similar way as it is used in the operational risk taxonomy published by the ORX Consortium[157].

194. Whether environmental risks are already captured by the operational risk SA, and to what extent, may depend on how this approach is implemented in the EU. As explained above, of the two components of the capital requirements formula the BIC is a proxy based on a measure of an institution's income and expenses, whereas the ILM is based on a measure of an institution's historical losses.

195. From the perspective of incorporating the losses related to environmental risks, the methodology captures historical losses via the ILM component. However, due to the discretion of ILM equal to one being exercised in the EU, such information will only be considered in the services component in the BIC. Specifically, the BIC stems from the BI, which is a financial-statement-based proxy for operational risk consisting of three elements, each calculated as the average over 3 years: 1) the interest, leases and dividend component; 2) the services component; and 3) the financial component. Since losses and provisions incurred as a consequence of operational loss events contribute to the services component through 'other operating expenses', the BIC includes some built-in sensitivity to operational risk losses, including those triggered by environmental factors.

196. Nonetheless, even if ILM did not equal 1, the BI and the ILM would only incorporate historical losses, which may be expected to change significantly with the transition to a sustainable economy and climate change and environmental degradation progressing further. In addition, a more forward-looking perspective could be considered. Capital requirements for operational risk are partly based on losses of the past 10 years. However, environmental risks may increasingly materialise in the coming decades. It is plausible that with a higher frequency and severity of physical climate damage and more public awareness on the issues of climate change and the transition towards sustainability, the number of complaints and litigations

[155] See EBA (2019), *Policy advice on the Basel III reforms: operational risk*, p. 66 (link).

[156] BCBS FAQ 16: 'Losses due to natural disasters map to the event type category "Damage to physical assets" from Table 2. However, climate-related financial risks may also cause operational risk losses in other event type categories. For example, if a bank is perceived to misrepresent sustainability-related practices or the sustainability-related features of its investment products, it could lead to litigation cases (event type category "Clients, products and business practices"). A power cut as a consequence of climate-related financial risks could cause an interruption to a bank's services and communications (event type category "Business disruption and system failures"). Where feasible, losses whose root cause could stem from climate-related risk drivers could be identifiable from the loss database, for example, by using a flag' (link).

[157] See ORX, Operational Risk Reference Taxonomy (link).

challenging institutions for their financing of or investing in carbon-intensive corporates will significantly increase.

197. Hence, relying on historical data only might not be sufficient if one wanted to capture a risk materialising in the (near) future. Ways for incorporating forward-looking information in the operational risk framework could therefore be considered (e.g. leveraging the current work on climate and broader environmental scenarios, provided they cover events relevant for operational risk), bearing in mind that the new BCBS SA for operational risk measurement currently does not include forward-looking elements.

5.3 Conclusions

198. A key challenge in analysing the potential need to adapt the operational risk framework is the lack of data to identify how environmental and social factors have an adverse impact on the operational risk inherent in institutions. There is a presumption that operational risk events due to physical risks and business disruptions, such as power outages, or to legal or compliance risk, will become more prevalent. However, it is currently not possible to properly monitor such developments.

199. Therefore, institutions should be required to identify environmental and social factors as triggers of operational risk losses on top of the existing risk taxonomy. This would also allow identification of whether the part of operational risk that is associated with environmental and social factors is material, and whether there is an increasing trend in these E&S risks.

200. The BCBS SA includes historical data either via the BI and/or via the ILM, but there is no forward-looking component. Any forward-looking element would therefore require a revision of the BCBS SA methodology. Nonetheless, such amendments should be considered once clear evidence and robust data become available.

POLICY RECOMMENDATIONS ON OPERATIONAL RISK

OR-1: As a **short-term action**, the EBA recommends that institutions be required to identify whether environmental and social factors constitute triggers of operational risk losses in addition to the existing operational risk taxonomy. This could, for example, be performed as part of supervisory reporting.

OR-2: As a **medium- to long-term action**, the EBA will following evidence of environmental – and where relevant social – factors triggering operational risk losses in increased frequency and severity, reassess the appropriateness of revisions to the BCBS SA methodology, taking into consideration the developments agreed to at the international level by the Basel Committee.

6. Liquidity risk

201. This chapter intends to assess whether the regulatory liquidity and funding requirements, capture environmental risks, while contributing to their ultimate objective of liquidity and funding soundness of institutions. It is important to point out that there is a tight relationship between the liquidity and credit risk frameworks. Hence, the extent to which environmental risks are captured in the liquidity framework partly depends on the ability of the credit risk framework to capture these risks, and changes to the credit risk framework would indirectly influence liquidity requirements.

6.1 Liquidity Coverage Ratio

6.1.1 Overview of the framework

202. The LCR was first introduced by the Basel Committee in 2013, in the aftermath of the 2009 financial crisis. Its implementation in the EU took place with Commission Delegated Regulation (EU) 2015/61[158] (LCR Delegated Regulation) that applies since October 2015. The LCR aims to ensure that an institution has a liquidity buffer, comprising an adequate stock of unencumbered liquid assets that can be liquidated via outright sales or repos at little or no loss value in private markets, to meet its liquidity needs for a 30-calendar day severe market-wide or idiosyncratic liquidity stress scenario. At a minimum, the liquidity buffer should enable the institution to survive until day 30 of the cited stress scenario, by which time it is assumed that appropriate corrective actions can be taken by management and supervisors or that the institution can be resolved in an orderly way. The assets composing the liquidity buffer should have low volatility, low risk and certainty of their evaluation. Such assets should be traded in deep markets to be liquidated immediately.

203. Liquid assets are divided into three levels, each one having some specific haircuts to be applied on their market value to reflect their expected liquidity value under stress:

Levels	Composition	% of total liquidity buffer
1	Mainly of deposits towards central banks, cash and some assets that are issued or guaranteed by central or regional governments, PSEs, the BIS, IMF and MDBs and some other international organisations, meeting specific definitional criteria (0% haircut) Extremely high-quality covered bonds issued by institutions as Level 1, as long as they meet specific definitional criteria, such as minimum size, credit quality or collateralisation (minimum 7% haircut)	Level 1, other than covered bonds, at least 30% liquidity buffer

[158] Commission Delegated Regulation (EU) 2015/61 (link).

Levels	Composition	% of total liquidity buffer
2A	Some assets issued or guaranteed by central or regional governments, local authorities, PSEs or central banks as well as some high-quality covered bonds, corporate debt securities with specific definitional criteria like minimum credit quality, issue size and others (minimum 15% haircut)	Level 2A + Level 2B: maximum 40% liquidity buffer
2B	Some securitisations, corporate debt securities, shares and high-quality covered bonds meeting specific definitional criteria (25% to 50% haircut)	Level 2B: maximum 15% liquidity buffer

204. The LCR can be expressed as follows:

$$LCR = \frac{\text{Liquidity buffer}}{\text{net liquidity outflows over 30 days}}$$

Where the net outflows are given by *total liquidity outflows − total liquidity inflows.* The total liquidity inflows cannot exceed 75% of the total liquidity outflows to ensure a minimum amount of the liquidity buffer.

6.1.2 Interaction between E&S risks and the LCR framework

205. The LCR is built on a legal framework with specific definitions and requirements to ensure the effectiveness of the eligible liquidity resources. If an asset or an inflow does not meet those criteria, it is not considered as available liquidity for the LCR.

206. Environmental risks that might arise and potentially jeopardise the effectiveness of liquidity resources are expected to be covered by the current framework. For example, liquid assets could be affected by environmental risks. In particular, the marketability of environmentally harmful issuances could be negatively impacted in a significant manner for at least two reasons. First, customers might shift their preferences towards more sustainable products. This might be the case for secured bonds where the underlying pools are composed of environmentally harmful loans. Second, increasing default rates might be expected for underlying loans which would in turn reduce the market value of the secured bond itself.

207. The LCR Delegated Regulation has the necessary safeguards to ensure that this potential reduced marketability driven by environmental risks is properly captured. On the one hand because if the relevant securities became objectively non-marketable or had a significantly reduced marketability, the minimum necessary operational requirements for their eligibility would not be met (e.g. the required sale test[159] under Article 8(4)). Furthermore, because if such risks, while still not depriving those securities from being liquidated to a minimum extent,

[159] Banks are legally required to regularly liquidate a sufficiently representative sample of their liquid assets by means of outright sales or repos.

negatively impacted the market value of the securities, this would be reflected directly in the liquidity value of the securities which is based on their market value.

208. Other potential sources of environmental risks affecting liquid assets might be triggered in case of a downgrade of the credit quality of the relevant security if considered environmentally harmful and with higher exposure to credit risk. The definition criteria of some liquid assets requires that they meet a minimum credit quality. A downgrade might challenge their eligibility. Therefore, here again, the LCR Delegated Regulation has the ability to capture the related environmental risks to penalise the eligibility of liquid assets.

209. Contingent liabilities arising from environmental harmfully investments would also be captured in the LCR via additional outflows as recognised in Article 23 of the LCR Delegated Regulation.

210. Computation of inflows in the LCR is subject to those that are not past due and for which the credit institution has no reason to expect non-performance (Article 32(1) of the LCR Delegated Regulation). In this regard, potential environmental risks linked to increasing default expectations of environmentally harmful receivables would be captured in the LCR by not allowing for the computation of such inflows.

6.1.3 Conclusions

211. All in all, the LCR seems to already have the necessary framework in place to capture the environmental risks affecting liquid assets, inflows or outflows. This in turn entails that no unintended effect seems to be triggered under the current LCR definition but, on the contrary, it can be argued that green activities are fostered in the LCR with more beneficial treatment as regards liquid assets, inflows and outflows.

212. Overall, the LCR as is defined can already capture possible future implications coming from environmentally harmful activities while ensuring that its main objective to contribute to the liquidity soundness of institutions against short-term severe stress scenario is not challenged. Therefore, there does not appear to be reasons to amend the LCR regulatory framework in the context of environmental risks.

213. In addition to this, and for example in the case of excessive exposure to environmental risks, supervisors have the ability to set specific liquidity requirements, in the form of LCR Pillar 2 requirements, following Article 104 of the CRD and in the context of the EBA SREP Guidelines.

POLICY RECOMMENDATIONS ON LIQUIDITY RISK

LR-1: At this stage, the EBA does not recommend changes to the LCR framework.

6.2 Net Stable Funding Ratio

6.2.1 Overview of the framework

214. The NSFR was introduced by Basel in October 2014. It aims to manage the maturity transformation risk to ensure a proper funding structure. It intends to mitigate funding risk by ensuring that stable and long-term assets are financed with stable funding. The NSFR heavily builds on accounting, takes into account all on- and off-balance sheet items and requires that funding resources weighted according to their assumed stability (available stable funding – ASF) are at least equal to the required amount of stable funding based on assets and off-balance sheet weighted in accordance with their expected permanence in the institution (RSF).

215. The time horizon of the NSFR is 1 year, meaning that it is calibrated to ensure that funding risk is mitigated at least for 1 year. For this purpose and in order to foster medium-term funding, three time buckets are considered with different weights to contribute to the required and available stable funding, up to 6 months, between 6 and 12 months and above 12 months. This is also to avoid some cliff effect risks.

216. RSF weights are calibrated according to the stability of the assets for which various characteristics are considered, like tenor, marketability or performance. For example, the more liquid the asset, the lower RSF is required. Liquid assets in the NSFR generally apply RSF factors similarly to their LCR haircuts. The part that is not considered liquid requires stable funding. Non-liquid assets would trigger 100% RSF. Exposures that are non-performing or have a higher risk weight for credit risk purposes, would trigger higher RSF factors since their possibility to be liquidated is lower.

217. ASF weights are calibrated according to the stability of the liabilities depending mainly on their residual maturity and the type of counterparties. For example, longer-term liabilities trigger higher ASF. Liabilities with retail customers and non-financial corporates trigger more ASF since they are more stable.

6.2.2 Interaction between E&S risks and the NSFR framework

218. The NSFR framework is constructed under provisions that specify the RSF and ASF of each concrete type of asset or liability. Similarly to the LCR case, the environmental risks that might arise and potentially jeopardise the adequateness and stability of the funding structure of a bank by requiring additional stable funding, are addressed by the own NSFR framework.

219. For example, environmentally harmful loans, linked to higher exposure to credit risk, are captured. Generally performing long-term loans subject to a risk weight equal to or lower than 35% will require less stable funding (65% RSF factor applies) than if they are subject to a higher than 35% risk weigh (85% RSF factor applies in this case). More generally, any non-performing exposure will be subject to 100% RSF.

220. Analogously, securities with underlying environmentally harmful exposures might expect to not trigger the same appetite from investors as with other bonds also due to the inherent higher credit risk exposures. This might indeed impact negatively the marketability of those securities to the extent that, as explained in the item before, those securities might miss their LCR eligibility condition. This is also addressed in the NSFR framework where generally the RSF is linked to the LCR haircuts and where, in the case of a security that is non-LCR eligible, a higher RSF factor applies up to 85% if maturing above 1 year.

6.2.3 Conclusions

221. All in all, the NSFR seems to already have the necessary framework in place to capture the environmental risks that might affect specific assets with a differentiated RSF treatment. This in turn entails that no unintended effect seems to be triggered under the current NSFR definition but, on the contrary, it can be argued that green activities are fostered in the NSFR with more beneficial treatment as regards the stable funding requirement.

222. Overall, the current NSFR framework can already capture possible future implications coming from environmentally harmful activities while ensuring that its main objective to contribute to an adequate funding structure of institutions is not challenged. Therefore, there does not appear to be reasons to amend the NSFR regulatory framework in the context of environmental risks.

223. In addition to this, and for example in the case of excessive exposure to environmental risks, supervisors can set specific liquidity requirements, in the form of NSFR Pillar 2 requirements, following Article 104 of the CRD and in the context of the EBA SREP Guidelines.

POLICY RECOMMENDATIONS ON LIQUIDITY RISK

LR-2: At this stage, the EBA does not recommend changes to the NSFR.

7. Concentration risk

224. Institutions' sectoral and geographical concentrations of assets may expose them to increased environmental risks. In a report published in 2022, the ECB and ESRB Project Team on climate risk monitoring highlighted that the European banking sector could be materially exposed to environmental sectoral and geographic concentration risks[160]. In this respect, concentration risk deserves specific consideration when looking at how environmental risks, as well as social risks, are or could be better captured by the prudential framework.

7.1 Overview of the framework

225. The assumption of portfolio invariance on which the Pillar 1 credit risk framework is built implies that it does not capture the concentration risks that may arise due to imperfect diversification of idiosyncratic risk and imperfect diversification across sector or geography. This assumption constitutes the theoretical grounds warranting the development of tools for the identification and management of institutions' concentrated exposures outside of the Pillar 1 credit risk framework. Indeed, the ASRF model underpinning the IRB formula is based on two key assumptions: i) perfect granularity of institutions' portfolios – hence, it assumes perfect diversification of idiosyncratic risk; ii) single source of systematic risk – hence, it assumes well-diversified portfolios across sectors and geographies. In contrast, under the market risk framework the DRC for trading book instruments requires the model: i) to use two types of systematic risk factors; ii) to appropriately reflect issuer concentrations and concentrations that can arise within and across product classes under stressed conditions.

226. Concentration risks have been traditionally captured by the LEX regime under Pillar 1 and by dedicated requirements under Pillar 2. The large exposures regime serves as a backstop measure to complement minimum capital requirements and supports efforts to manage systemic risks. It aims to capture idiosyncratic, name concentration risks arising from imperfect granularity. Sectoral and geographical concentration risks are currently addressed through specific requirements for risk management by institutions and potential additional own funds requirements under the Pillar 2 framework.

[160] See ECB and ESRB Project Team on climate risk monitoring (2022), *The macroprudential challenge of climate change* (link).

7.2 Interaction between E&S risks and the concentration risk framework

7.2.1 Development of a definition of E&S-related concentration risks

227. Given the methodological assumptions underlying the current prudential framework, E&S-related concentration risks are not adequately captured by the Basel Pillar 1 framework. In particular, the current large exposure regime does not appear to be relevant to capture E&S-related concentration risks due to its own purpose (i.e. to capture idiosyncratic, name concentration risk)[161]. Hence, the large exposure regime should continue serving its own purpose and a reorientation of its objective and design is not warranted.

228. The impossibility to reflect concentration risks under the Pillar 1 framework and the inability of the large exposure regime to address E&S risks represent a potentially material gap of Pillar 1. Therefore, the EBA deems the following necessary: i) the development of a definition for environment-related concentration risks; ii) a further assessment of the appropriateness of a definition for social-related concentration risks.

229. A definition for environment-related concentration risk could be developed around the following points:

a. The scope of environment-related concentration risk should encompass aggregated exposures to the institution's counterparties/issuers both in the banking book and in the trading book. As soon as an exposure is sensitive to environmental risk drivers, it should fall within the scope of environment-related concentration risk. The definition should consider the environmental dimension both in the form of physical and transition risks.

b. The definition of environment-related concentration risk should, to the extent possible, reflect second-round effects stemming from supply-chain related risk events, which have been shown to amplify financial stress due to increased correlations[162].

c. For consistency with respect to the current prudential framework, potential references to the notions of direct and indirect exposures should be used in line with how these notions are used under the large exposure regime. In particular, the notion of indirect exposures should refer to exposures to a client arising from derivative contracts listed in Annex II CRR and credit derivative contracts, where the contract was not directly entered into with the client, but the underlying debt or equity instrument was issued by that client.

[161] For additional discussion, see EBA (2022) Discussion Paper on *The role of environmental risks in the prudential framework*, pp. 56-57 (link).

[162] See ECB and ESRB Project Team on climate risk monitoring (2022), *The macroprudential challenge of climate change* (link).

d. The development of a definition for environment-related concentration risk is intended to be a short-term action. In particular, the definition should take into consideration the developments agreed to at the international level by the Basel Committee.

e. The definition of environment-related concentration risk should only capture potential risks stemming from institutions' exposures to their counterparties/issuers (outside-in).

230. For social risks, the EBA will reassess the need for the development of a definition of social-related concentration risks.

231. To address E&S-related concentration risks, different options can be designed with respect to different time horizons. The following section provides an overview of the possible approaches to progressively develop environment-related concentration risk measures. An analogous approach could be used towards the measurement of social-related concentration risks as soon as more evidence is gathered on their potential financial effects.

7.2.2 Possible approaches toward environment-related concentration risks

Short-term policy considerations

232. Short-term policy considerations should focus on creating the conditions for an increasingly granular assessment of the sensitivity to given physical or transition risk drivers of banks' exposures, as well as on building relevant environment-related concentration risk metrics in the form of exposure-based metrics. Such metrics would be expected in the short term to rely on rather crude estimates of concentration risks, while progressively improving in granularity and accuracy in the medium- to longer term. Due to the inherent limitations of such metrics in the short term and, hence, the need for supervisory judgement for their interpretation and use, those metrics would not have any mechanical consequence in terms of Pillar 1 capital. Instead, the metrics would be considered as part of the Pillar 2 framework under SREP and, where relevant, as part of the Pillar 3 framework, possibly complementing the existing Pillar 3 disclosures on ESG risks.

233. This may take the form of:

a. Enhanced reporting requirements and disclosure requirements in the form of exposure-based metrics.

b. Enhanced monitoring and supervisory actions.

234. The enhanced reporting and disclosure requirements would rely on the use of predefined exposure-based metrics. The purpose of such indicators would be to measure, report and, where relevant, disclose the relative importance of relevant geographical and sectoral exposure for each entity. This could be achieved by requiring institutions to provide a ratio of their exposures sensitive to a given environmental risk driver in a specific geographical area or in a specific industry sector over total exposures, total capital or RWA.

235. As mentioned above, environment-related concentration risk metrics are expected to improve over time based on the level of geographical and sectoral granularity. It is, in particular, expected that enhanced disclosure requirements will contribute to data availability and to the progressive development of more refined environment-related concentration metrics. In the short term, considering the limitations of such metrics, environment-related concentration risk metrics should be first developed as part of supervisory reporting and any potentially disclosed metrics should be complemented by qualitative considerations such as concentration risk management and mitigation practices.

236. The EBA has started work on integrating ESG risks into supervisory reporting requirements as per the expected mandate under Article 430 CRR3. As part of this work, the EBA will develop environment-related concentration risk metrics. For instance, supervisors could benefit from additional reporting on the largest exposures subject to environment-related risk drivers, either in the form of a fixed number of the largest exposures or in the form of the largest exposures that are subject to environment-related risk drivers (e.g. exposures to carbon-intensive firms)[163]. New supervisory reporting requirements could also help understand the size of an institution's exposures toward counterparties/issuers that do not have transition plans regarded as aligned with sustainable transition trajectories. In addition, benchmarking analyses based on reported values for these concentration risk metrics across EU institutions could lay the foundations for the assessment of the relevance of potential thresholds.

237. Monitoring and supervisory actions may be enhanced to better account for environmental risk-related concentration risks. While under the Pillar 2 framework supervisors already have full discretion to address institutions' resilience to potential future losses that may arise from geographical and/or sectoral concentration through supervisory actions, environment-related concentration risk metrics could be explicitly embedded in the SREP. Developing a specific treatment of environment-related concentration risks within SREP would have the advantage of allowing for a more harmonised treatment of environment-related concentration risks across competent authorities.

Medium to long term policy considerations

238. As data quality and availability increase and institutions progressively become able to produce more refined environment-related concentration risk metrics, enhanced metrics could be considered in the form of scenario-based metrics or metrics relying on sensitivity-based measures. Such environment-related concentration risk metric could be designed as a ratio assessing the share of own funds requirements related to exposures to a given environmental risk driver over total own funds requirements.

239. Section 4.2.4 mentions as a medium- to long-term policy recommendation the possibility to amend the SbM to introduce an additional bucketing dimension reflecting physical and transition risks. The additional environment-related bucketing dimension would de facto model

[163] Pillar 3 ESG disclosures already require information on the top 20 carbon-intensive firms, however only on an aggregated and worldwide basis.

a systematic component that may characterise names subject to the same environmental risk driver. Since the purpose of environment-related concentration risk metrics is to assess the potential concentration of an institution to a given environmental risk driver, as well as, if possible, capture the sectoral/geographical concentration of the institution, it seems advisable to take inspiration from the principles underlying the SbM as a starting point for the development of such a concentration risk metric.

240. However, the design of such an environment-related concentration risk metric inspired by the SbM poses several issues that would first need to be addressed:

a. The SbM framework is meant to capture market risks. The extent to which this approach can be used to capture environment-related concentrations stemming from non-trading-book exposures should be assessed.

b. The SbM relies on the use of sensitivities. Instead, other measures (such as, notional / exposure at default) could better serve for the objective of assessing the concentration toward a given environmental risk driver.

c. In the absence of widely accepted standards across jurisdictions, it is crucial to properly characterise the environment-related bucketing dimension in order to allow for a common level playing field at the European and international level. Environment-related buckets can eventually be constructed based on sustainability-linked metrics, international agreements or transition trajectories.

d. In line with the general principles described in this report, the concentration risk metric should be based on reliable data properly reflecting the exposure of an institution towards environment-related risk drivers.

241. In the medium- to long term, as environment-related concentration risk metrics start becoming more accurate and granular as part of supervisory reporting, disclosures or supervisory tools used under Pillar 2, the EBA could leverage the acquired experience and information in order to reassess whether those metrics could serve as a basis for the development of a new framework for environment-related concentration risks under Pillar 1. Such framework would be designed to act as a quantitative ceiling intended to limit the exposure of individual banks to environment-related concentration risks and increase the resilience of the overall banking system. Concentration policy measures could be expressed in terms of limits, thresholds, capital add-ons or buffers or a combination of those measures. Institutions exceeding regulatory concentration thresholds could be exposed to enhanced monitoring and supervisory actions aiming to reduce exposures toward a given sectoral and geographical dimension.

242. Notwithstanding this, the design of concentration policy measures should be carefully assessed taking into consideration the developments agreed to at the international level by the Basel Committee. On the one hand, limits and thresholds could be designed as static or dynamic or they could be expressed in absolute or relative terms. On the other hand, the credibility of

the transition path of a counterparty should be taken into account in the design of limits or thresholds and calibrations should rely on an internationally recognised classification system of (sub-)sectors/geographies exposed to environment-related risks. In addition, it is worth noting that the characterisation of (sub-) sectors/geographies for transition/physical risks may be dynamic and may depend on the speed of the transition of one sector relative to another. As the role of transition plans increases across industries, consideration should be given to the transition plans of counterparties when assessing environmental-related concentration risks. Importantly, environment-related concentration risk policies should not hinder institutions' counterparties from receiving financing for transitioning to low-carbon activities or introducing mitigating measures against physical risks. To this purpose, limits or thresholds could be phased-in over time by increasingly sharpened requirements.

7.3 Conclusions

POLICY RECOMMENDATIONS ON CONCENTRATION RISK

CONC-1: As a **short-term action**, the EBA will work on the development of a definition of environment-related concentration risk, taking into consideration the developments agreed to at the international level by the Basel Committee.

CONC-2: The EBA recommends that the current large exposures regime continue serving its own specific purpose (i.e. to capture idiosyncratic, name concentration risk) and should be kept unchanged.

CONC-3: As a **short-term action**, the EBA will work on the development of exposure-based metrics for the quantification of environment-related concentration risks. Those exposure-based metrics should be implemented as part of supervisory reporting and should be disclosed where relevant. The EBA will conduct benchmarking analyses based on reported values for these concentration risk metrics across EU institutions. Due to the inherent limitations of those new metrics in the short-term, the developed exposure-based metrics should be considered as part of Pillar 2 under SREP or as part of the Pillar 3 framework, possibly complementing the existing Pillar 3 disclosures on ESG risks. The EBA will amend its SREP Guidelines accordingly to provide guidance on how competent authorities should assess and treat environment-related concentration risks.

CONC-4: As a **medium- to long-term action**, as data quality and availability increase and institutions progressively become able to produce more refined environment-related concentration risk metrics, the EBA will consider the possible implementation of enhanced concentration risk metrics, taking into consideration the developments agreed to at the international level by the Basel Committee. The EBA considers as a good starting point for defining those metrics, the principles on which the SbM is built.

CONC-5: As a **medium- to long-term action**, based on the acquired experience and the results derived from the implementation of environment-related concentration risk metrics, the EBA

will reassess the appropriateness of introducing environmental-related concentration risks under the Pillar 1 framework. The new framework would entail the design and calibration of possible limits and thresholds, add-ons or buffers, as well as the specification of possible consequences if there are breaches. The work should take into consideration the developments agreed to at the international level by the Basel Committee.

8. Capital buffers and macroprudential framework

243. In the context of systemic aspects of environmental risks, the capital buffer and macroprudential framework can have a role to play to appropriately address them. This chapter assesses the extent to which the current framework enables adequately addressing environmental risks or whether specific clarifications or enhancements could be considered to more adequately capture such risks going forward.

8.1 Overview of the framework

244. The capital buffer and macroprudential framework generally consists of two broad pillars: policies on institutions (i.e. capital buffers) and policies on borrowers (i.e. borrower-based measures).

245. Capital buffers include the CCoB, the CCyB and SyRB. They also include capital buffers which relate to the risks posed by banks' systemic dimension (the G-SIIs and O-SIIs buffers), but these are less relevant from an environmental risk perspective as environmental risks are not specifically related to the systemic importance of individual institutions and are therefore not covered here.

246. The CCoB aims to improve institutions' general loss-absorbing capacity and addresses the vulnerability of the financial system to systemic risk, regardless of the factors that contribute to the build-up of those risks. It is constant over time and it is not releasable by national competent authorities. The current buffer rate is set at 2.5%, which must be complied with by institutions at all times to avoid facing distribution restrictions.

247. As a cyclical capital-based measure, the CCyB operates by increasing the capital requirement of institutions in times of increasing systemic risk and correspondingly releasing the additional requirement during financial stress periods or when risks have receded. The design of the CCyB is based on the historical observation of a build-up in aggregate credit often occurring in advance of episodes of financial crisis.

248. The SyRB addresses systemic risks that are not already covered by the CCyB and G-SII/O-SII buffers. The SyRB is flexible as it may apply to all or a subset of institutions, on an individual or consolidated basis, to all or a subset of exposures. If applied to specific sectors, the sectoral SyRB (sSyRB) can apply to domestic exposures only, unless related to recognising a SyRB measure that has been introduced in another Member State. While there is no maximum limit for the SyRB rate, the European Commission needs to provide an authorisation if a 5% threshold is exceeded, whether for the cumulative SyRB rate applicable to a subset of exposures or for the cumulative rates of the SyRB and other (G-SII or O-SII) buffers.

249. Borrower-based measures (BBMs) provide policymakers with the option to limit borrowing relative to household incomes and/or property values. They can be used in either a cyclical manner, when growing cyclical pressures emerge, or in a structural manner, ensuring minimum prudent lending standards are maintained at all times. The parameters of the instruments can be adjusted in response to economic or market developments and therefore allow for an amount of flexibility in their application. The most widely used BBMs are the LTV restrictions and the LTI restrictions.

250. The LTV operates by imposing a minimum deposit requirement on borrowing households relative to the value of the property. It increases the resilience of the banking sector by making both borrower and lender less vulnerable in the event of property price declines, i.e. lowering the LGD. LTI measures impose borrowing restrictions relative to income, to enhance the resilience of both borrowers and lenders by lowering the PD. When used in isolation, LTV limits may still leave the capacity of borrowers to service their mortgages vulnerable to income shocks, while an isolated use of LTI restrictions could leave banks exposed to house price adjustments. This is why in some instances both LTV and LTI are used in conjunction with each other.

8.2 Interaction between E&S risks and the capital buffer and macroprudential framework

8.2.1 Non-capital-based measures

Borrower-based measures

251. Environmental risks may affect both the collateral value as well as the solvency of borrowers and hence both the LGD and PD of mortgage borrowers. In this context, BBMs could be applied for mortgages to the extent that properties used as collateral are exposed to physical and transition risks, hence mitigating the impact of environmental risks on leverage or the repayment capacity of borrowers.

252. BBMs could serve as a tool to ensure that environmental factors and risks are incorporated into the assessment of the repayment capacity of the borrower, e.g. environmental risks to real estate properties used as loan collateral (e.g. energy efficiency characteristics or insurance coverage of physical risks) and potential impact of this on the borrower's disposable income. BBMs could hence be a relevant tool to prevent institutions' excessive risk taking. BBMs have the advantage of being flexible and targeted (e.g. enabling addressing regional risks such as droughts, floods, etc.) and would not require additional capital. At the same time, several drawbacks would be associated with amending BBMs. First, given that BBMs generally apply to new loans for households only, their effect on environmental risks building in the overall stock of loans may take time to materialise. Second, being implemented at the national level and with no harmonised framework at the EU level, BBMs would face a risk of disparate application across jurisdictions, specifically in the absence of a uniform definition of what constitutes properties that are exposed to physical and transition risks. Third, since BBMs currently only

apply to households, it would be necessary to explore ways in which BBMs could be applied to commercial real estate loans and loans taken by legal persons to ensure that environmental risks are addressed effectively and comprehensively. Finally, it is important that BBMs are designed in a way that limits possible unwanted effects on household lending such as the exclusion of certain vulnerable categories of consumers from the opportunity to take part in the transition to a sustainable economy.

8.2.2 Capital-based measures

Capital Conservation Buffer

253. The CCoB was calibrated without taking environmental risks into account. Hence, increased environmental risks may require a higher buffer rate than the current 2.5%. The feasibility and desirability of such a potential capital add-on would however need to be analysed carefully. Such an add-on would require substantial changes to the existing framework, increasing its complexity. Moreover, it is unclear whether adding such a component would make any significant difference to the overall resilience of the banking sector should there be a disruptive tail event related to environmental risks.

Countercyclical Capital Buffer

254. The purpose of the CCyB is to help counter procyclicality in institutions' lending. However, given the non-cyclical nature of environmental risk drivers, the CCyB is inappropriate to address potential capital needs resulting from increasing environmental risks. Additionally, the calibration of the CCyB is linked to, inter alia, the deviation of the ratio of credit-to-GDP from its long-term trend. Since the interaction between environmental risks and the ratio is not straightforward, the calibration would need to be re-thought entirely to reflect environmental risks, which is not appropriate given the purpose of the instrument and the need to have a usable framework.

SyRB – General, Sectoral or Based on a Concentration Measure

255. The SyRB framework can generally be used to tackle a wide range of systemic risks. In relation to environmental risks, three options could be considered.

256. A first option would be the use of the existing general SyRB buffer, which could be used as a general tool to guard against systemic aspects of environmental risks not necessarily linked to the risk of individual institutions. The general SyRB does not distinguish between sectors, and therefore would be less challenging than applying a sectoral SyRB. A structural SyRB could be envisaged to address unexpected exogenous shocks, including environmental risk-related ones. The buffer could help to maintain a steady flow of lending to the economy and prevent an amplification of the initial shock in such a tail event. A common methodology to calibrate the buffer would be needed to ensure a harmonised approach in the EU.

257. A second option would be to use the sSyRB to contain the build-up of risks, and at the same time enhance the resilience of institutions against the materialisation of environmental risks. Consideration could be given to the exposure of institutions to assets sensitive to environmental risks under the sSyRB framework, noting the caveat that to effectively be able to do so, some targeted adaptations would need to be made. Firstly, it would require a classification system of exposures pertaining to sectors or subsets of sectors associated with environmentally harmful or risky activities, which would need to be applied uniformly. Secondly, it would require extending the scope of the sSyRB from only domestic exposures to also include non-domestic exposures, as environmental risks tend to be geographically dispersed. Such extensions would need to be carefully designed and calibrated, to avoid possible unintended side-effects, such as fragmentation in the single market and undesirable interferences in the macroprudential policies of other countries. Furthermore, a revision of the EBA Guidelines[164] on the appropriate subset of sSyRB exposures would be required to enable an appropriate identification of relevant exposures. Moreover, it should be considered that designated authorities might lack the detailed data which are needed for the sSyRB's proper application in other Member States.

258. As a third option, activating the SyRB based on a concentration measure could be considered. Addressing concentration risks from a macroprudential perspective could be justified on the basis that environmental risk-related concentration risks could affect exposures to multiple counterparties exposed to the same environmental risk drivers. This includes potential large exposures, but also some otherwise unrelated exposures with shared sensitivity to physical risks, due to their geographical location or activity, and/or which are part of the same economic sector and have shared production characteristics and hence could be impacted by the same transition risks. These communalities increase the likelihood of a tail event with potentially large losses, which could threaten not only the financial condition of individual banks or their ability to maintain critical services or functions, but also put the whole banking system into financial distress. For this option to be able to work in practice, environment-related concentration risk metrics that are appropriate for this purpose would need to be developed.

8.3 Conclusions

259. The deployment of macroprudential measures to address environmental risks, requires a close dialogue between micro prudential and macroprudential authorities to ensure an effective and consistent set of policies to address those risks. In particular, the activation and calibration of macroprudential measures should consider whether and to what extent environmental risks are already addressed from an idiosyncratic perspective through the microprudential framework, including through possible Pillar 1 clarifications and Pillar 2 measures in the SREP.

[164] See EBA (2020), *Guidelines on the appropriate subsets of exposures in the application of the systemic risk buffer* (link).

260. Out of all existing capital buffers, and despite the limitations mentioned above, the SyRB appears to be the most suitable to potentially address environmental risks and, as highlighted in the CRD6 proposal, it may already be used to address various kinds of systemic risks, which may include risks related to climate change. Targeted adjustments would, however, be necessary to better cater for the specificities of environmental risks, especially if the sSyRB were to be used.

POLICY RECOMMENDATIONS ON CAPITAL BUFFERS AND MACROPRUDENTIAL FRAMEWORK

MACRO-1: The SyRB appears as the most relevant tool to address environmental risks within the current macroprudential framework. As a **short-term action**, the EBA will assess the need for changes to its guidelines on the appropriate subsets of sectoral exposures to which a SyRB may be applied.

MACRO-2: Considering the adjustments to the wider macroprudential framework needed for such a framework to be able to address environmental risks effectively, the EBA will, as a **medium- to long-term action**, coordinate with other ongoing initiatives and assess the most appropriate adjustments.

9. Investment firms

9.1 Overview of the framework

261. The specific prudential framework for investment firms is specified in the IFR (Regulation (EU) 2019/2033), and the IFD (Directive (EU) 2019/2034). The IFR and IFD entered into force in December 2019, and most of their provisions have been applicable since 26 June 2021.

262. With the finalisation of the Basel III Accord, it became more and more evident that the provisions CRR and CRD would not take into account the specificities of investment firms as compared to credit institutions. This led to the change of the regulatory framework and the IFD and IFR were brought into force.

263. Under the new prudential treatment, investment firms are subject to a Pillar 1 requirement equal to the highest of the following three components:

a. the PMC requirement;

b. the FOR equalling 25% of annual fixed overheads;

c. capital requirements determined by the K-factors formula incorporating RtC and RtM – i.e. the risks an investment firm can pose to others – and the RtF, i.e. the risks the firm itself is exposed to.

264. Since the IFR/IFD regulatory package was introduced, investment firms have been split into the following groups:

a. investment firms that are systemically important or exposed to the same types of risks as credit institutions, to which the CRR and CRD requirements continue to apply;
b. investment firms that should apply the new, more tailored prudential regime based on K-factors;
c. small and non-interconnected investment firms as defined in Article 12 of the IFR, that furnish some limited and non-combined services, to which a very simple regime applies.

265. The exact scope of systemically important investment firms or investment firms exposed to the same types of risks as credit institutions is outlined in the table below. These firms are not covered by the analysis presented in this chapter but are subject to considerations of CRR requirements as presented in the previous chapters.

Table 3: Investment firms outside the scope of the report

Thresholds	Reference	Applicability of prudential requirements
Investment firms with assets above EUR 30 billion	Article 62(3) of the IFR	Included in the definition of credit institutions, through an amendment of Article 4(1) CRR; as a result all requirements of the CRR and CRD apply
Investment firms with assets above EUR 15 billion	Article 1(2) of the IFR Article 2(2) of the IFD	Requirements of the CRR apply to investment firms authorised and supervised under Directive 2014/65/EU, which carry out any of the activities referred to in points (3) and (6) of Section A of Annex I to Directive 2014/65/EU, and which are not a commodity and emission allowance dealer, a collective investment undertaking or an insurance undertaking
Investment firms with assets above EUR 5 billion	Article 1(5) of the IFR Article 2(2) of the IFD Article 5(1)–(3) of the IFD	

266. The small and non-interconnected firms are excluded from the prudential regime based on K-factors, and therefore they are also outside the scope of this analysis.

267. The main focus of this chapter is on those investment firms that apply the methodologies based on K-factors. Therefore, for the remainder of this chapter, the term 'investment firms' will refer to the investment firms applying the K-factors, and not to the large and systemically important ones or to the small and non-interconnected investment firms.

268. The analysis on the interaction between environmental risk factors and the own funds requirements set out in the IFR should be based on the same overarching principles that led to the establishment of the IFR and IFD as a separate regulatory framework from the one for credit institutions. These principles include the following elements:

a. **Size:** Investment firms are often smaller and perform simpler activities than credit institutions and thus raise lower concerns in terms of financial stability and systemic risk. Where this is not the case, investment firms are required to apply the prudential framework for credit institutions.
b. **Comparability:** logical consistency across the requirements for investment firms and credit institutions should be maintained in all areas where services, activities and risks are comparable.
c. **Specificity:** the peculiarities of certain investment firms' specific business models should be taken into account, especially where these business models rely on performing a limited set of MiFID services.

269. The IFR identifies three layers of protection that lead to the capital requirements for all the investment firms not subject to the CRR: PMC, FOR and K-factors requirements. However, the PMC is not risk-based, as it is only a fixed amount based on the services provided by the

investment firm and not on the volume or riskiness of these services. Similarly, the FOR does not reflect the risk profile of the investments made by an investment firm but is rather a flat charge proportional to the size of its overheads. Nevertheless, increased ESG screening of portfolios (if applied by the firm) could drive those costs up, so that FOR would indirectly reflect ESG factors. Nonetheless, as per the mandate in Article 34 of the IFR, the subsequent analysis focuses on the K-factor requirements, as they are risk-sensitive measures.

270. The K-factors under RtC capture client assets under management and ongoing advice (K-AUM), client money held (K-CMH), assets safeguarded and administered (K-ASA), and client orders handled (K-COH). The K-factor under RtM captures net position risk (K-NPR) in accordance with the market risk provisions of the CRR or, where permitted by the competent authority for specific types of investment firms which deal on own account through clearing members, based on the total margins required by an investment firm's clearing member (K-CMG). Investment firms have an option to apply K-NPR and K-CMG simultaneously on a portfolio basis.

271. The K-factors under RtF capture an investment firm's exposure to the default of its trading counterparties (K-TCD) in accordance with simplified provisions for counterparty credit risk based on the CRR, concentration risk in an investment firm's large exposures to specific counterparties based on the CRR that apply to large exposures in the trading book (K-CON), and operational risks from an investment firm's daily trading flow (K-DTF).

272. The overall own funds requirement under the K-factors is the sum of the requirements of the K-factors under RtC, RtM and RtF. Together they cover all MiFID services[165]. K-AUM, K-ASA, K-CMH, K-COH and K-DTF relate to the volume of activity referred to by each K-factor. If a firm does not undertake the relevant activity, the amount of the K-factor requirement equals zero.

273. The definitions of the K-factors provided in the IFR clarify that some of these factors include capital requirements against losses stemming from operational failures, improper internal process implementation or legal aspects. Therefore, the same considerations set out for the operational risk capital requirements for credit institutions are valid for certain K-factors. Nonetheless, as the calculation methodologies are different, an explicit integration of environmental risk factors in the IFR framework should account for these differences.

274. Similarly, certain K-factors cover activities related to trading book positions, consisting of either securities or derivatives. Therefore, the relevant K-factors are logically (and, in some cases, directly) associated with the market risk and the counterparty credit risk frameworks of the CRR. Although this may often lead to similar recommendations on capturing risk arising from environmental risk factors, investment firms have the possibility, in certain cases, to apply radically different methodologies, such as the use of CMG, in case of centrally cleared positions. This again suggests the need for specific considerations for investment firms that would not be available for credit institutions.

[165] The list of core services investment firms can provide or perform is in Section A, Annex I of MiFID (link).

275. The IFR framework was developed as a risk-sensitive regime and, to serve its purpose, it should remain so with respect to any risk. Therefore, the potential incorporation of environmental risk factors into the IFR framework has to rely on an overall assessment on whether they substantially increase the risk for the investment firms or, indirectly, for the clients and the markets.

276. The next section discusses technical aspects related to each K-factor and how they may differ from the similar requirements for credit institutions. It also provides some considerations on the incorporation of environmental risk factors into the capital requirements based on the K-factors.

9.2 Interaction between environmental risks and the prudential framework for investment firms

9.2.1 Business models and risk categories

277. The sections below distinguish between risk categories as defined in the IFR (i.e. RtC, RtM and RtF). The universe of investment firms is very scattered and diverse; therefore, it is difficult to exhaustively map investment firms to business models. However, intuitively, different risk types are more relevant for certain business models.

278. On the one hand, the RtC is more relevant to portfolio managers, advisers and broker-dealers. These investment firms primarily engage in discretionary portfolio management, advice, execution, reception and transmission of orders and running trading facilities. Although performing a relatively limited range of services, these types of investment firms do not usually expose their balance sheet to market and credit risks. As opposed to the operational risk framework for credit institutions, the K-factors under RtC were not calibrated on the basis of historical operational risk loss data. Therefore, historical losses do not play a role in any of the formulas (as they would for the ILM in the banking framework); they are instead based on a looser approach where the capital requirements cover all operational risks proportionally to the volume of operations.

279. On the other hand, RtM and RtF are more relevant for firms trading on own account (including principal traders, market makers as well as those underwriting on a firm commitment basis) and commodity dealers. These firms have a balance sheet exposure to market changes, either via securities, derivatives or underwriting commitments. For the purposes of this document, they can be considered a single business model of firms trading on own account, although they can act on own account in the name of the client or on a principal basis. Depending on their business strategies, however, they can have very different risk profiles.

280. Wholesale investment firms, those performing all the activities above on a large scale, may be associated with all three risk types.

9.2.2 Risk to Client

281. The K-factors under RtC are volumetric measures covering those activities where an investment firm may harm clients. These measures were introduced to simplify the capital requirements calculation, therefore reducing the burden for the investment firm to the extent possible without losing the general objectives of ensuring risk sensitivity and, ultimately, supporting financial stability. To this end, only aggregated values are used (an item-by-item analysis by instrument is not envisaged in the IFR), even though granular data are available to the investment firm. Specifically, on each K-factor the following considerations can be applied:

a. **K-COH (Client Orders Handled)** captures the potential risk to clients posed by an investment firm which executes orders in the client's name by using as a proxy the volume of orders executed over time. As such, the investment firm is exposed to operational risk, but the firm has no influence on the order received or on the clients' decisions. Therefore, this specific K-factor requirement addresses the operational risk of the investment firm. As the client itself decides about the financial instruments, there is no environmental risk evolving from COH as such. Therefore, the incorporation of environmental risks into this part of the framework does not seem necessary.
b. **K-CMH (Client Money Held)** captures the potential harm to clients that may occur when an investment firm holds client money on its own balance sheet or in third-party accounts. Client money held by an investment firm, although protected under MiFID, may be exposed to the default of the investment firm. This aspect does not seem to be related to environmental risks. Therefore, the incorporation of environmental risks into this part of the framework does not seem necessary.
c. **K-AUM (Assets Under Management)** is relevant for investment firms offering discretionary portfolio management and investment advice. This element of RtC refers to operational errors such as poor execution and legal errors. The possibility of committing such errors does not seem to be related to environmental factors and therefore the incorporation of environmental risks into this part of the framework does not seem necessary. The composition of the assets under management in terms of their sustainability should not be considered as the basis for differentiating capital requirements for investment firms, as it depends on the client's mandate. However, it should be noted that sustainability of investments is not neglected in the EU regulatory framework, as certain organisational requirements and operating conditions are already addressed in the EU regulation[166]. It might be worth highlighting that, despite the considerations above, a loss in income due to a reduction in fees from discretionary portfolio management or advice following environmental events can still impact an investment firm's ongoing viability. However, the analysis of such potential vulnerabilities belongs to the domain of firm-specific business model analysis as part of the Supervisory Review and Evaluation Process under Pillar 2.
d. **K-ASA (Assets Safeguarding and Administering client assets)** ensures that investment firms hold capital proportionately to activities, which are often closely related, but

[166] Commission Delegated Regulation (EU) 2021/1253 of 21 April 2021 amending Delegated Regulation (EU) 2017/565 as regards the integration of sustainability factors, risks and preferences into certain organisational requirements and operating conditions for investment firms (link).

additional, to portfolio management and investment advice. As such, a capital requirement protects the clients from the operational risks the investment firm is facing. Similarly, as for the other RtC K-factors, the element of operational risk addressed under this K-factor does not seem to be significantly affected by environmental risks.

282. As far as RtC K-factors are concerned, operational risk is the main risk driver, and it seems to be already well captured by the IFR requirements, taking into account the proportionality principle with a view to avoiding an overly complex framework.

283. In line with Chapter 5, one might argue that almost if not all K-factors may be ultimately related to environmental factors if we take transition risks into account for investment firms. For example, new climate policies, technologies and changing market sentiment may increase reputation and/or liability risks and may lower the demand for investment services if investment firms cannot meet the new standards. Also, new climate policies may generate stranded assets which trigger an abrupt repricing on financial markets. This may have an impact on market risk for investment firms trading on own account, but also on business model risks for investment firms whose fee income depends on the assets under management or advice. From this point of view, the composition of assets under management in terms of their environmental profile may still be considered as the basis for differentiating capital requirements for investment firms, because the investment firms may run reputational risk and business model risk if they do not take environmental factors into account.

284. Finally, for these K-factors, the general considerations on the relationship between environmental factors and operational risk presented in Chapter 5 on operational risks are also valid here. Because of the different underlying methodologies, the approaches used for the two frameworks may differ. In particular, the framework for investment firms is not based on historical observations of operational losses. Therefore, any potential future changes in average frequencies and/or severities of operational events affecting the clients of investment firms will not be automatically reflected in the own funds requirements. Therefore, should correlations between operational losses and environmental factors be observed in the future, the framework may need to be recalibrated.

9.2.3 Risk to Market and Risk to Firm

285. As explained in Section 9.1 above, RtM and RtF refer to firms trading on own account and, since the two types of risk are strictly related, they are discussed together in this section.

286. To leverage the analysis for credit institutions, it is possible to associate specific K-factors with the risk types in the CRR as follows:

Risk types in the IFR	K-factors	Related risk types in the CRR
RtM	**K-NPR**	Market risk
	K-CMG	Market risk

Risk types in the IFR	K-factors	Related risk types in the CRR
RtF	K-TCD	Counterparty credit risk
	K-DTF	Operational risk
	K-CON	Concentration risk

287. Each K-factor merits a separate discussion:

a. **K-NPR (Net Position Risk)** is defined in the IFR by direct reference to the market risk approach in the CRR and this alignment is expected to be maintained in the future. Therefore, the observations in Chapter 64 on market risk are also valid for investment firms.

b. **K-CMG (Clearing Member Guarantee)**, similar to K-NPR, is a K-factor that covers the market risk an investment firm is exposed to, although with a different calculation methodology. The use of this alternative method is limited to positions that are centrally cleared via a clearing member and guaranteed by the same clearing member. This method has no equivalent in the CRR framework, and it is not available to credit institutions. Under the K-CMG, the level of capital requirements is set in accordance with the total amount of margins required by the clearing member from the investment firm. As such, it depends on the clearing member's internal models and it is heavily reliant on the netting of the cleared positions. By construction, intervening directly in the calculation of the K-CMG is hard to envisage, as the clearing members' models are not part of a regulatory framework. Therefore, if any concern were identified in the context of environmental risks, a correction could only be possible via either: (a) an external add-on to the K-CMG; or (b) further limiting the use of the K-CMG. On the latter option, the case of investment firms authorised to use the CMG could be addressed by upgrading the IFR in line with the original EBA recommendation in this area[167], i.e. suggesting that the application of the CMG should have a minimum limit equal to the calculation under the SA for market risk, so that any adaptation to the market risk framework would have an effect on the CMG as well.

c. **K-TCD (Trading Counterparty Default)**, despite the different terminology, is for all intents and purposes equivalent to the counterparty credit risk module for credit institutions. Accordingly, the observations for counterparty credit risk in Chapter 4 are also valid for investment firms. The IFR does not take into account capital requirements for credit risk, other than counterparty credit risk, in the Pillar 1 requirements. However, some investment firms may grant credit (as an ancillary service) or have material non-trading-book positions. This might lead to material credit risk exposures, but, in the IFR, this type of risk should be treated under the Supervisory Review and Evaluation Process under Pillar 2.

d. **K-DTF (Daily Trading Flow)** was introduced recognising the need for the IFR framework to cover operational risk related to trading activities, especially when these activities are of high frequency. Accordingly, the K-TCD is measured on the volume of transactions (either securities or derivatives) and was calibrated to lead to results broadly comparable to capital

[167] See EBA (2017), Opinion on appropriate supervisory and enforcement practices for the process of authorising investment firms as credit institutions, Section 5.6.5, p. 52 (link).

requirements under the BIA for operational risk in the CRR. As with other K-factors, the K-DTF is a volumetric measure and is not based on historical operational risk losses. The K-DTF applies to all investment firms which trade on own account. Nonetheless, based on how the K-DTF is defined, high-frequency trading leads to higher capital requirements. Since high-frequency traders usually operate within a short-term horizon, environmental factors seem less relevant for K-DTF.

e. **K-CON (Concentration)** captures concentration risk in relation to individual or connected counterparties with whom firms have exposures above certain given thresholds, distinguished by type of counterparty. Capital add-ons against this type of concentration risk are set up in the IFR[168] in line with large exposures requirements for the trading book as specified in Article 397 CRR. Although the two frameworks have some differences, in line with the overarching objective of the IFR to maintain a simpler regime for investment firms, the functioning of these capital add-ons is largely equivalent. Chapter 7 on concentration risk elaborates more on the possibility to develop metrics applicable to institutions for E&S-related concentration risks. Although theoretically the same considerations would be valid for investment firms, the general objective of the IFR of keeping the framework as simple as possible, proportionally to the size and complexity of most investment firms, should be taken into account.

288. Special consideration should be given to commodity and emission allowance dealers. These are defined in MiFID as trading firms whose main business consists exclusively of the provision of investment services or activities related to commodity derivatives or derivatives on emission allowances. It is worth recalling that commodity dealers may be part of banking or investment firm groups, independent firms or part of industrial groups. Therefore, a large commodity dealer may not be in the scope of IFD/R, in virtue of the ancillary activity exemption in MiFID II.[169] The prudential requirements for these firms address trading in commodity derivatives (or emission allowances), rather than the underlying 'raw material' itself. For example, a commodity dealer part of an energy group may trade in derivatives on gas prices and also buy and sell gas on behalf of the group. This dealer has to hold capital for its derivative trading, and not for trading in gas. Therefore, for these firms, the K-TCD should be the most relevant K-factor, in terms of capital requirements, followed by the K-NPR. Commodity dealers usually focus on very specific markets, depending on the underlying they are interested in. They differ substantially in terms of hedging and investment strategies, especially in terms of time horizons. Therefore, it might be appropriate to further investigate whether environmental risks could justify a dedicated treatment of commodity dealers under the IFR because of the high specialisation of these investment firms. If that were the case, differentiating factors would have to be identified to distinguish those commodity dealers which are materially exposed to environmental risks.

[168] See Article 39 of the IFR: Calculating K-CON.

[169] See Directive 2014/65/EU, Article 2(j).

9.3 Conclusions

289. Some conclusions can be drawn from the analyses in this chapter. Firstly, the IFR prudential framework shows similarities and differences to the CRR framework. Those interrelations must be taken into account when considering any adjustment to the IFR framework to ensure an overall consistency while maintaining proportionality.

290. Second, although it seems difficult to directly associate the RtC K-factors with the risks arising from environmental factors, investment firms may face reputational risk and business model risk if the composition of assets under management in terms of their environmental profile is not taken into account. It is nonetheless recommended to keep these considerations within the Pillar 2 framework.[170]

291. Third, since RtM and RtF are closer (conceptually and in methodology) to the existing framework for market risk and counterparty credit risk for credit institutions, any improvement in the CRR should be reflected in the IFR as well, although with due consideration of the proportionality principle. For the cases where such alignment is not applicable (investment firms using the CMG), the original EBA recommendation would be a viable solution.

292. Finally, commodity and emission allowance dealers in the scope of IFD/R may need further analysis and special consideration, because of the specificities of their business models and the markets in which they operate. Whether commodity dealers in the scope of IFD/R are materially exposed to environmental risks would require further analysis. Nonetheless, it should be taken into account that these firms are already required to capitalise in accordance with the K-factors in RtM and RtF, which, as explained above, should be aligned to the CRR. This is a point that should be considered when assessing the appropriateness of a dedicated treatment of commodity dealers under the IFR, such as through introducing differentiating factors.

POLICY RECOMMENDATIONS ON INVESTMENT FIRMS

IF-1: As a **short-term action**, the EBA recommends that the treatment of E&S risks for investment firms remain under the Pillar 2 framework for all K-factors including those related to RtC. Accordingly, the EBA does not recommend changing, in the short term, the prudential framework for investment firms independently from the CRR.

IF-2: However, as a **medium- to long-term action**, the EBA recommends extending the potential changes made to the CRR/CRD framework to the investment firms' prudential framework, where applicable. In particular, this would concern the parts of the investment firm framework that are directly or very closed related to the CRR. This includes the K-factors related to market risk, trading book concentration risk, CVA and counterparty credit risk. These should be replicated for investment firms, to ensure overall consistency while maintaining proportionality. Differences

[170] See EBA and ESMA (2022), Joint Guidelines on common procedures and methodologies for the supervisory review and evaluation process (SREP) under Directive (EU) 2019/2034, Section 4.9 (link).

between the two frameworks, such as the use of the K-CMG, could be addressed as originally recommended by the EBA in its 2017 report.

IF-3: Nonetheless, the EBA still recommends that the peculiarities of investment firms, including the overarching objective of having a simpler framework than credit institutions, be preserved also in the medium- to long term. This would apply, in particular, to the RtC key factors.

IF-4: At this stage, the EBA does not recommend introducing differentiating factors for commodity dealers in the scope of IFD/R as they currently apply the K-factors in line with the CRR and should apply the same requirements in case of any improvement in the CRR framework in the future for E&S risks. As a **medium- to long-term action**, the EBA will reassess, subject to further evidence and analysis, the appropriateness of introducing differentiating factors for commodity dealers to further reflect the concentration risk of those particular business models.

Annex 1. Summary of feedback received to the Discussion Paper

The EBA published on 2 May 2022 its DP on The role of environmental risks in the prudential framework. The DP provided an initial analysis of the framework and identified areas for further work. It aimed to initiate the discussion and gather a wide range of views and inputs to allow for comprehensive consideration of these complex issues.

In total, 43 responses were received from the public consultation, ranging from various national and European banking and financial market associations, credit institutions, investment firms, NGOs, research institutes, consultancy/advisory firms and one rating agency.

Principles, Premises and Challenges

There is overall agreement with the premises set out in the DP, such as the risk-based approach, the consideration that environmental risks are drivers of traditional categories of financial risk, the need for a holistic approach and the recognition of underlying data-related and methodological challenges. Many respondents outline the importance of synergies and cooperation with other international players that are working on the topic, such as the BCBS and European lawmakers.

The overall view of respondents is that Pillar 2 is more appropriate to address environmental risks than Pillar 1. Some respondents think that Pillar 2 and Pillar 3 already sufficiently capture environmental risks and there would thus be no need for changes to the Pillar 1 framework; whereas others see the Pillar 1 framework in its current form already able to capture environmental risks sufficiently. Many respondents are against raising capital requirements / implementing adjustment factors. Those in favour of it, suggest mostly introducing a GSF, while one respondent proposes a BPF.

Double materiality

Many respondents disagree with including the concept of double materiality in the Pillar 1 framework, as it would lead to an uneven playing field for EU banks given the lack of an international approach on the topic. It should, therefore, rather be applied to non-financial reporting and disclosures, according to some respondents.

Liquidity/leverage ratios

Most respondents support the exclusion of liquidity ratios and leverage ratios from the analysis, given that the time horizons of these ratios differ from the time horizons associated with environmental risks, as well as given difficulties around operationalising haircuts of the HQLA. However, some respondents are of the view that environmental risks do have an impact on liquidity and that this impact should be regularly evaluated, not necessarily in Pillar 1, but in Pillar 2.

Reallocation of risks vs increase in overall risk

Most respondents agree that environmental risks predominantly cause a reallocation of risks between sectors, rather than an increase in the overall level of risk, whereas two respondents argued that environmental risks do pose a risk for the system as a whole.

Time horizon / forward-looking nature

A number of NGOs and research institutes argue that the time horizon of the Pillar 1 framework does not account for environmental risks, so that an extension of this time horizon is warranted. Most banks, on the other hand, express the view that the time horizon should not be extended for environmental risks, as it should be consistent for all risks covered by the Pillar 1 framework. Two concrete suggestions are made on how to include forward-looking elements in the prudential framework, either through discounting future potential physical and transition risks to their present value or through assigning probabilities to the occurrence of future risks.

Social Factors

Many respondents are of the view that it would be too premature to consider social factors in the context of the prudential framework, due to, among other things, lacking definitions, data and methodologies; the fact that it is not the role of institutions to address such risks; incomparability of social risks across jurisdictions; social risks already being captured by existing EU legislation or by the current Basel framework, given that social risks are the root cause of fraud increase; unavailability of people and other operational issues; social risks already being addressed by institutions in the context of operational and reputational risk, for example in client onboarding processes, fraud detection, requiring client information on minimum social safeguards, and in financial inclusion initiatives; and the fact that it is not a risk management issue, but rather a compliance issue. A small number of respondents, however, think that social factors should already be considered at this stage, given that banks are already applying ESG considerations beyond environmental risks.

Respondents make various suggestions on how to analyse social risks in the context of the prudential framework: prioritise human rights given that these are a key source of social risk and can be best identified thanks to international declarations on the issue; use the social taxonomy as it already provides examples of activities that are contrary to the EU's social goals, which can give an indication of the social transition risks of a company; and derive inspiration from ESG rating providers and institutions' existing methodologies to assess social risks, such as screening of clients based on social elements. Also, comments are made about the need to recognise the interrelation between social and environmental risks by addressing them through similar mechanisms in the prudential framework, as they affect each other, and by distinguishing between social risks per se and social risks resulting from the materialisation of environmental risks of a systemic nature. A few respondents outline the importance of identifying social risks and their transmission channels, distinguishing between social risks related to institutions' own resources, which would be protected by their HR framework, and social risks as societal risks, which are external to institutions and are impacting counterparties.

Credit risk – Standardised Approach

Current use of ESG dimensions in credit risk assessment

Many respondents state that they are currently using ESG dimensions in their credit risk assessments, some through scenario analysis and stress testing activities, while recognising a variety of challenges associated with this, such as integrating ESG risk drivers into internal processes, data and methodological issues, and limits to backward-looking risk differentiation.

Incorporation of environmental risks by credit rating agencies

Respondents note a number of challenges associated with the incorporation of environmental risks by credit rating agencies, such as incomplete and inconsistent data, the use of different modelling approaches, and a lack of comparability and transparency. Some respondents state that they are currently using ESG ratings when assessing environmental risks, while others are considering doing so going forward and others are not considering this at all.

Broadening due diligence requirements

Most respondents are of the view that it would not be necessary to broaden due diligence requirements to capture environmental risks, including because of data availability challenges. Some note that, instead, the focus should be on external ratings. One bank notes data availability as a non-issue, as it has already broadened its due diligence requirements in spite of it.

Revision of CRM framework

Most respondents do not see a need to revise the CRM framework to explicitly address environmental risks, while some respondents make suggestions for what such a revision could look like, pertaining to conducting frequent reviews of risk parameters, considering energy efficiency, starting from the funded credit protection, and extending the time horizon.

CRR3 proposal on energy efficiency

Most respondents consider the current clarification in the CRR3 proposal on energy efficiency sufficient, while pointing out challenges in the use of Energy Performance Certificates (EPCs), such as a lack of data and the fact that information about EPCs is inaccessible in some jurisdictions.

High-quality object finance and project finance

Most respondents are of the view that the current framework for HQ OF and HQ PF already captures environmental risk, while some respondents think that further analysis would be needed on whether this is indeed the case. One respondent highlights that fossil fuel exposures should not be classified as HQ OF or HQ PF.

Risk differentiation in corporate/retail/other exposure classes

Views diverge on whether further risk differentiation should be introduced in exposure classes, ranging from respondents thinking that it should be introduced for corporates only, to respondents considering that it should be introduced for fossil fuel companies and other polluters that do not have credible transition plans, to respondents being of the view that it should be introduced at sector level.

Credit risk – IRB Approach

Revisions to IRB framework

Most respondents do not support revisions to the IRB framework due to data and methodological issues, general uncertainties, the fact that Pillar 1 is not the place to address such risks but rather Pillar 2 is, or the current Pillar 1 framework being flexible enough to cater for environmental risks. A small group of respondents is of the view that changes to the IRB framework should be made to include forward-looking components and a longer-term time horizon.

Incorporation of environmental risks in IRB models

Virtually no respondents are currently explicitly incorporating environmental risks in their IRB models. If they do incorporate these risks, they do so through qualitative approaches (overrides). Some banks are currently assessing or planning to assess if ESG risk drivers can improve performance of IRB models. Many banks believe that ESG risk drivers are captured in the models indirectly (or will be over time) through the variables already in use (collateral value or financial KPIs).

Suggestions for further improvements to the framework

Respondents make various suggestions for making further improvements to address environmental risks in the framework. Some argue for more reliance on overrides and expert judgement, reflecting environmental risks in risk weights for mortgages, introducing add-ons or reflecting environmental risks in the MoC. Pricing, loan duration and funding are also mentioned as areas where differentiation in risk weights could be made. Some banks request more supervisory guidance on the topic as well as an update of the existing guidelines. One respondent warns against overreliance on the use of overrides or expert judgement as this could be unreliable.

Credit Risk – Adjustment Factors

Strengthening of environmental criterion for Infrastructure Supporting Factor

The vast majority of respondents are in favour of keeping the criteria for the ISF as they are, without strengthening them on the environmental side, with a few even arguing for loosening the current criteria as they are not workable and are penalising special purpose vehicles (SPVs) in infrastructure finance projects. Two respondents agree with the EBA's proposal to strengthen the environmental criteria under Article 501a, and one respondent argues that guidance should be provided on how to interpret the existing criteria.

Integration in existing Pillar 1 instruments vs adjustment factors

Many respondents argue against adjustment factors because they are non-risk-based, there is limited data availability, and the fact that the current Pillar 1 framework allows for environmental risks to be addressed (such as through CRA ratings). A small number of respondents is in favour of adjustment factors, either in the form of a GSF named a 'Sustainability Adjustment Factor' to be applied to energy-efficient mortgages and other suitable exposures or in the form of a BPF for fossil fuel exposures. One respondent argues that given the urgency to address environmental risks, adjustment factors represent a simple tool that fits the nature of such risks better than an approach depending on detailed modelling exercises.

Double counting

On the issue of double counting between adjustment factors and environmental risks possibly already being captured by the current Pillar 1 framework, respondents note that this should not be supervisors' worry, is unavoidable and also exists between microprudential and macroprudential requirements.

Market Risk

Incorporating environmental risks in the FRTB SA and FRTB IMA

Most respondents are of the view that no changes to both the FRTB SA and FRTB IMA are needed. Respondents note that the current FRTB SA framework already allows for capturing environmental risks, that environmental risks are not considered to be material in the trading book given its short time horizon, that the impact of environmental risks should already be priced in and that, as the FRTB SA is a fallback solution, if the FRTB IMA has poor quality models, both frameworks should be consistent with each other.

Some are of the view that environmental risks are already part of the FRTB IMA model so that there is no need for an additional model to be built, while others think environmental risks should be modelled outside of the model as the back-testing of the internal model would reject inclusion of (forward-looking) ESG factors.

Various challenges are listed for modelling approaches for environmental risks, such as lack of adequate data and uniform definitions, increased complexity of the model in daily operations, environmental risks not being components of valuation which make it impossible to back-test and the current regulatory framework not allowing for adjusting historical data for ESG factors.

Some suggestions are made for modelling techniques, such as the use of existing scenarios (e.g. IPCC/ECB), add-ons differentiating green and brown risk factors, enhancing the DRC module and including trading book exposures in relevant large exposures under the LEX regime.

Proposals for integrating environmental risks in the market risk framework

Further proposals for integrating environmental risks in the market risk framework are made around setting guidance for parameter-setting of models to ensure uniformity among banks and including the risk of greenwashing, as assets that have been affected by greenwashing can lose significant market value (or become stranded).

Operational Risk

In the feedback to the public consultation, most respondents consider the existing operational event types sufficient, as they cover various types of events that could be caused by environmental risks, whereas a small group of respondents would deem it useful to add a causal dimension to the current classification by event type. A number of respondents note that finding a way to flag environmental risks within the operational risk framework could be a good way forward to identify the impact of these risks.

Some respondents state that they are already modelling environmental impacts on operational risks through physical environmental risk scenarios and that they plan to introduce a flag for identifying environmental risks going forward. Challenges that are being observed in this regard include differentiating between environmental risk events and 'normal' weather events and limited access to data and forecasts.

The reduced risk sensitivity and the lack of forward-looking capabilities are seen as two limitations of the framework proposed under the upcoming CRR, incorporating Basel III reforms. It was specifically noted that, under the upcoming CRR, the use of the new SA for operational risk setting ILM equal to 1, would reduce its risk sensitivity to historical losses, including those arising from environmental risk factors. Furthermore, the new SA, in both the BIC as well as the ILM component, does not include any forward-looking component.

Concentration Risk

Extension of LEX regime or introduction of new limits

Most respondents do not believe an extension of the LEX regime or introduction of new hard concentration limits constitute a good way forward to address environmental risks, because they could lead to unintended consequences such as hampering the transition, as well as they would imply data-related and methodological issues and extra costs for the sector. Some argue that the current LEX regime and CRR in its current form can already address concentration risks stemming from environmental risk drivers or the risks could be handled via Pillar 2 to take into account the specific situation of institutions. With regards to the hard limit specifically, it is noted by one NGO that this should not replace capital requirements to address environmental risks, but that any such limit should only be used as a complementary tool, while one bank thought that the reduction of vulnerable exposures under LEX with a new limit based on emissions would be a good way forward.

Reporting and monitoring

Many respondents did support a combination of reporting, monitoring and Pillar 2 measures as an effective way forward to address environment-related concentration risks, in which bank specificities such as transition plans could be taken into account. Some respondents stated that reporting and monitoring could either be introduced as a new requirement or as part of the current requirements. It was recognised that lacking classifications of exposures might pose a challenge for enhancing reporting obligations.

Investment Firms

Respondents mostly agree on environmental risks being of minor relevance for investment firms in the scope of IFR, given that these are generally not affected by environmental risks in the same way as a systemic investment firm or a bank in the scope of CRR could be through its exposures or invested assets. A few respondents note that environmental risks are not relevant for K-factors, as these look at volume, value and size of the asset, but not at the specific company or economic activity underlying the asset.

On commodity traders and emission allowance dealers specifically, respondents note that their portfolios are not directly exposed to environmental risks given that no directional bets are taken based on ESG criteria, and that any higher volatility of commodity derivatives would already be included in the RtM, and to the extent that this is not sufficient, in the Pillar 2 assessment.

Annex 2. RICS Sustainability Report (2022): Charts and Figures

Figure A1: Are buildings that are not classed as green/sustainable subject to a reduction in rents (a brown discount) compared to green/sustainable buildings?

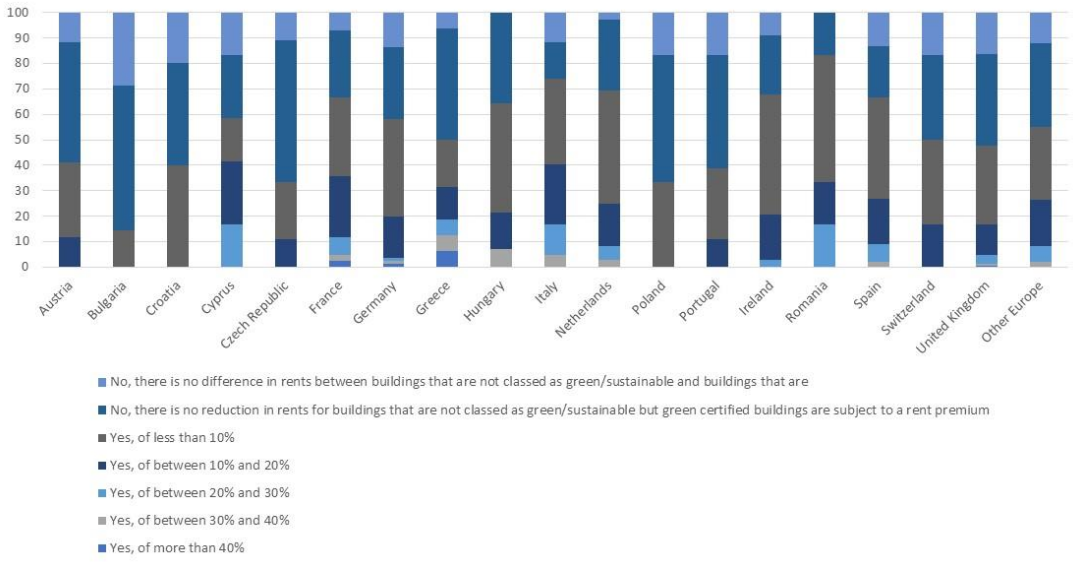


Figure A2: Are buildings that are not classed as green/sustainable subject to a reduction in prices (a brown discount) compared to green/sustainable buildings?

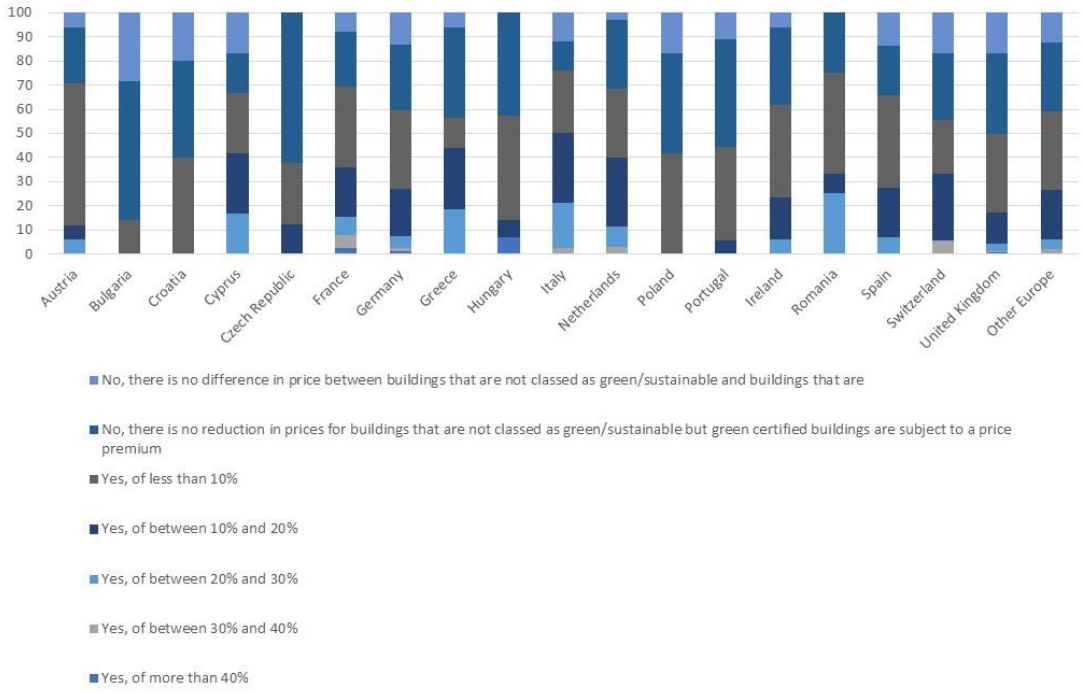


Figure A3: How has the gap in rents between green/sustainable buildings and buildings that are not classed as green/sustainable changed in the last 12 months?

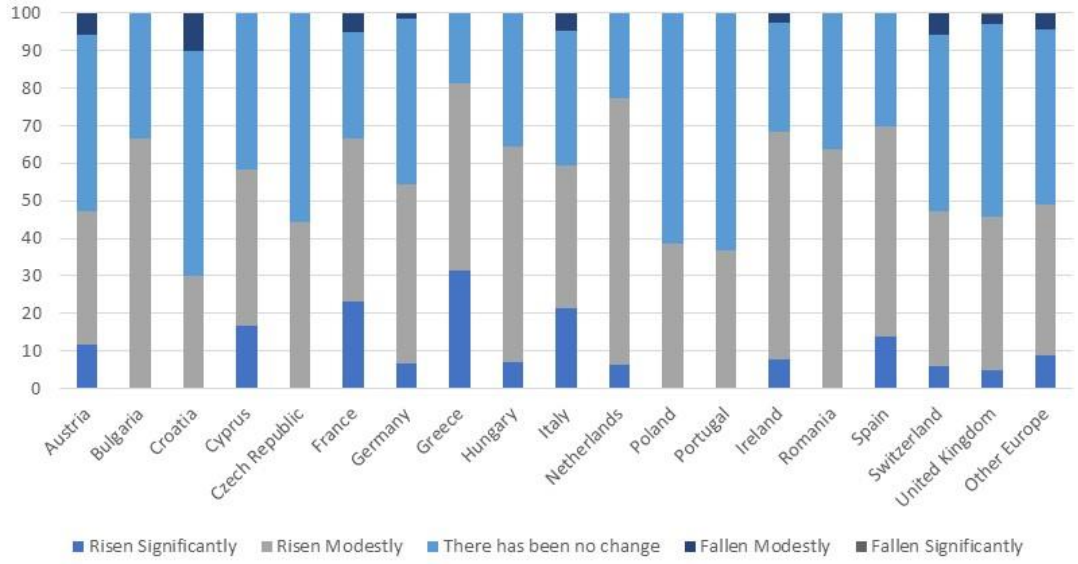
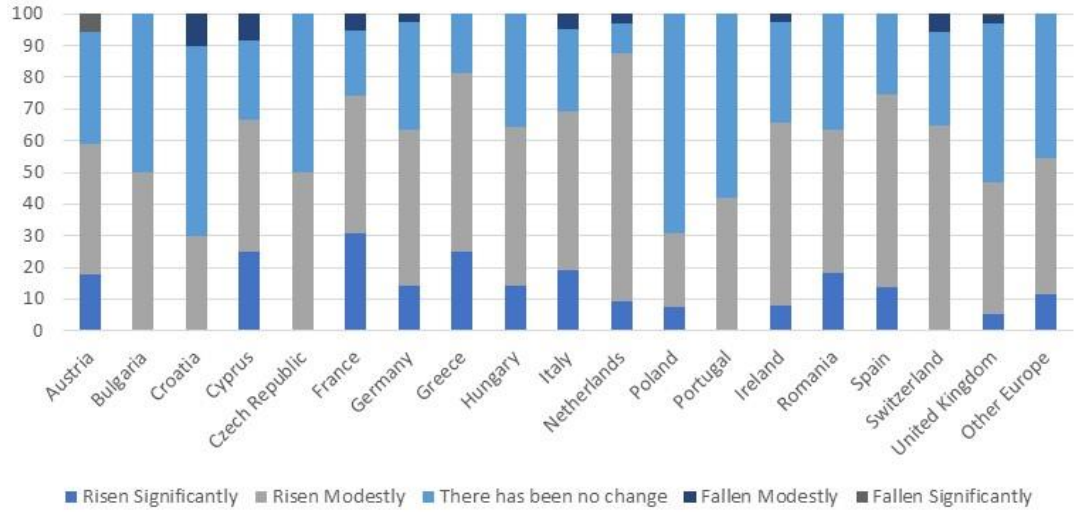


Figure A4: How has the gap in prices between green/sustainable buildings and buildings that are not classed as green/sustainable changed in the last 12 months?



EUROPEAN BANKING AUTHORITY

Tour Europlaza, 20 avenue André Prothin CS 30154
92927 Paris La Défense CEDEX, FRANCE

Tel. +33 1 86 52 70 00

E-mail: info@eba.europa.eu

https://eba.europa.eu