

Just in Time

Climate Stress Test **Banque de France's First Pilot Exercise** *Main Results and Methodology - Focus on* *Transition Risk*

Jun 2021

At a Glance



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01

Overview

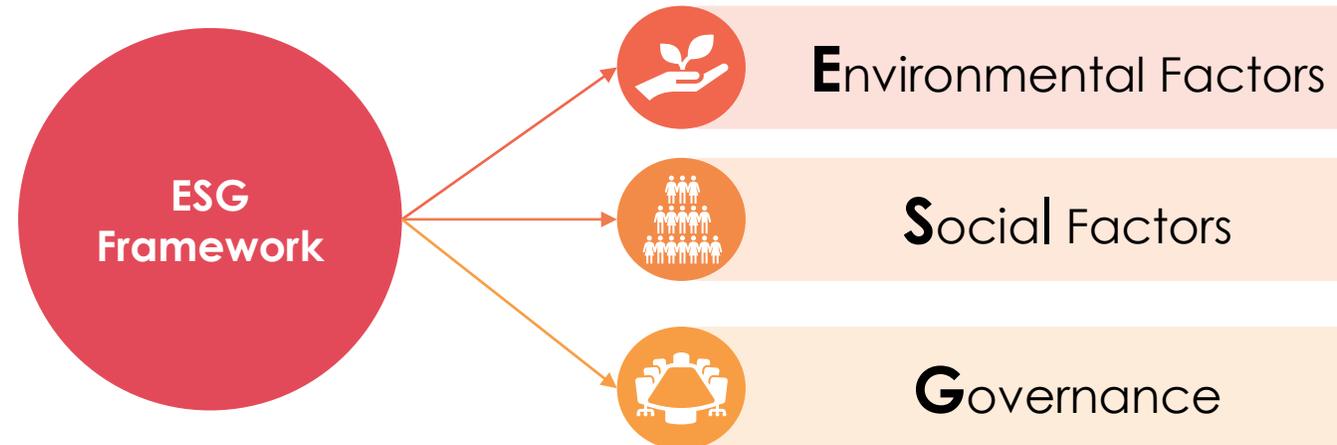
ESG Framework within Financial Sector
Overview on Climate Change and its Risk Drivers
Banque de France's Pilot Exercise at a Glance



Overview 1/3

ESG Framework within Financial Sector

The so called **ESG** framework is a set of criteria that play a role in the decision-making process of a company, in measuring the sustainability and societal impact of an investment. Analysis of these criteria is aimed to help to better determine the future financial performance of companies



In particular, it entails several **implications** and **challenges** for financial institutions, such that both regulatory and supervisory authorities are moving fast to:

- **Formalize rules and standards** in order to avoid disruptions and monitor effectively the ESG performance of the financial sector
- Encourage financial institutions to begin developing tools and models for the proper **handling of risks related to the climate change**

Overview 2/3

Overview on Climate Change and its Risk Drivers



Physical Risks

It arises from the **changes in weather and climate that affect the economy**

- **Acute physical risks** refer to those driven by extreme weather events
- **Chronic physical risks** refer to longer-term progressive shifts in climate patterns



Transition Risks

It arises from the **transition to a low-carbon and more sustainable economy**

- Change in public sector **policies**
- Investments in **technology** and innovation
- Change in **investors** and **customers sentiment**



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Banque de France's Pilot Exercise at a Glance

Between Jul '20 and Apr '21, Banque de France conducted a climate stress exercise, **unprecedented** in terms of methodology, assumptions and time horizon

Purpose

- Providing a first concrete **measurement of vulnerabilities related to climate change risk**
- **Raising awareness about climate risk** and its impact on financial institutions

Methodology

- **Very long-term** time horizon
- **No economic recessions** foreseen in any scenario
- **Plausibility** underlying all the scenarios
- **Sectoral granularity**



Scope

- **Voluntary based participation**, without any regulatory purpose
- Bottom-up exercise for **both french banks and insurers**
- **Both Physical & Transition risk** analyzed

Results

- Vulnerabilities related to
 - *Transition risk* are **small but significant for banks**
 - *Physical risk* are **hard to identify for banks** but **significant for insurers**

02

Methodology

At a Glance

Scenarios' Overview: Climate-Related Narratives

Modeling Process

Methodological Differences wrt Ordinary Stress Test

Limitations / Open Points



Methodology 1/5

At a Glance

In the following the main methodological features to assess *Transition Risk* of Banque de France's pilot exercise

Exercise's Methodology



Exercise's Scope

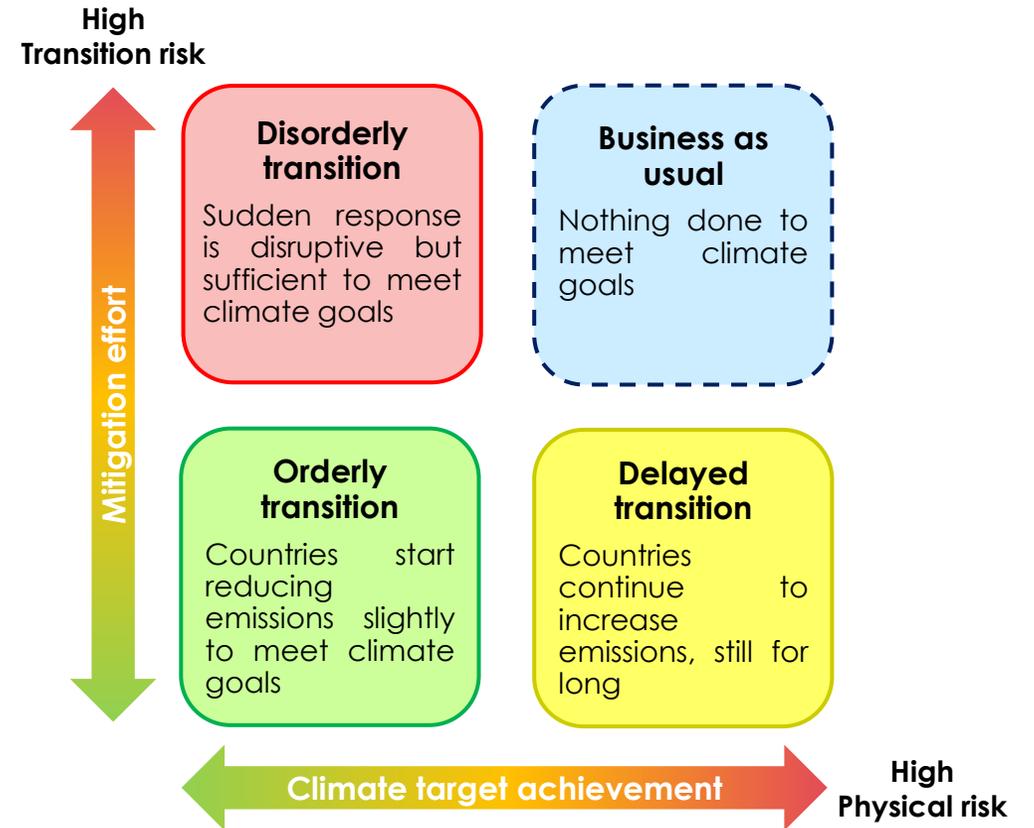
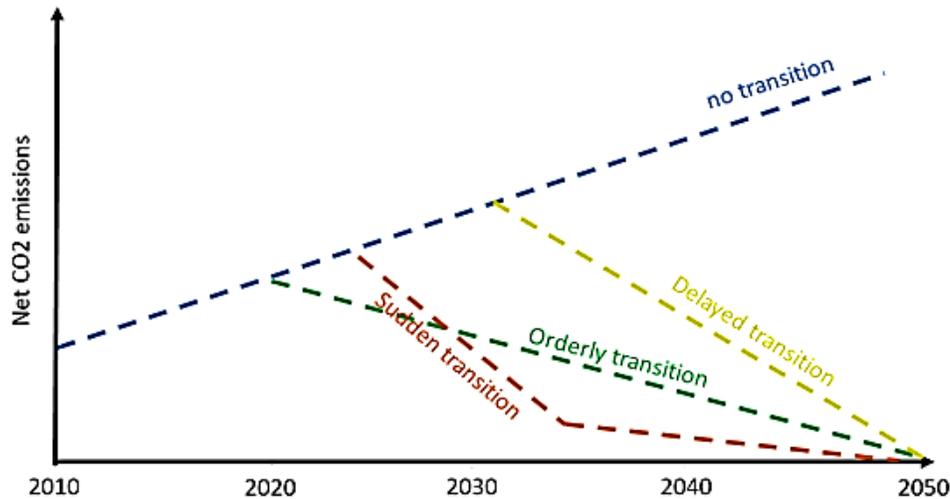
- A **bottom-up** exercise covering banks aiming to analyze the interactions between banking and insurance sectors, in particular the impact of insurance coverage on banks' risk parameters
- Banks' participation has been voluntary based, **without any regulatory purpose**
- An **international dimension**, designed to take account of the global nature of climate change and its differentiated impact across different regions of the world
- The exercise also includes the consideration of "**second-round effects**" to measure banks' indirect exposure to physical risk

Methodology 2/5

Scenarios' Overview: Climate-Related Narratives

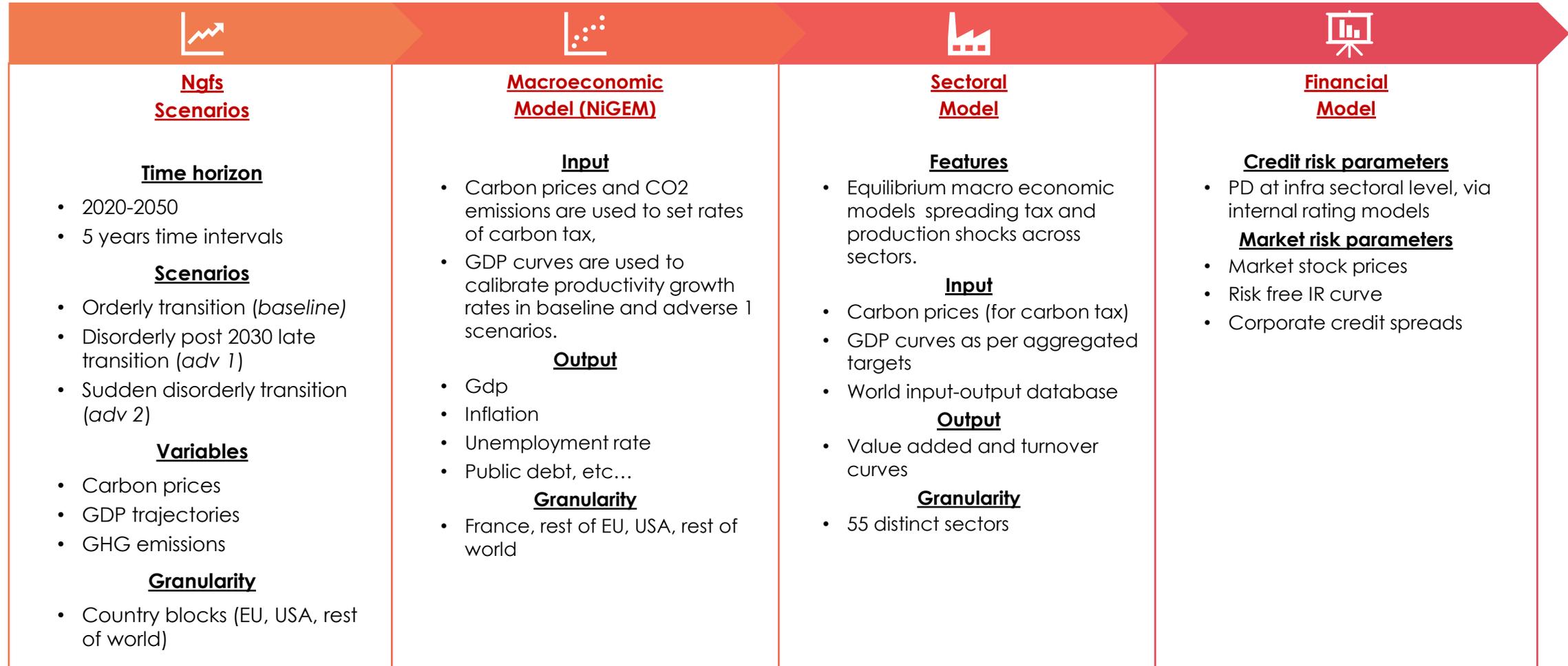
Banque de France leveraged on a set of **3 plausible climate scenarios** (compared with **an unplausible hypothetical "business-as-usual"** scenario with no transition) provided by the Network for Greening the Financial System (**NGFS**)

The climate scenarios are expressed in terms of Carbon prices and CO2 emissions, and are defined to cover both transition and physical risks



Methodology 3/5

Modeling Process



Methodology 4/5

Methodological Differences with Ordinary Stress Test

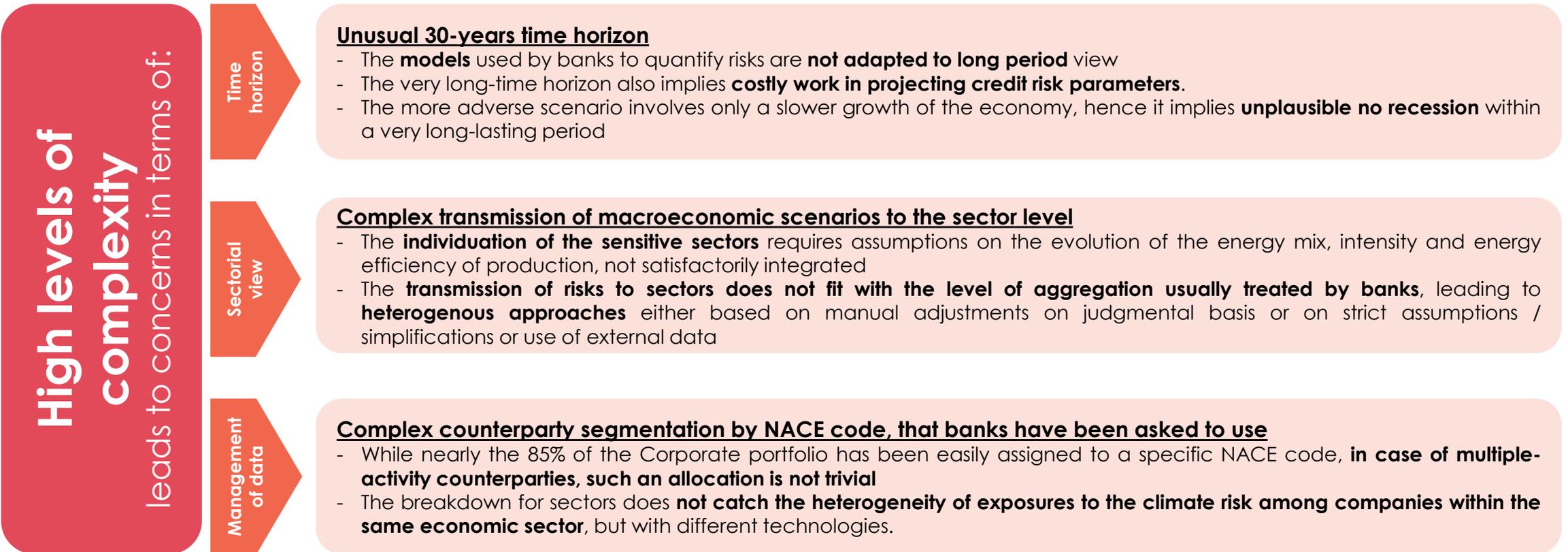
	— Ordinary Stress Test Framework —	Climate Stress Test
Scenario	<ul style="list-style-type: none"> • Only macroeconomic factors, provided by regulator • 3-years time horizon • Baseline scenario related to ordinary / as usual business • Adverse scenario leading to severe economic recession 	<ul style="list-style-type: none"> • Climate NGFS + macroeconomic NiGEM • 30-years time horizon • No recessions, but different plausible transition's paths towards emissions targets
Assumptions	<ul style="list-style-type: none"> • Static balance sheet • Historical data steering the future • Baseline scenario as the most likely • Adverse scenario as a tail event 	<ul style="list-style-type: none"> • Static until 2025, then dynamic BS • No historical data about climate related risks • All scenarios probable representations of the future
Granularity	<ul style="list-style-type: none"> • Scenarios provided at country level • Satellite models developed at country + asset class level • Aggregated PD a-posteriori redistributed at counterparty level 	<ul style="list-style-type: none"> • NGFS climate scenario globally • NiGEM macro scenario at country level • Sectorial models on added value • Impact on counterparty's Rating

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Limitations / Critical Points

The lack of precedent exercises and of a common well-defined framework leads to carefully analyze the results, considering the unavoidable limitations of the proposed framework.

This exercise has to be taken as a **starting point for future enhancements**



03

Main Results

Overview on Achieved Targets

Credit Risk - Overall

Credit Risk – Overview on Impacted Portfolios

Credit Risk – Corporate Portfolio Insight

Credit Risk – Impact on Corporate Portfolio due to
Dynamic Balance Sheet

Credit Risk – Dispersion Across Different Institutions

Market Risk



Main Results 1/7

Overview on Achieved Targets

The pilot exercise reveals a **general "moderate" exposure of French banks to the climate transition risk.**

But this conclusion must consider the **uncertainty** on both pace and impact of climate change, and also its contingency on assumptions, scenarios' definition and **methodological difficulties.**

Nevertheless, the pilot exercise, besides the results, **achieved some important objectives:**

Very strong industry-wide mobilization



9 banking groups (the 6 main French groups and 3 public sector financial institutions), reflecting the **85% of the total balance sheet for the banking side**

Stakeholders' concrete awareness



Institutions appreciated the benefits of the exercise in terms of **cross-functional mobilization of teams, internal reflections on risk analysis, and strategic guidelines** in better assessing the impact of climate change on their business model

Assessment of complex climate scenarios based on the work of NGFS



NGFS guidelines in building climate scenarios will serve as a basis for other exercises, such as the ECB's one in 2022. This pilot exercise is hence important for the development of a **common knowledge base and assessment of climate risks**

First assessment of risks and vulnerabilities to climate change

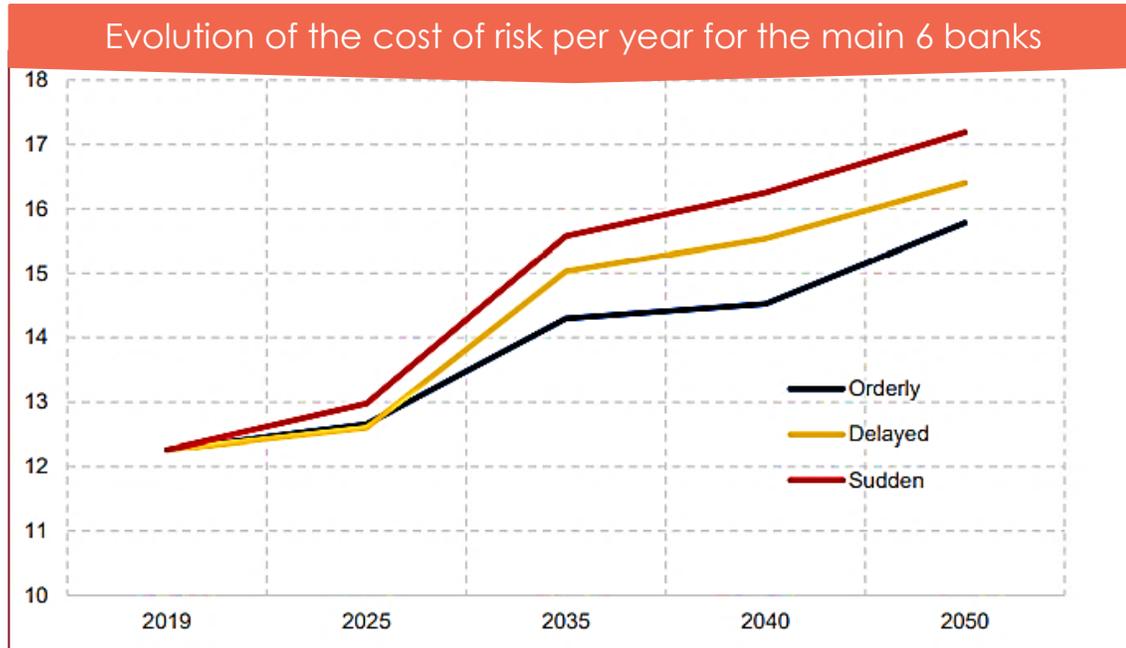


The exercise provided the opportunity to assess financial institutions' corrective actions (e.g. exit from certain sectors), using the **dynamic balance sheet** assumption

Main Results 2/7

Credit Risk – Overall

Results within Credit Risk framework are expressed in terms of **Cost of Risk**, whose projections increase with time within all the analyzed scenarios, with overall **increasing levels for the more severe scenarios**, even though the **difference among the analyzed scenarios is quite limited**



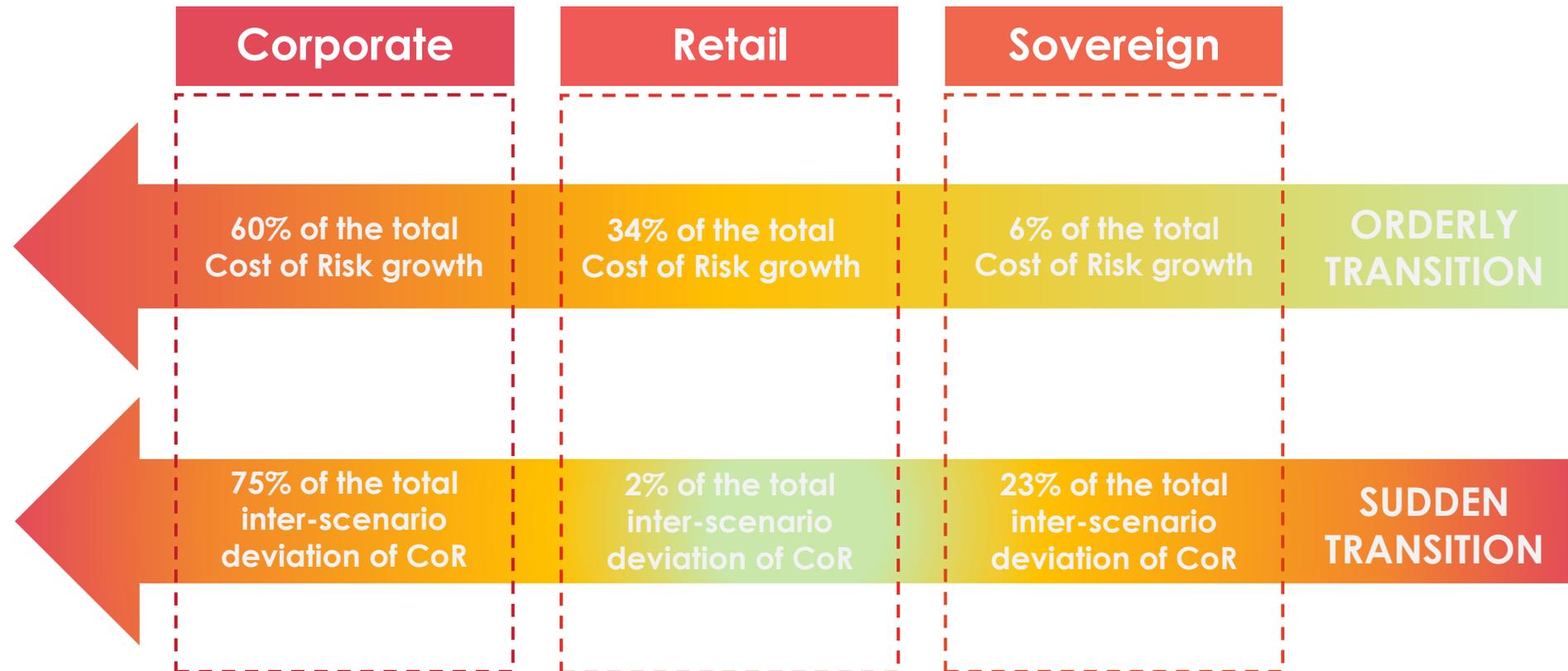
Note: data in basis points. The annual credit risk is calculated by dividing the total annualised flows of provisions for each time interval by the average of the exposures over that time interval. The figures presented correspond to the aggregate of the six main French banks participating in the exercise covering all geographical areas. Under the sudden transition scenario, the cost of annual credit risk was 17.2 bps in 2050, compared with 15.8 bps in the orderly transition scenario (+8.9%).

- CoR projections **increase** with time within all scenarios showing an higher impact for **more severe scenarios** (+22,4% in “Orderly” scenario vs +32,4% in “Sudden” scenario with respect to the projected 2025 value)
- The impact of the scenarios on Cost of Risk is especially **significant** in the **severe scenario** of **disorderly** transition
- The **impact** of the scenarios on Cost of Risk is **smaller than** the ones usually observed with **ordinary Stress Tests**, but that's consistent with the climate scenarios narrative (no scenario induces an economic recession)

Main Results 3/7

Credit Risk – Overview on Impacted Portfolios

French institutions were requested to perform credit risk projections on three portfolios, each one differently impacted by the scenarios and hence differently contributing to the total CoR:



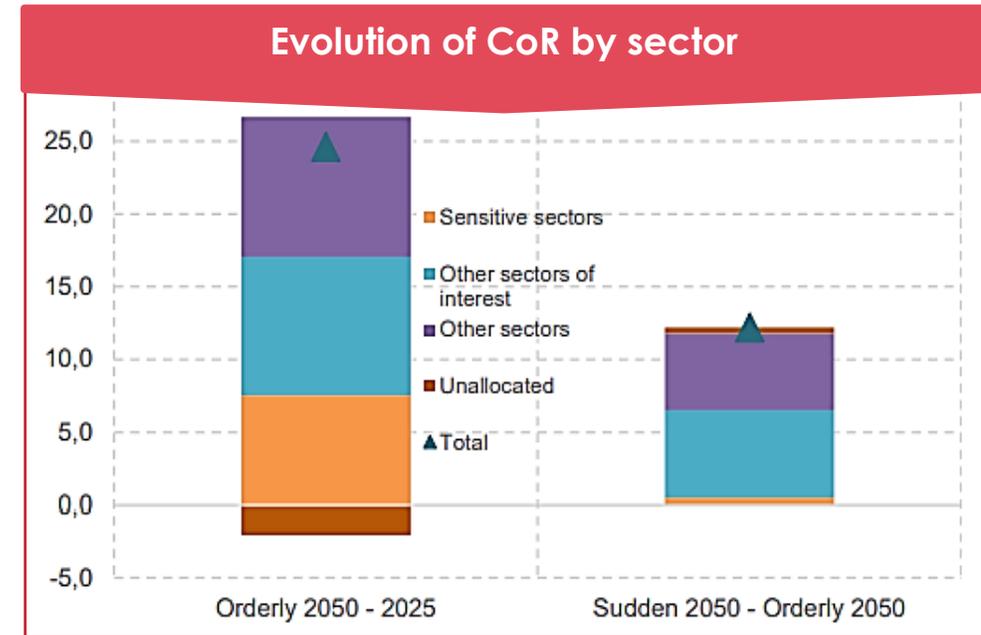
Main Results 4/7

Credit Risk – Corporate Portfolio Insight

Corporate portfolio impacts on Cost Of Risk (basis points) are also provided at **sector level**, grouped based on the different sensitivities to the transition risk

	Orderly transition 2025	Orderly transition 2050	Sudden transition 2050	CoR Increase (Orderly)	CoR Increase (Sudden)
Sensitive Sectors	12.4	30.8	37.3	+150%	+200%
Sectors of Interest	19.0	23.3	27.8	+20%	+50%
Other Sectors	19.4	24.1	26.8	+20%	+40%
Not allocated	39.1	36.4	37.0	-10%	-10%
Total	21.6	26.3	29.5	+20%	+40%

The **increase in the Cost of Risk is significant in sensitive sectors under any scenario** (with very low difference between the orderly/baseline and sudden/adverse), comparable e.g. to the observed impacts due to COVID crisis



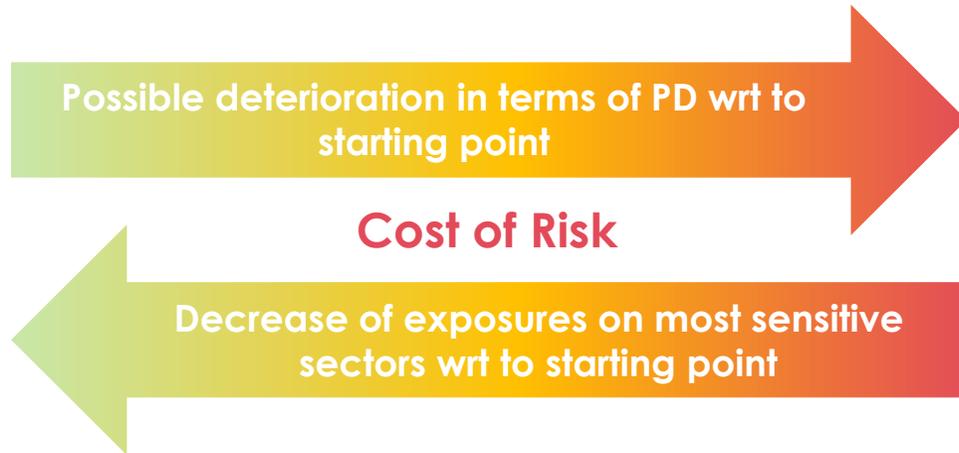
Note:
 The triangle represents the total rate of variation (in %) in the cost of risk between the two studied bounds. Each part of the histogram then represents the variation (in %) induced by different sets of sectors.
 The left-hand side represents the dynamics of the CoR between 2025 and 2050 in the orderly transition scenario; the right-hand side the cost of risk observed at the end of 2050 in the sudden transition scenario.

Main Results 5/7

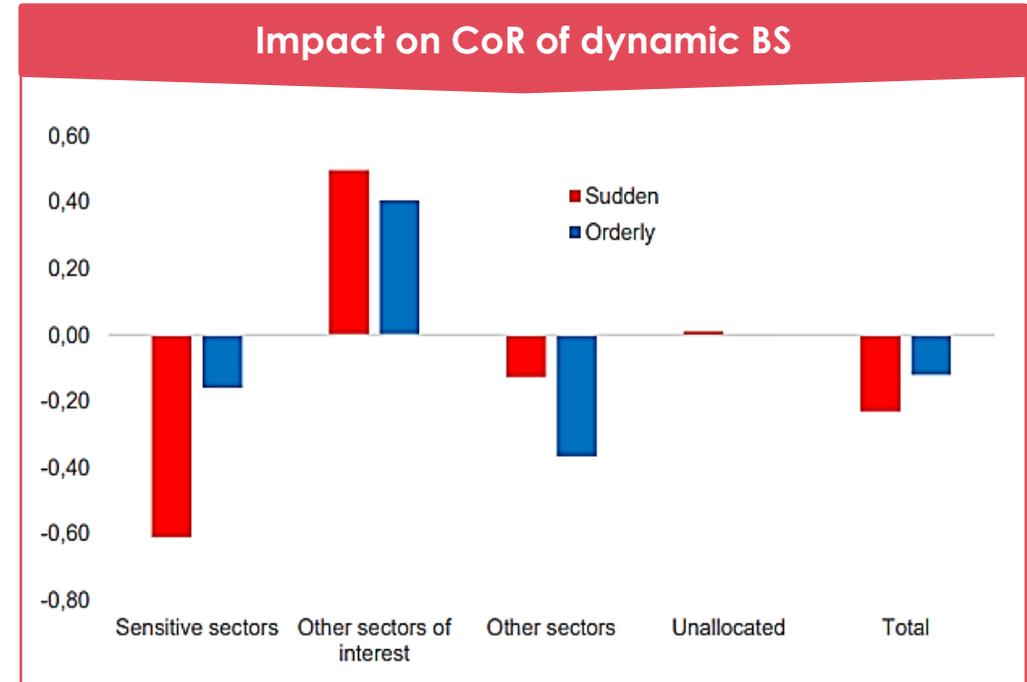
Credit Risk – Impact on Corporate Portfolio due to Dynamic Balance Sheet

The effect of the dynamic balance sheet is not the main factor explaining the observed difference between the orderly and sudden transition scenarios

The possibility of reallocations of sectoral exposure during the scenarios generates **conflicting effects** in terms of Cost of Risk



These different effects partially offset each other and **the dynamic balance sheet assumption** as such ultimately has **little impact on the total cost of risk**

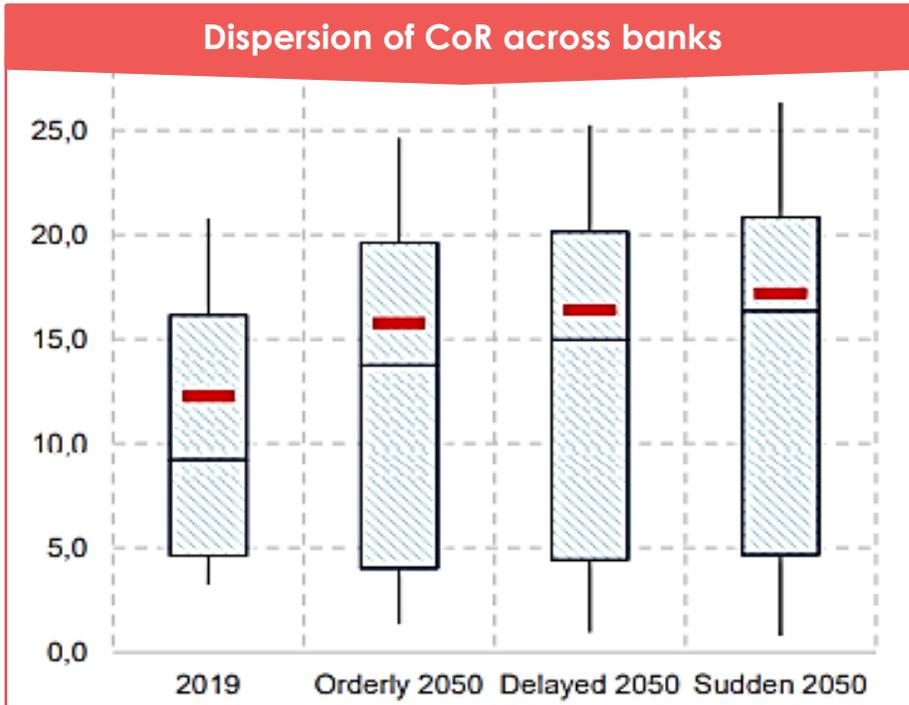


Note:
The dynamic BS assumption lowers the total corporate cor by 0.2bps in the sudden transition scenario compared to the level that would have prevailed under a static balance sheet assumption by 2050.

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Credit Risk – Dispersion Across Different Institutions

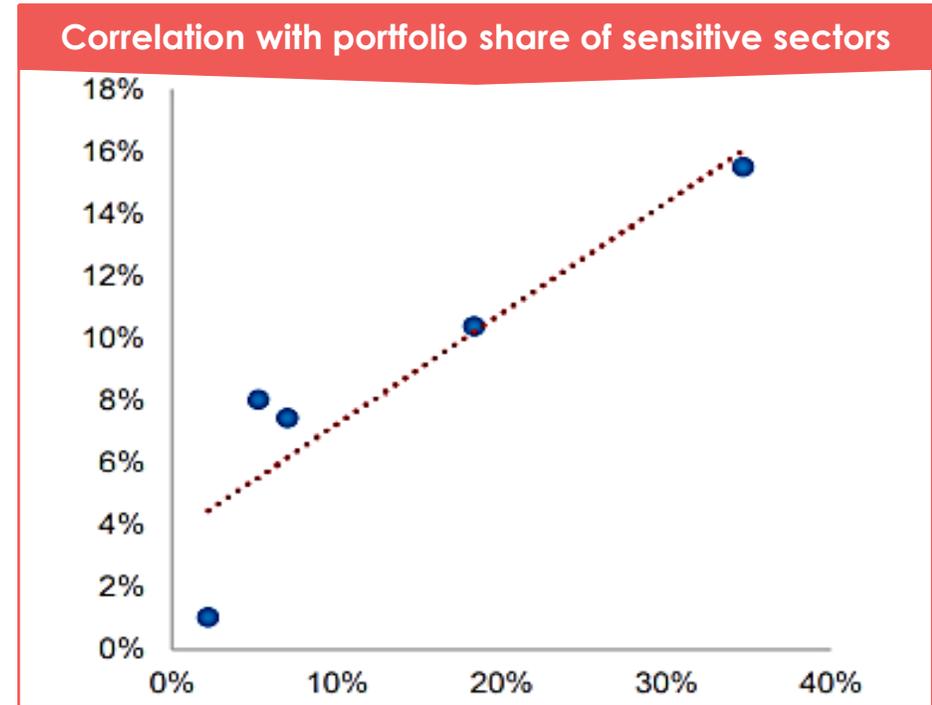
A **significant heterogeneity within any scenario** also appears in the levels of the Cost of Risk for Corporate portfolio



Note:

The crossed-hatched part represents the interquartile range, and the lines extend from the observed minimum to the observed maximum Cost of Risk

The heterogeneity is mainly due to the fact that **Cost of Risk strongly depends on the weight of sensitive sectors** in Corporate portfolio



Note:

rate of change in corporate CoR (x-axis) between the sudden transition scenario and the orderly transition scenario over the time interval 2040-2050 and the share of sensitive sectors in 2025 (y-axis)

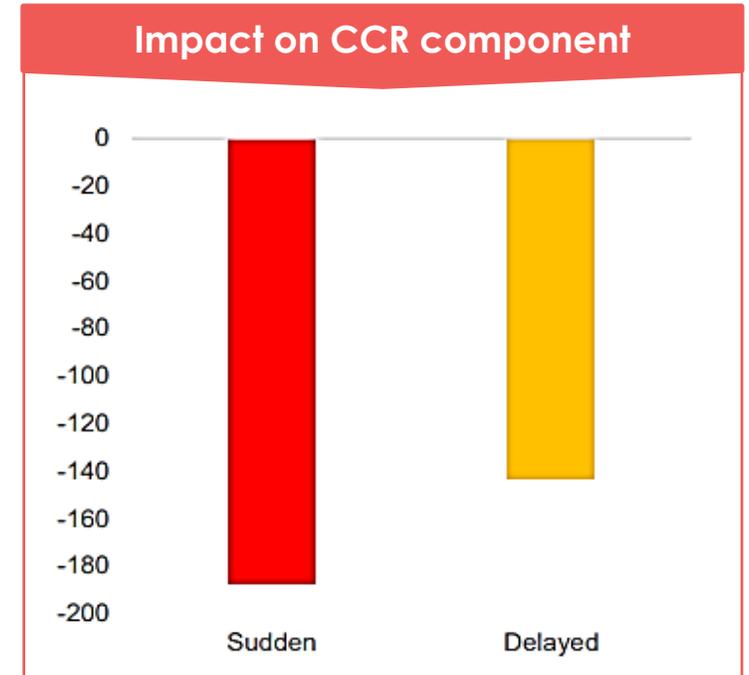
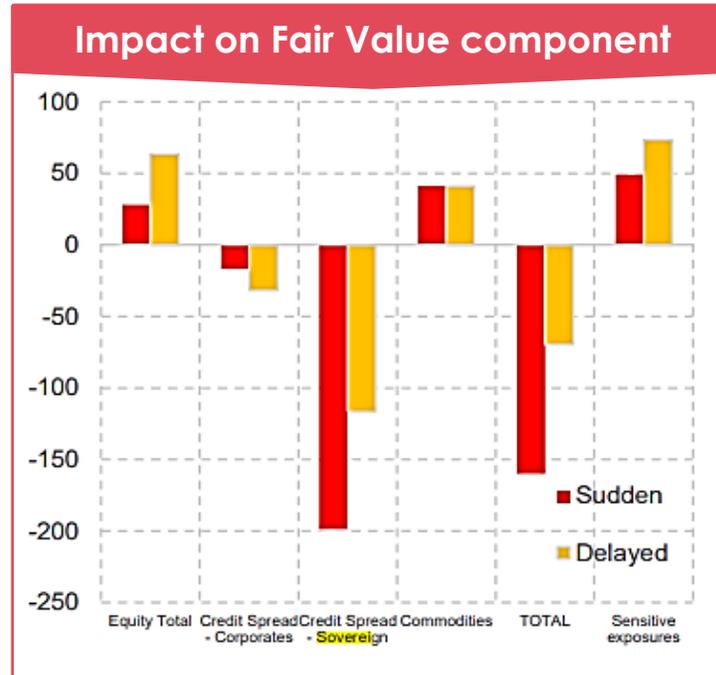
Main Results 7/7

Market Risk

The impact on Market Risk is very low (< 200mln €) on both the two components of Fair Value and CCR

Reasons behind the low impact

- Shocks applied to **small portion of portfolio**
- **Short positions** in sensitive sectors as of Dec 19
- **Operational burden** due to information systems not allowing sectorial analysis, being based on risk factors, this leading to several manual adjustments
- **Lack of understanding** of the underlying narrative of the scenarios



Note:

The significant impact of interest rate positions is not taken into account as it makes the results more difficult to read without these instruments being particularly relevant to the analysis of the transition risk. Sensitive exposures are isolated (not summed up with other contributions) and correspond to equity and bond instruments on the 6 sensitive sectors identified

Sources and Literature

- [01] **ACPR – Banque de France.** [Banque de France main results of pilot Stress exercise climate related.](#) ACPR – Banque de France, 2020.
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- [02] **ACPR – Banque de France.** [Banque de France paper with details on Methodology used to assess Climate risks.](#) ACPR – Banque de France, 2020.
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Company Profile

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This document was prepared in collaboration with Bernardo Rapagnetta and Alessandro Miola, who at the time were working for Iason Consulting.

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