



# Climate Change Risk Management Support

## Results of the 2023 ACPR Stress Test

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A FRESH TAKE ON RISK AND VALUATION



## Introduction

### Summary of ACPR 2023 stress test exercise

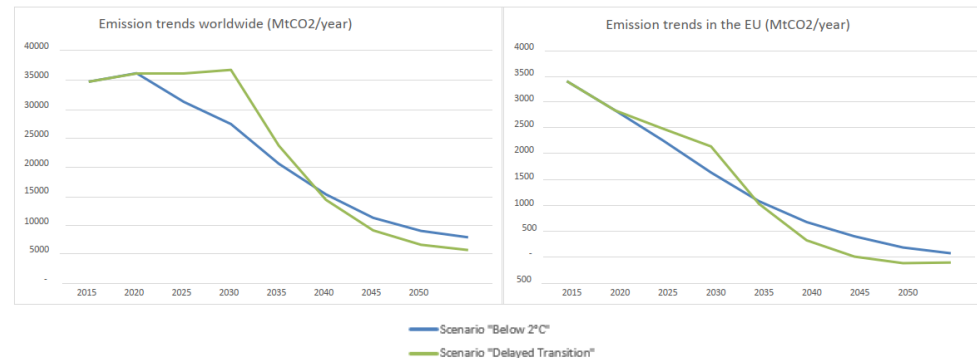
- The challenges linked to climate change are considerable for the **financial sector** including:
  - Facing a significant rise in financial risks linked to **global warming**.
  - Having to play a **decisive role** in financing the transition to a **low-carbon economy**.
- In this context, the Prudential Control and Resolution Authority (ACPR) has a dual mission:
  - Preserve the **stability of the financial system** by ensuring that financial institutions have clearly identified and implemented a framework for managing the climate-related risks that they are exposed to.
  - Contribute to the **establishment of favourable conditions** for **financing an orderly transition** towards a balanced and sustainable economy, in order to effectively combat global warming.
- The ACPR hence conducted a **first pilot climate stress test** exercise in **2020-2021**, which concluded that French **banks and insurance companies** have a “moderate” exposure to risks linked to climate change.
- The ACPR conducted a **second climate exercise** in 2023, restricting its scope to the **insurance sector**.



# Introduction

## Summary of ACPR 2023 stress test exercise

- The ACPR 2023 insurance sector exercise had 22 participants, representing **90% of the French market** based on **balance sheet**.
- The stress test exercise consisted of **one short-term scenario** and **two long-term scenarios**, plus an additional **hypothetical baseline** which represents **no climate change**:
- The **short-term scenario** was developed by the ACPR in collaboration with the Banque de France and considers the time horizon of **2023-2027**, combining:
  - Two acute **physical risk** shocks, **limited to France**:
    - long-lasting episode of drought/heat waves (2023-2024)
    - followed by a localized flood hazard (Q1 2025)
  - A **transition risk** shock, characterized by a drop in asset values, following a sudden correction of financial markets (2025-2027).
- **Two long-term scenarios** were developed by the NGFS (Network for Greening the Financial System), which have **similar levels of exposure to physical risks** and are calibrated so that the probability of reaching a temperature **below 2°C in 2100 stands at 67%**:
  - An **orderly scenario** “Below 2°C” which assumes that **climate policies are introduced immediately** and become gradually more stringent.
  - A **disorderly scenario** “Delayed Transition” which assumes global annual emissions do **not decrease until 2030**. Strong policies are then needed to limit warming to below 2°C. This leads to **higher transition risks** than the orderly scenario.





# Introduction

## Summary of ACPR 2023 stress test exercise

|                              | Long Term   | Short Term  |
|------------------------------|---|---|
| Projections starting point   | 31/12/2022  | 31/12/2022  |
| Scenarios                    | Baseline, Below 2°C & Delayed Transition  | Baseline & Stressed Scenario  |
| Horizon and projection steps | 2025, 2030, 2035, 2040, 2050  | 2023, 2024, 2025, 2026, 2027  |
| Main Assumptions             | <p><b>Dynamic</b> Balance Sheet:</p> <ul style="list-style-type: none"><li>▪ <b>Adjustment of</b> investment and risk management* <b>strategies</b>: premiums increase, reallocation of assets, adjustment of reinsurance cessions, reallocation of activity (by geographical area or by branch of activity).</li><li>▪ On the other hand, <b>contracts retained or acquired</b> during a given financial year <b>must have guarantee levels comparable</b> to those held in the portfolio at the <b>end of 2022</b>.</li></ul> <p>* The ACPR provides assumptions related to impact of premium increases on policyholder demand to allow for the risk of uninsurability.</p> | <p><b>Static</b> Balance Sheet:</p> <ul style="list-style-type: none"><li>▪ No <b>change in portfolio structure</b>, hence excluding management or mitigation actions (renewal of contracts, coupon rate, risk profile according to the same characteristics)</li></ul> |



## Introduction

List of companies having participated to the ACPR 2023 stress test exercise

| Sector       | Non Life                   | Life                  | Mixed                      | Reinsurance |
|--------------|----------------------------|-----------------------|----------------------------|-------------|
| Company Name | ACM IARD                   | ACM VIE               | AEMA                       | SCOR        |
|              | AESIO                      | BNP PARIBAS CARDIF    | AXA                        |             |
|              | ALLIANZ IARD               | BPCE VIE              | CREDIT AGRICOLE ASSURANCES |             |
|              | BPCE ASSURANCE IARD        | CNP ASSURANCE VIE     | GROUPAMA                   |             |
|              | CNP ASSURANCE IARD         | GENERALI VIE          | MAIF                       |             |
|              | GENERALI IARD              | SGAM AG2R LA MONDIALE |                            |             |
|              | GMF ASSURANCES (COVEA)     | SOGECAP               |                            |             |
|              | MAAF ASSURANCES SA (COVEA) |                       |                            |             |
|              | MMA IARD (COVEA)           |                       |                            |             |



# Physical Risk

## Long-Term Scenario

- The acute physical risk is assessed based on the **RCP 4.5\*** scenario of the Intergovernmental Panel on Climate Change (IPCC). The analysis aims to consider the **long-term impact** of the acute **physical risk** through:
  - An increase in the **frequency and intensity of natural disasters**, impacting property damage insurance:
    - The evolution of natural disasters on **property damage** (personal, business and motor) insurers was **assessed by the Caisse Centrale de Réassurance (CCR)**.
  - The **potential effects** of **environmental degradation** on the **population's health**, impacting life insurance, medical expenses and work stoppage benefits:
    - For pollution and vector-borne diseases, **AON provided assumptions** on the evolution of **mortality tables and health costs** by **geographical area** and by **age** of the population.
    - **Average shocks** for the **entire French territory** were also provided to allow for impact calculations without segmenting insurers' liability portfolio.

Figure 1: Breakdown by department of the termination threshold assumption for contracts concluded with individual homeowners

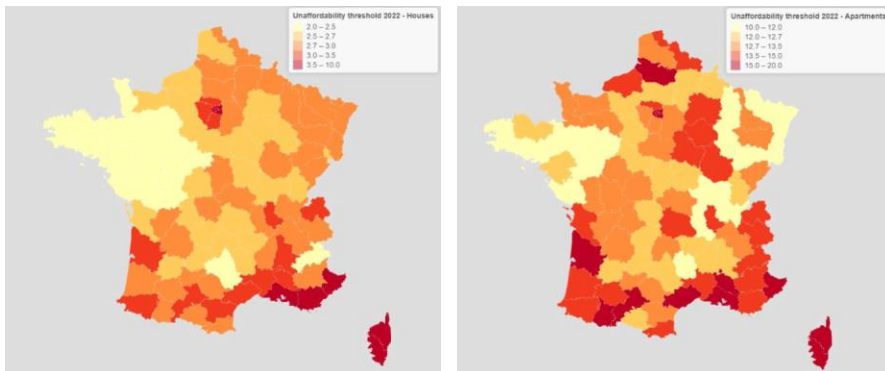
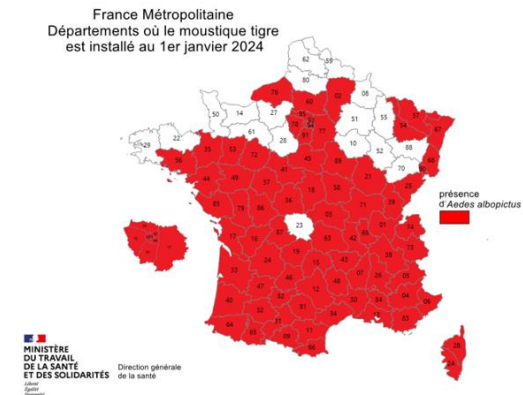


Figure 2: Geographical presence of the Aedes albopictus dengue vector in mainland France in 2022



\* The RCP 4.5 scenario assumes an increase of the global temperature between 0.9°C and 2.0°C by 2050, compared to 1.4°C to 2.6°C by 2050 under RCP 8.5

- For the **short-term scenario**, ACPR defined the following assumptions :
- **Severe droughts in 2023 and 2024**: the episodes of drought and heat waves observed in 2022 would recur.
  - For **non-life** insurance activities (Nat Cat drought peril, agricultural insurance), insurers were able to apply a **loss ratio** which corresponds to that observed or **estimated in 2022**.
  - For **life** insurance activities, **AON provided mortality and healthcare expense assumptions** associated with the **heat waves of 2022**.
- In the first quarter of **2025**, a **localized flood** from the Durance river, generated by **Serre-Ponçon dam failure**:
  - For **non-life** insurance activities, the **impact of the dam failure** was **assessed by the CCR** according to the same procedures as for Nat Cat flood claims in the long-term scenario.
  - For **life** insurance activities, **AON provided mortality rates** at a departmental level. In this context, insurers would be able to simulate their losses via their number of policyholders and capital under risk.

Figure 3 : Map of relative excess mortality during the heatwaves of summer 2022

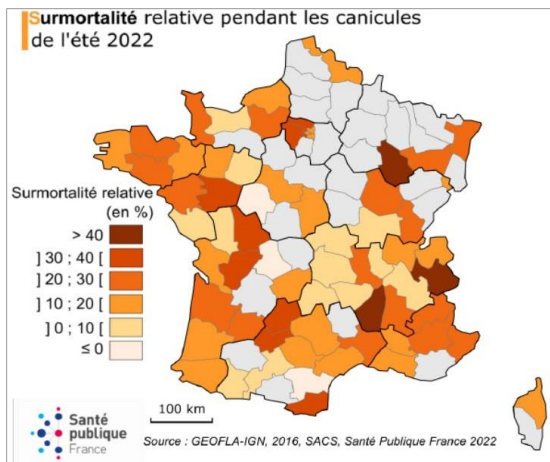


Figure 4 : Drought in France (2023-2024)

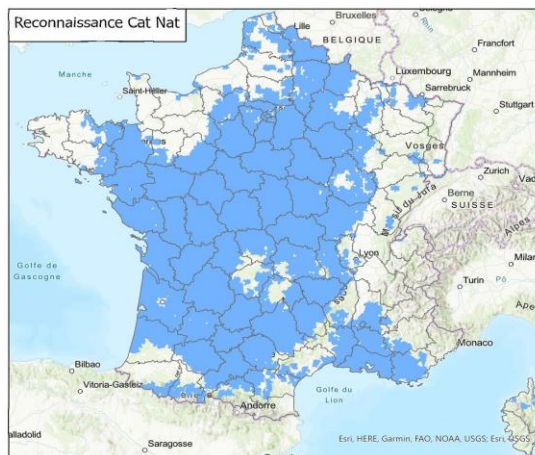
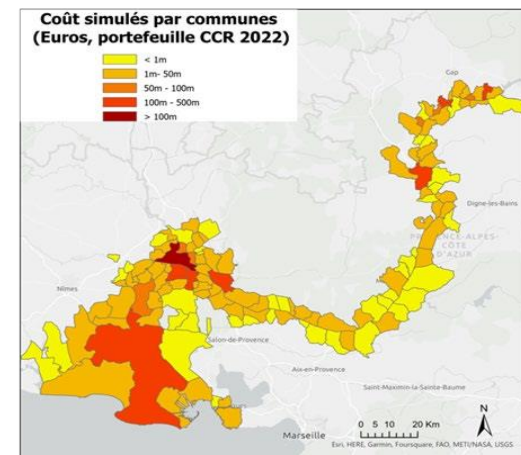


Figure 5 : Localised flood risk due to Heavy rainfall and a dam burst (2025)

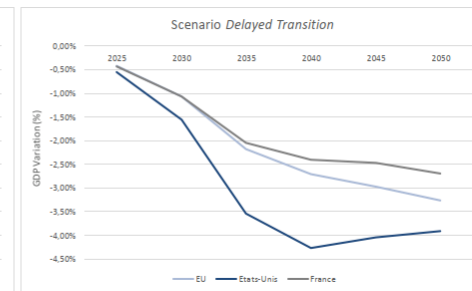
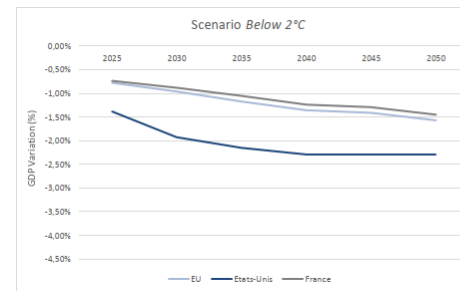
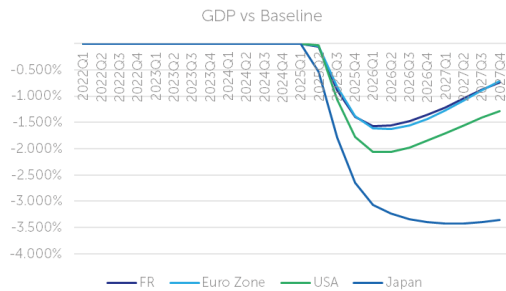




# Transition Risk (Market Risk)

## General approach

- The objective is to capture the **financial impact** of the **devaluation of certain assets** within the framework of **transition policies** or their anticipation, starting in 2025, **following the physical risks observed in 2023 and 2024** (drought, heat waves & flood).
- **Short-term scenario:**
  - Exceptional events hitting France are followed by a sudden adjustment of the financial markets, in anticipation of the rapid implementation of carbon regulations in several major economies
  - Euro area **GDP** falls by **1.6%**, by the end of the first year following the shock. Inflation is also falling in this recessionary context.
- **Long-term scenarios:**
  - **Below 2°C:** thanks to a growing awareness that has led to the early adoption of environmental regulations; variations in **GDP** level do not fall below **-2.5%** in all the geographical areas.
  - **Delayed Transition:** following the sharp increase in carbon prices starting in 2030, **GDP** drops as low as **-4.3%** in the United States in 2040 and reach **-3.3%** in Europe by 2050.







## Transition Risk (Market Risk)

### General approach

- **No distinction in methodology** between short-term and long-term scenarios.
- Insurers' **bond and equity** portfolios were valuated at **market value** for each of the proposed scenarios, following Solvency 2 principles.
- Insurers would need to **assess** and provide a **breakdown** of their **asset portfolios** based on the different long-term and short-term scenarios, **by type of security and investment sector**.
  - It was not necessary to enter data for each individual asset. The minimum required granularity was the nature of assets by sector of activity.
  - Further segmentation could be based on the country where the asset is issued.
  - The type of shares (listed, unlisted) could also be specified.
  - Transparency of investments fund was not required.
  - Asset reallocation decisions would be integrated based on the dynamic nature (in long-term scenarios) or static nature (in the short-term scenario) of the projections.



## Transition Risk (Market Risk)

Financial Variables to be shocked

|                                      | Long-Term   | Short-Term   | Granularity                             |
|--------------------------------------|---|--|---|
| Equities                             | Shocks provided in the assumption tables            | Shocks provided in the assumption tables                         | Country x GICS Code / NACE Group x Year |
| Bonds, Derivatives                   | Shocks provided in the assumption tables            | Shocks provided in the assumption tables                         | Country x GICS Code x Year x Maturity   |
| Real Estate                          | Shocks provided in the assumption tables            | Use of the shock on <b>Real Estate subsector of the Equities</b> | Country x Region (France only) x Year   |
| Other Assets (deposits, loans, etc.) | Must remain constant, multiplying by inflation only | Shocks provided in the assumption tables                         |   |

*NB: A mapping table between NACE code, NACE Group and GICS code is provided by ACPR*



## Transition Risk (Market Risk)

List of Stressed Variables provided by ACPR

|                         | Long Term                                      | Short Term                            |
|-------------------------|--|---------------------------------------|
| Gross Domestic Product  | Country x Year                                 | Country x Quarter                     |
| Unemployment            | Country x Year                                 | Country x Quarter                     |
| Inflation               | Country x Year                                 | Country x Quarter                     |
| Public Debt             | Country x Year                                 | Not applicable                        |
| Budget Deficit          | Country x Year                                 | Not applicable                        |
| Carbon Price            | Country x Year                                 | Not applicable                        |
| Oil Price               | Year   | Not applicable                        |
| Insured Values          | Country x NACE Group x Year                    | Not applicable                        |
| Gross Revenue           | Country x NACE Group x Year                    | Not applicable                        |
| Real Estate             | Country x Region (only France) x Sector x Year | Not applicable                        |
| Sovereign Yields        | Country x Year x Maturity                      | Country x Year x Maturity             |
| EIOPA Rates (VA / noVA) | Year x Maturity                                | Year x Maturity                       |
| Corporate Spread        | Country x GICS Code x Year x Maturity          | Country x GICS code x Year x Maturity |
| Equities                | Country x NACE Group x Year                    | Country x GICS code x Year            |

**NB: A mapping table between NACE code, NACE Group and GICS code is provided by ACPR**



## Results

### SCR capital coverage ratio | Short-Term Scenario

- A **significant decrease** in the SCR capital coverage ratio is observed, mainly due to the **impact of the financial shock**.

Figure 6 : SCR coverage ratio by scenario and years (in %)

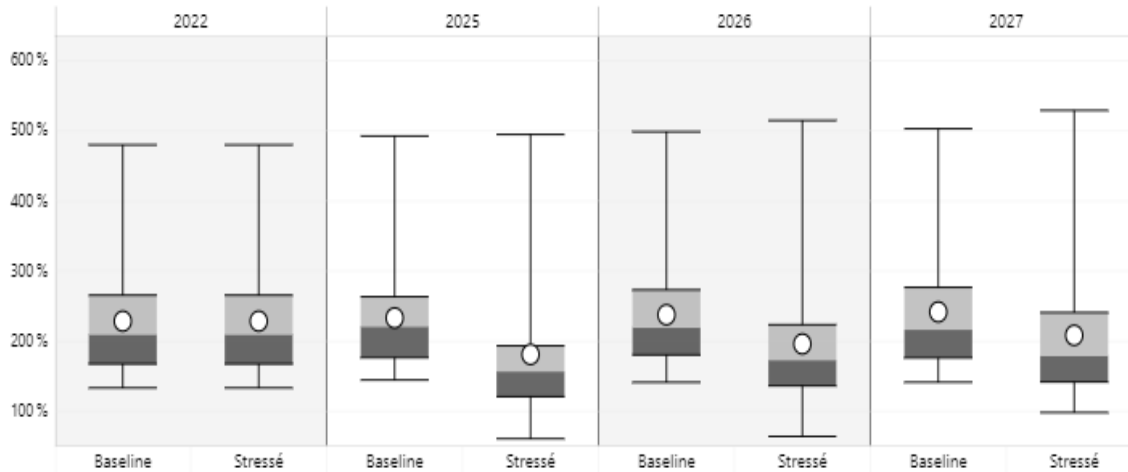
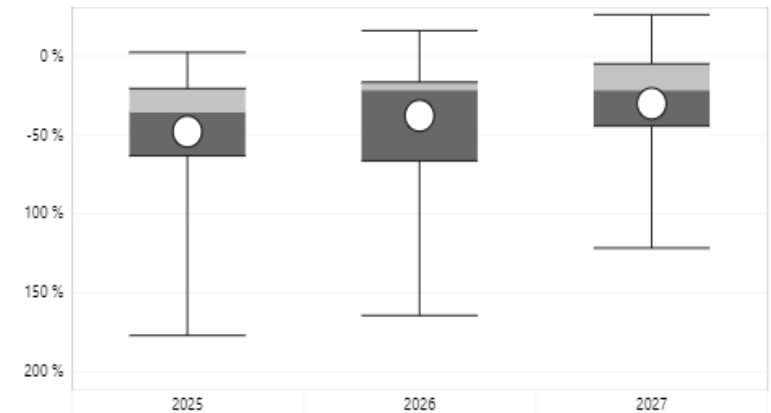


Figure 7 : Distribution of the Relative Difference Between the Reference RAS Ratio and the Adversarial RAS Ratio, by Organization and Year (%)



Source : Les principaux résultats de l'exercice climatique sur le secteur de l'assurance, APCR 2024

- Starting in 2025, the shocked **coverage ratios** deviate by an average of **-48 points** with **25% of organizations** experiencing a loss of more than **-63 ratio points**.

**NB:** This is primarily due to a **significant decrease in own funds** (-28% in 2025) rather than an **increase in the SCR** (+9% in 2025).



# Results

## Financial Impact | Short-Term Scenario

- The financial shock associated with transition risk directly affects the economic value of investments on the assets side of insurers' balance sheets.
  - In 2025, the value of **equities** and **real estate** assets drop by **27%** and **32%** respectively.
  - Due to **contagion** effects, **government and corporate bonds** lose an average of **8%** of their value.
- The **overall investments value** drop by approximately **13%** in **2025**.

Figure 8 : Total investments by asset class (in € billion)

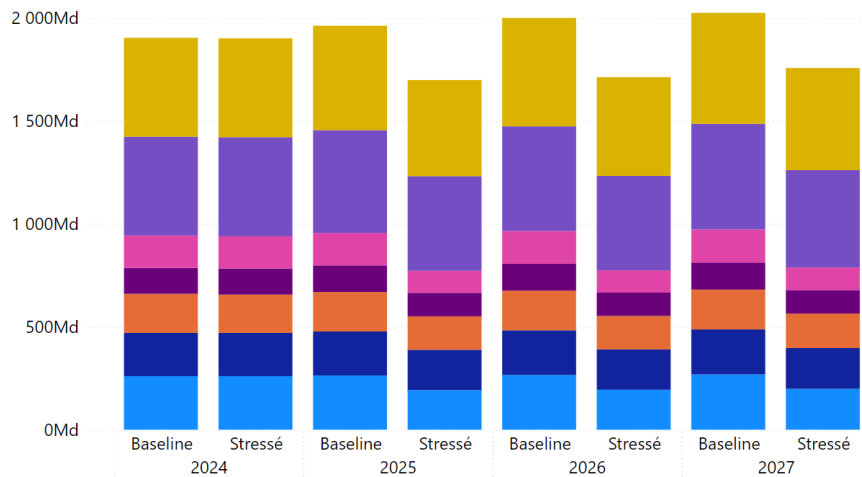
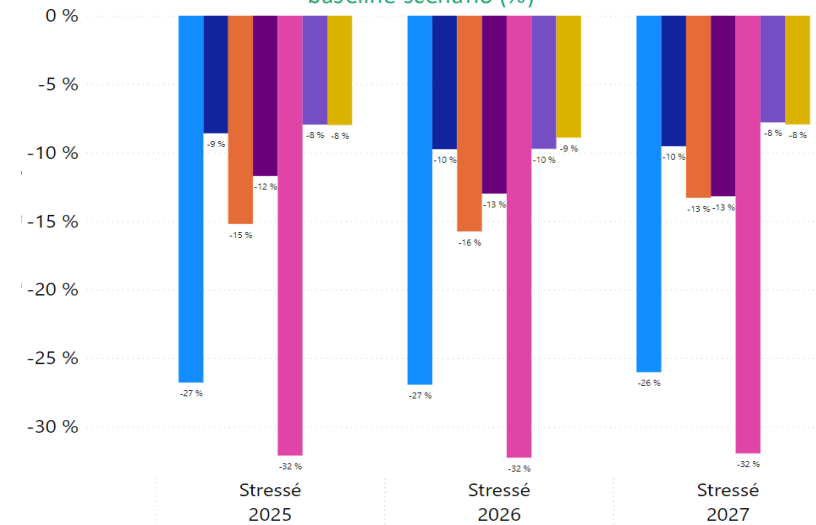


Figure 9 : Change in the value of asset classes relative to the baseline scenario (%)



● Actions et fonds assimilés ● Autres ● Autres fonds ● Fonds obligataires ● Immobilier et fonds assimilés ● Obligations d'entreprise et assimilés ● Obligations souveraines et assimilés

Source : Les principaux résultats de l'exercice climatique sur le secteur de l'assurance, APCR 2024



# Results

## Financial Impact | Long-Term Scenario

- The impairment loss of **total investments** is **-3%** in the **Below 2°C** scenario and **-3.5%** in the **Delayed transition** scenario.
  - **In 2035, equities and real estate** assets decrease in value by **7%**, and by **10%** in **2050**.
  - **Government and corporate bonds** lose an average of **less than 4%** of their value.
- The proportions of each **asset class** remain relatively **stable over time** and across scenarios, aligning with the minor changes observed.

Figure 10 : Share of Investments by Asset Class, Scenario and Year (%)

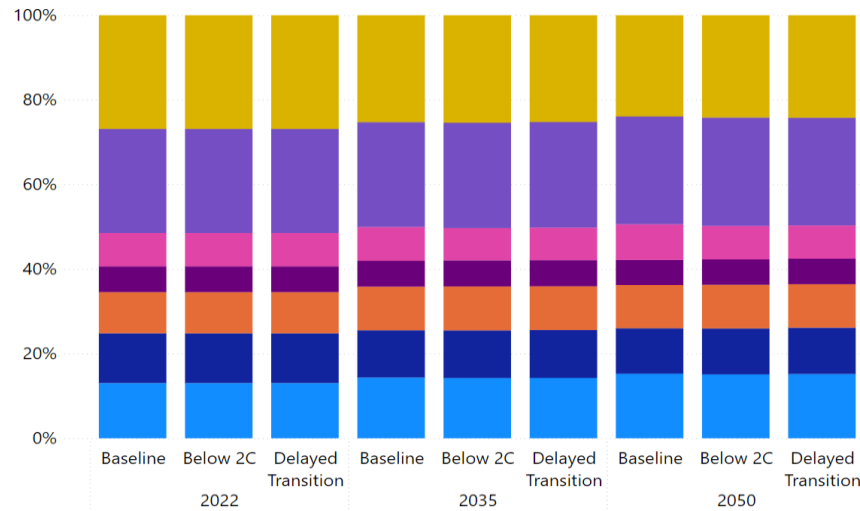
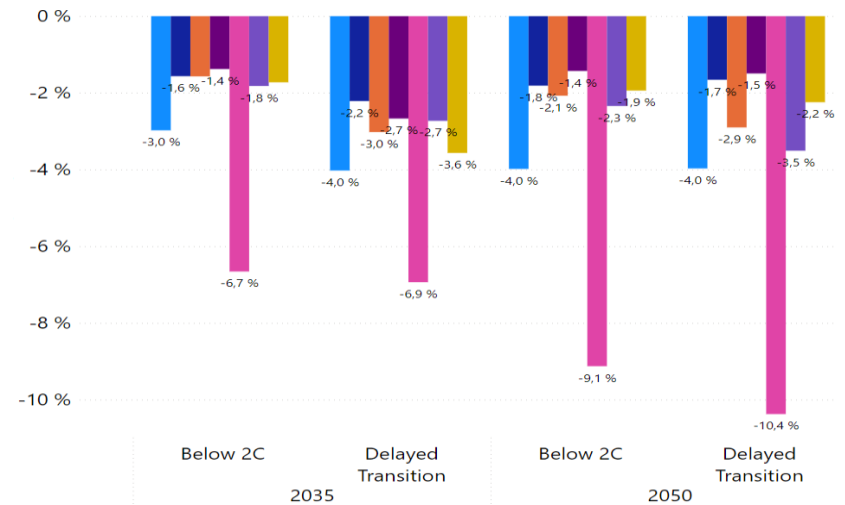


Figure 11 : Baseline change in asset class values in 2035 and 2050, by transition scenario (%)



● Actions et fonds assimilés ● Autres ● Autres fonds ● Fonds obligataires ● Immobilier et fonds assimilés ● Obligations d'entreprise et assimilés ● Obligations souveraines et assimilés

Source : Les principaux résultats de l'exercice climatique sur le secteur de l'assurance, APCR 2024



# Results

## Nat Cat Claims | Short-Term Scenario

- In mainland France, the gap in total claims between the adverse scenario and the reference scenario is:
  - +€1.5 billion (i.e. **+86%**) in **2023**
  - +€2.23 billion (i.e. **+128%**) in **2024**
  - +€3.51 billion (i.e. **+141%**) in **2025** (year of the dam failure)

Table 1 : Key figures for claims (in % and €bn)

| Year | Event           | Adverse Scenario<br>(amounts and % compared to 2022) |               |                | Baseline Scenario<br>(amounts and % compared to 2022) |               |                | Loss Differences<br>(Adverse scenario – Baseline scenario) |               |                |
|------|-----------------|--|---------------|----------------|---|---------------|----------------|--|---------------|----------------|
|      |                 | Claims Total   | Claims Floods | Claims Drought | Claims Total  | Claims Floods | Claims Drought | Claims Total   | Claims Floods | Claims Drought |
| 2022 | Baseline        | 2,24 €bn   | 0,38 €bn      | 1,68 €bn       | 2,24 €bn  | 0,38 €bn      | 1,69 €bn       |  |               |                |
|      |                 | 100 %  | 100 %         | 100 %          | 100 %   | 100 %         | 100 %          |  |               |                |
| 2023 | Severe Droughts | 3,37 €bn   | 0,63 €bn      | 2,66 €bn       | 1,82 €bn  | 0,51 €bn      | 1,27 €bn       | 1,56 €bn   | 0,12 €bn      | 1,39 €bn       |
|      |                 | 150 %  | 166 %         | 159 %          | 81 %  | 133 %         | 75 %           | 86 %   | 24 %          | 109 %          |
| 2024 | Severe Droughts | 3,96 bn  | 0,64 €bn      | 3,24 €bn       | 1,74 €bn  | 0,52 €bn      | 1,19 €bn       | 2,23 €bn   | 0,13 €bn      | 2,05 €bn       |
|      |                 | 177 %  | 168 %         | 193 %          | 77 %  | 135 %         | 70 %           | 128 %  | 25 %          | 173 %          |
| 2025 | Dam Failure     | 6,0 €bn  | 4,35 €bn      | 1,57 €bn       | 2,49 €bn  | 1,2 €bn       | 1,25 €bn       | 3,51 €bn   | 3,15 €bn      | 0,32 €bn       |
|      |                 | 267 %  | 1138 %        | 93 %           | 111 %   | 313 %         | 74 %           | 141 %  | 262 %         | 25 %           |

Source : Les principaux résultats de l'exercice climatique sur le secteur de l'assurance, APCR 2024

- The excess claims observed in the adverse scenario are distributed very unevenly across mainland France due to:
  - Varying **assumptions and insured values** for drought-related claims in **different geographical areas**;
  - The highly localised **nature of dam failure** in a specific region for the flood risk.



# Results

## Nat Cat Claims | Long-Term Scenario

- In mainland France, regarding total claims, we observe the following for the adverse scenario:
  - +105.3%** between **2022 and 2050**
  - +42%** in **2050** compared to the **baseline scenario** (+39.7% for drought and +44% for floods).

Table 2: Key figures for claims (in % and €bn)

| Year | Adverse Scenario<br>(amounts and % compared to 2022) |               |                |                   | Baseline Scenario<br>(amounts and % compared to 2022) |               |                |                   | Loss Differences<br>(Adverse scenario – Baseline scenario) |               |                |                   |
|------|--|---------------|----------------|-------------------|---|---------------|----------------|-------------------|--|---------------|----------------|-------------------|
|      | Claims Total   | Claims Floods | Claims Drought | Claims Submersion | Claims Total  | Claims Floods | Claims Drought | Claims Submersion | Claims Total   | Claims Floods | Claims Drought | Claims Submersion |
| 2022 | 2,24 €bn   | 0,38 €bn      | 1,68 €bn       |                   | 2,24 €bn  | 0,38 €bn      | 1,68 €bn       |                   |  |               |                |                   |
|      | 100 %  | 100%          | 100 %          |                   | 100 %   | 100%          | 100 %          |                   |  |               |                |                   |
| 2025 | 1,9 €bn  | 0,55 €bn      | 1,31 €bn       | 0,01 €bn          | 1,82 €bn  | 0,53 €bn      | 1,25 €bn       | 0,01 €bn          | 0,07 €bn   | 0,02 €bn      | 0,05 €bn       | 0,001 €bn         |
|      | 84,49 %  | 143,77 %      | 77,81 %        | 100 %             | 81,23 %   | 139,13 %      | 74,58 %        | 100 %             | 4,01 %   | 3,36 %        | 4,35 %         | 11,57 %           |
| 2035 | 2,72 €bn   | 0,82 €bn      | 1,83 €bn       | 0,02 €bn          | 2,31 €bn  | 0,69 €bn      | 1,57 €bn       | 0,01 €bn          | 0,41 €bn   | 0,13 €bn      | 0,27 €bn       | 0,01 €bn          |
|      | 121,43 %   | 214,88 %      | 109,30 %       | 196,53 %          | 103,06 %  | 179,81 %      | 93,43 %        | 133,02 %          | 17,82 %  | 19,53 %       | 17,01%         | 64,84 %           |
| 2050 | 4,61 €bn   | 1,43 €bn      | 3,03 €bn       | 0,04 €bn          | 3,25 €bn  | 0,99 €bn      | 2,17 €bn       | 0,02 €bn          | 1,35 €bn   | 0,44 €bn      | 0,86 €bn       | 0,02 €bn          |
|      | 205,33 %   | 373,71 %      | 180,31 %       | 425,96 %          | 144,96 %  | 259,66 %      | 129,13 %       | 203,80 %          | 42 %   | 43,95 %       | 39,68 %        | 133,19 %          |

Source : Les principaux résultats de l'exercice climatique sur le secteur de l'assurance, APCR 2024

- The excess claims observed in the adverse scenario is spread in a very **heterogeneous way** over mainland France due to:
  - different **assumptions and insured values** for drought-related claims in **different geographical areas**;
  - the very localized **local nature of floods, drought and submersion** perils.





# Results

## Nat Cat Claims | Short-Term Scenario

- In the adverse scenario, the technical result in 2025 represents **-400%** of premiums **without reinsurance** and **-239%** **with reinsurance**.
- Although reinsurance allows insurers to **transfer some risks** to reinsurers, it remains **insufficient** to offset the excess claims caused by **acute perils**. However:
  - **Nat Cat insurance is never a standalone product**; it is always included in insurance policies that cover other property damage risks.
  - The **increase** in the **Nat Cat surcharge** from 12% to 20%, adopted in December 2023 and effective January 2025, has **not been considered** in this ACPR exercise.

Figure 12 : Nat Cat technical result in % of premiums, without reinsurance (adverse scenario)

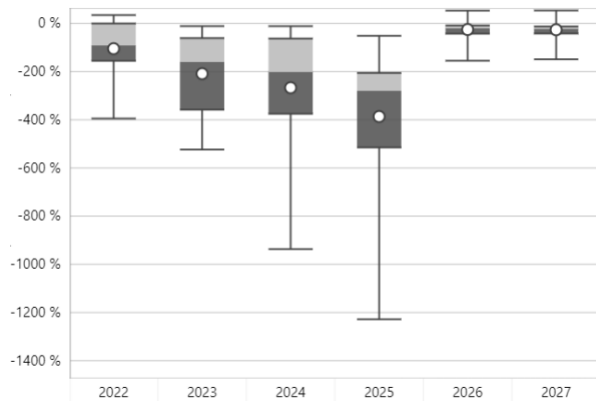


Figure 13 : Nat Cat technical result in % of premiums, with reinsurance (adverse scenario)

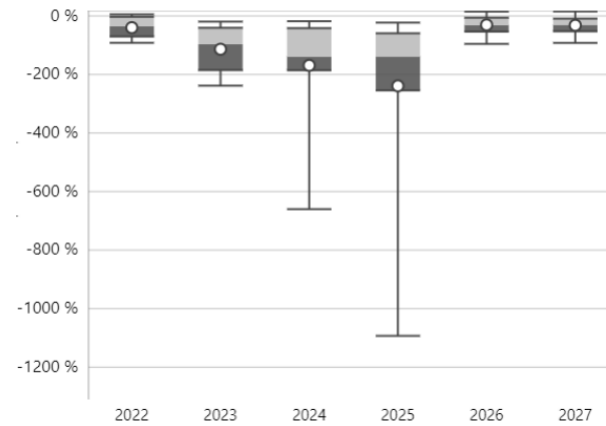
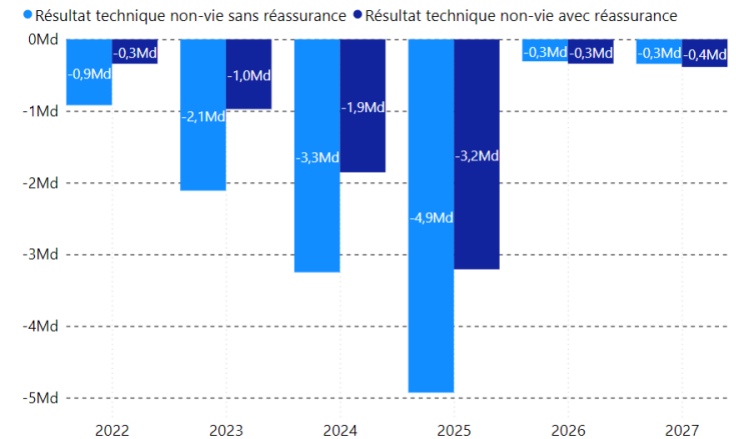


Figure 14 : Nat Cat technical result with and without reinsurance (adverse scenario)



Source : Les principaux résultats de l'exercice climatique sur le secteur de l'assurance, APCR 2024



# Results

## Nat Cat Claims | Long-Term Scenario

- In the adverse scenario, the technical result in 2050 represents **-35%** of premiums **without reinsurance** and **-20%** with reinsurance.
- Although reinsurance allows insurers to **transfer some risks** to reinsurers, it remains **insufficient** to offset the excess claims caused by **acute perils**. However :
  - **Nat Cat insurance is never a standalone product**; it is always included in insurance policies that cover other property damage risks.
  - The **increase** in the **Nat Cat surcharge** from 12% to 20%, adopted in December 2023 and effective January 2025, has **not been considered** in this ACPR exercise.

Figure 15 : Nat Cat technical result in % of premiums, without reinsurance (adverse scenario)

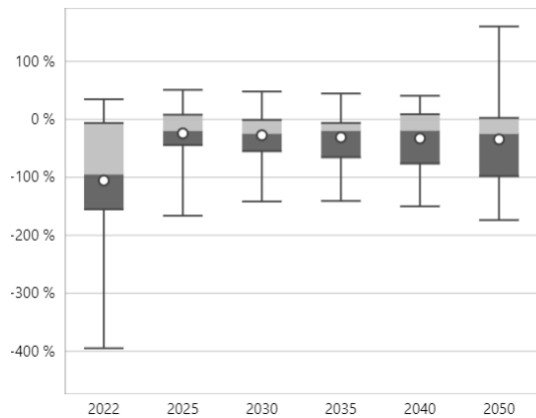


Figure 16 : Nat Cat technical result in % of premiums, with reinsurance (adverse scenario)

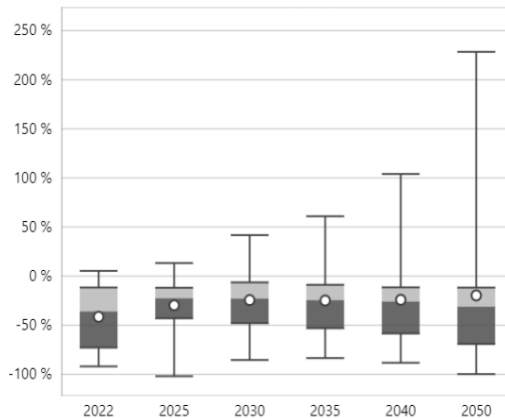
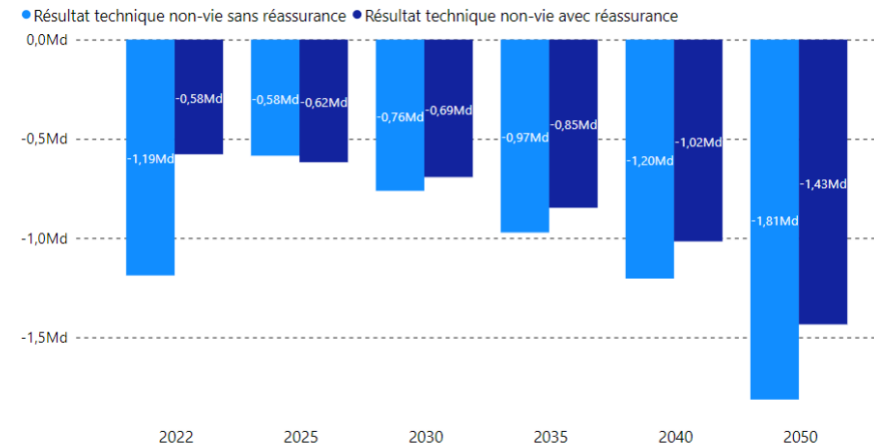


Figure 17 : Nat Cat technical result with and without reinsurance (adverse scenario)



Source : Les principaux résultats de l'exercice climatique sur le secteur de l'assurance, ACPR 2024



## Conclusion

### General insights

- Regarding the scenarios used, the **Delayed Transition** scenario is still **not sufficient** to **generate strategic changes** or adequate awareness, leading to a potential **underestimation of the impacts of climate change** on financial stability.
- Additionally, some insurers have noted that the **significant difference** between the **stress tests time horizon** (2050) and their usual **business planning horizon** (3-5 years) constitutes a **challenge for effectively integrating climate risks into their decision-making processes**. This disparity affects certain methodological choices and the few management decisions considered in the projections.
- Participants in the exercise also believe they will **not face any specific difficulty in accessing reinsurance** in 2025. Therefore, the question of risk transfer remains to be explored.
- Supervisors and insurers must continue to **improve the methodology and granularity of their analyses**.
- Despite these challenges, climate stress tests are a valuable tool for **assessing the financial system resilience to climate risks**.



## Contact

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