XIII CONGRESSO NAZIONALE DEGLI ATTUARI

INNOVAZIONE TECNOLOGICA E RISCHI SISTEMICI: L'ATTUARIO VALUTATORE GLOBALE DELL'INCERTEZZA

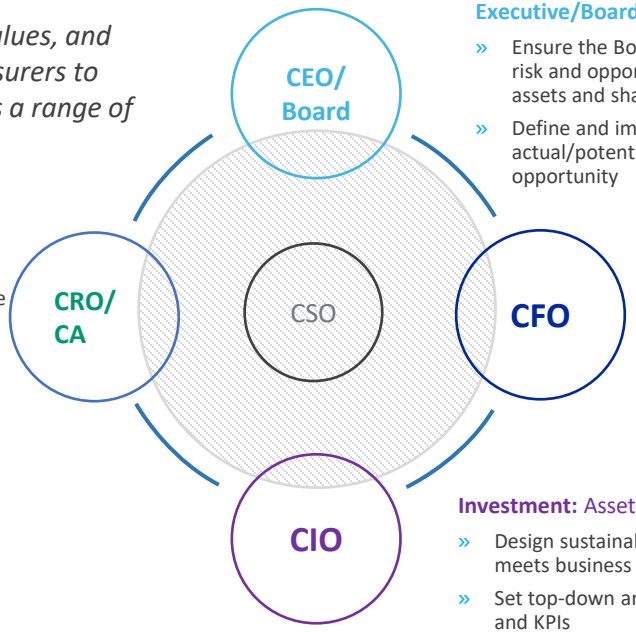
ROMA
10-12 Novembre 2021

Assessing the financial impact of climate risk and implication for ORSA

Domenico Brambati, Moody's Analytics

Climate Risk: A Challenge For Everybody

External scrutiny, corporate values, and financial impact are driving insurers to address new challenges across a range of business functions



Executive/Board: Strategy and governance

- Ensure the Board can provide oversight of climate-related risk and opportunity, and perform fiduciary duty to protect assets and shareholders against climate risk
- Define and implement business strategy that considers the actual/potential impact of climate risk and business opportunity

Risk/Actuarial: Risk identification, regulatory stress testing, and capital

- Risk identification relating to climate risk
- Measure climate risk in economic/regulatory capital
- Perform risk assessment via ORSA
- Monitor climate-related risk to business solvency and capital
- Implement risk mitigation accounting for climate risk

Finance: Regulatory and financial reporting

- Ensure regulatory and financial reporting includes impact on climate risk
- Produce and monitor business plan aligned with business strategy that reflects the impact from climate risk

Investment: Asset allocation, security selection

- Design sustainable and Green investment strategy that meets business objectives
- Set top-down and bottom-up ESG and climate metrics and KPIs
- Ensure the investment team can report climate risk on investment portfolios by incorporating ESG climate data into SAA and investment selection

Climate Change: A Complex Risk

- There are two common types of risks:
  - **Transition risks**—permanent shifts driven by changes in policy and regulation, development in technology, consumer preferences
  - **Physical risks:**
    - **Acute physical risks**—shocks due to an increased number of extreme weather events e.g. wildfires
    - **Chronic physical risks**—long-term systemic (not diversifiable) shifts e.g. temperature
- Underlying these two types of risks and the balance between them is **scientific and socioeconomic uncertainty:**
  - Future development of emissions driven by factors such as population and income growth
  - Degree of warming and climate disruption remains uncertain

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How can insurers address these risks?

Modelling Physical and Transition Risk Scenarios

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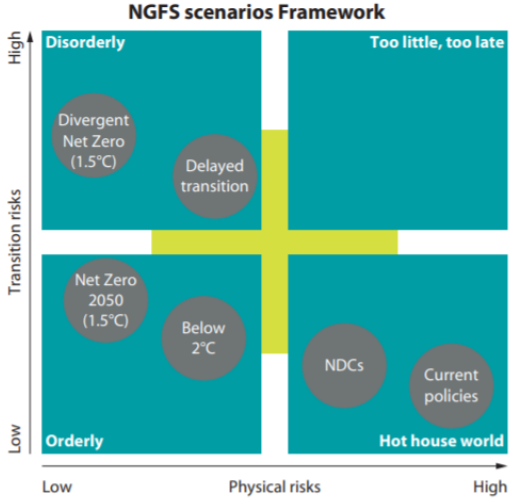
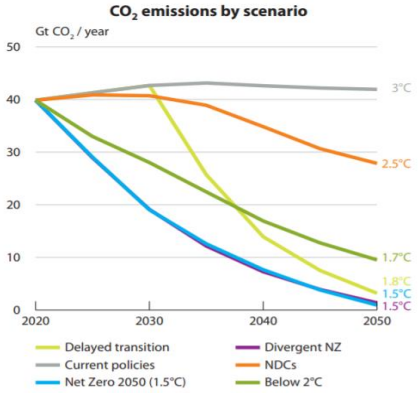


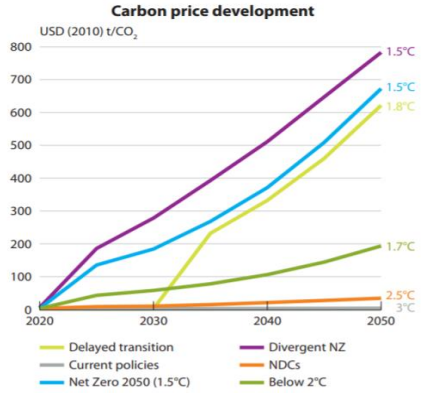
Positioning of scenarios is approximate, based on an assessment of physical and transition risks out to 2100.

Network for Greening the Financial System (NGFS): a group of 66 central banks and supervisors and 13 observers committed to sharing best practices, contributing to the development of climate and environment-related risk management in the financial sector and mobilising mainstream finance to support the transition towards a sustainable economy.

- **Disorderly**: response is disruptive but sufficient to meet climate goals
- **Orderly**: we start reducing emissions now in a measured way to meet climate goals
- **Hot house world**: we do little to avert the physical risk
- **Too little too late**: we don't do enough to meet climate goals



Source: IIASA NGFS Climate Scenarios Database, REMIND model. End of century warming outcomes shown.



Source: IIASA NGFS Climate Scenarios Database, REMIND model. Carbon prices are weighted global averages. End of century warming outcomes shown.

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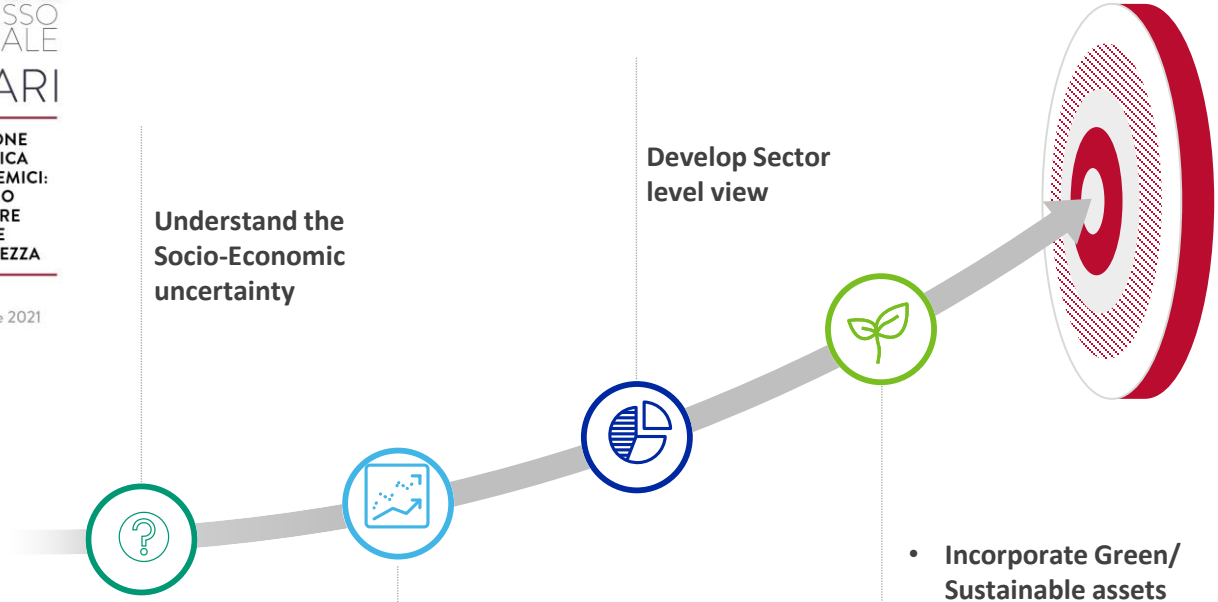
Quantitative Climate Based ORSA

Own Risk and Solvency Assessment (ORSA: a set of processes constituting a tool for **decision-making** and **strategic analysis**. It aims to assess the overall solvency needs related to the **specific risk profile of the insurance company** (*source Wikipedia*)



Climate Aware ORSA

Claim: companies can't ignore climate risk going forward

Understand the Socio-Economic uncertainty

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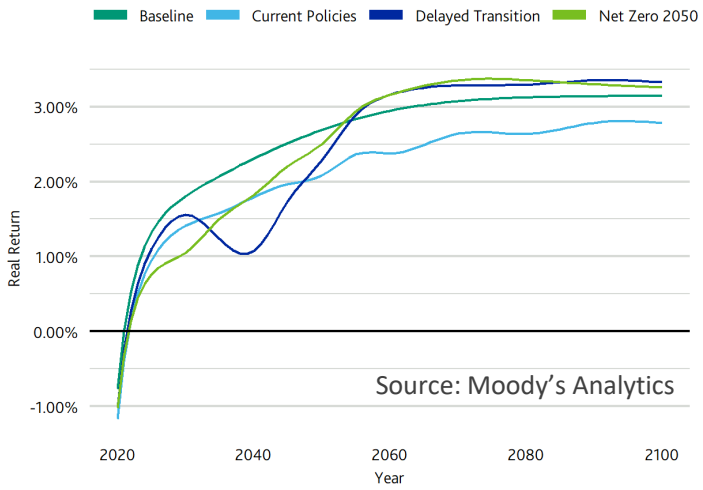
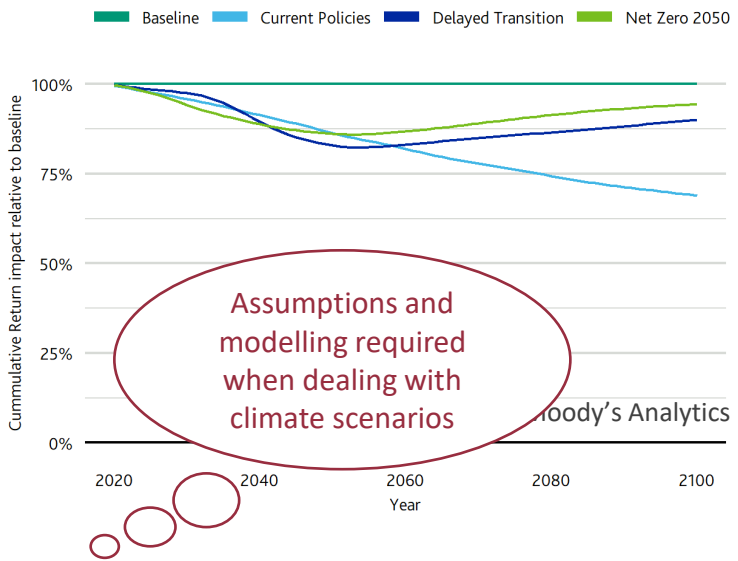
Real returns on a diversified portfolio





Focus on the climate's impact on consumption:

$$Consumption = GDP - Policy\ costs - Physical\ damages - Other\ investment$$

Then obtain real returns, following Nordhaus, via the Ramsey rule:

$$real\ return = pure\ time\ preference + relative\ risk\ aversion \times change\ in\ per\ capita\ consumption\ growth$$

Sector Costs

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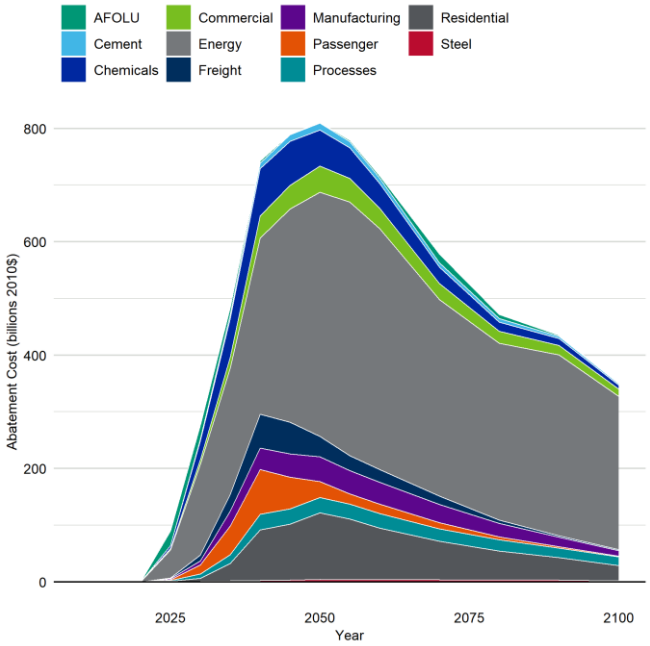
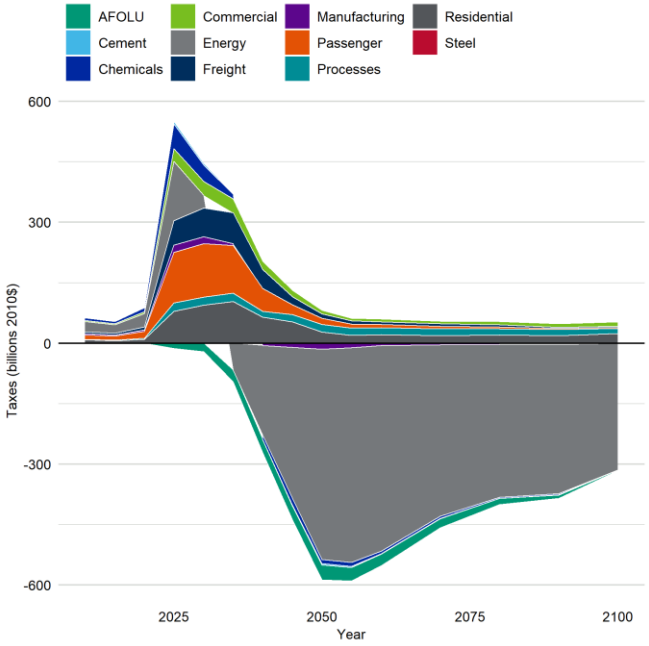
Emissions and abatement costs by sector, Europe Net Zero 2050



Source: Moody's Analytics



Source: NGFS

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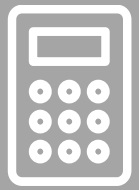
Climate Calibration Process

Select Climate Scenarios

NGFS/IPCC aligned climate scenarios for 1.5°C, 2°C or hot house scenarios with early or late policy action

Translate Macroeconomic Impact

Policy costs, via carbon taxes, and physical damages drive changes in GDP and consumption growth



Calculate Financial Returns

Convert macroeconomic impact into key financial variables

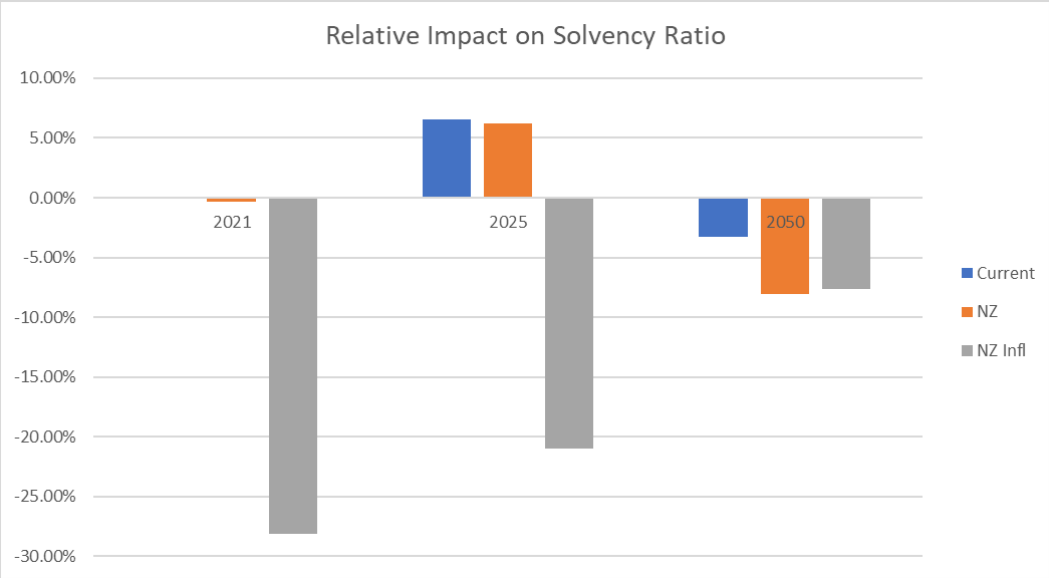
Set Calibration Targets

Decompose real returns to set expected paths for short rate, long rate, credit spreads and asset risk premia

Generate Scenario Sets

Calibrate and run a Scenario Generator to produce deterministic or stochastic scenario sets

Impact on Solvency Position



Source: Moody's Analytics

- Climate Scenarios could materially impact companies' solvency position
- The impact isn't necessarily adverse, it can be beneficial

- Theoretical Italian company holding one single product (with minimum guarantee)
- Scenarios calibrated on current Italian market conditions + projection assumptions
- NZ = Net Zero Emission reached by 2050, no impact on inflation
- NZ Infl = NZ + Inflation Modelling