Course 2023-2024 in Sustainable Finance

Lecture 15. Climate Stress Testing and Risk Management

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¹The opinions expressed in this presentation are those of the authors and are not meant to represent the opinions or official positions of Amundi Asset Management.
Agenda

- Lecture 1: Introduction
- Lecture 2: ESG Scoring
- Lecture 3: Impact of ESG Investing on Asset Prices and Portfolio Returns
- Lecture 4: Sustainable Financial Products
- Lecture 5: Impact Investing
- Lecture 6: Engagement & Voting Policy
- Lecture 7: Extra-financial Accounting
- Lecture 8: Awareness of Climate Change Impacts
- Lecture 9: The Ecosystem of Climate Change
- Lecture 10: Economic Models & Climate Change
- Lecture 11: Climate Risk Measures
- Lecture 12: Transition Risk Modeling
- Lecture 13: Climate Portfolio Construction
- Lecture 14: Physical Risk Modeling
- Lecture 15: Climate Stress Testing & Risk Management
Transmission channels

**Figure 1:** Publication of the Basel Committee on climate-related financial risks (2021)
Transmission channels

Figure 2: Publication of the Basel Committee on climate-related financial risks (2022, 2023)

Basel Committee on Banking Supervision

Principles for the effective management and supervision of climate-related financial risks
June 2022

Basel Committee on Banking Supervision

Working Paper 40

The effects of climate change-related risks on banks: a literature review
by Olivier de Bandt, Laura-Chloé Kuntz, Nora Pankratz, Fulvio Pegoraro, Haakon Solheim, Greg Sutton, Azusa Takeyama and Dora Xia
December 2023
Direct and indirect transmission
Systemic risk
Financial regulation

Figure 3: Campiglio et al. (2018)
Figure 4: Impact on the trading book
Commodity market
Climate value-at-risk
Figure 5: ESRB (2021), Climate-related Risk and Financial Stability
Mortgage portfolios
Loan portfolios
<table>
<thead>
<tr>
<th>Market risk</th>
<th>Credit risk</th>
<th>Stress testing</th>
<th>Mortgage and loan portfolios</th>
<th>Bond portfolios</th>
<th>Capital requirements</th>
</tr>
</thead>
</table>

Bond pricing
Structural models
Default barrier models
CDS pricing
Bond portfolios
Introducing climate risk into risk-weighted assets
A climate stress-test of the financial system

Stefano Battiston1,2, Antoine Mandel1, Irene Monasterolo3, Franziska Schütze4, and Gabriele Visentin5

The urgency of estimating the impact of climate risks on the financial system is increasingly recognized among scholars and practitioners. By adopting a network approach to financial dependencies, we develop a novel methodology and apply it to large Euro Area financial systems, including banks, pension funds, and insurance companies. We find that climate shocks can lead to substantial changes in the value of financial assets, with the magnitude of impacts depending on the timing and stability of climate policies. Our results highlight the importance of addressing climate risks in a timely and structured manner, as the financial system is currently seen as one of the most urgent and pressing policy issues. In particular, there is a debate on whether the implementation of climate policies can lead to a 2°C target, given the risks associated with non-linearity and uncertainties. This implies that the financial system should be prepared for both a smooth transition and abrupt changes in the economic landscape. We develop a network-based stress-test methodology and apply it to large Euro Area financial systems. Our results suggest that climate policy risk matters. As an early and stable policy framework would allow for smooth asset value adjustments and lead to potential net winners and losers, in contrast, a late and abrupt policy framework could have adverse systems consequences.
Earnings’ risk
Figure 7: Climate risk stress test
<table>
<thead>
<tr>
<th>Market risk</th>
<th>Credit risk</th>
<th>Stress testing</th>
<th>Corporates</th>
<th>Banks</th>
<th>Insurance companies</th>
</tr>
</thead>
</table>

**Banking**
Figure 8: 2023 ACPR insurance climate exercise

Scenarios and main assumptions of the 2023 ACPR insurance climate exercise

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