

EGU24-4075, updated on 20 May 2024

<https://doi.org/10.5194/egusphere-egu24-4075>

EGU General Assembly 2024

© Author(s) 2024. This work is distributed under the Creative Commons Attribution 4.0 License.



Measuring physical damages from natural hazards in the ECB top-down, economy-wide climate stress test

Tina Emambakhsh

European Central Bank, Directorate General Macroeprudential Policy and Financial Stability/Stress Test Modelling Division, Germany (tina.emambakhsh@ecb.europa.eu)

In the ECB top-down, economy-wide climate stress test, we developed novel damage functions to measure damages to physical capital from different natural hazards at granular firm-level. Combining address-level, forward-looking physical risk scores from Moody' Four Twenty Seven with projected damages from acute and chronic physical risk from NGFS, we translated firms' exposure towards floods, wildfire and sea level rise risk to future losses on their physical capital. Using loan-level information from the euro area credit registry, we assessed the deterioration in firms' profitability and indebtedness due to physical damages and subsequently the change in default probabilities and expected losses on banks' corporate loan portfolios. The dataset is unprecedented in terms of coverage, integrating both regulatory and private data sources and comprising financial and climate risk data for a total of 2.6 million European firms and 1,600 euro area banks, covering around 80% of total loan exposures of the euro area regulatory credit registry.

Losses from physical risk were calculated as the product of firms' future exposure towards the frequency and intensity of wildfire risk, flood risk and sea level rise and combining this with the expected physical damages as a share of GDP from the NGFS scenarios. Annual firm-level losses from physical risk were calculated between 2020 and 2050 and for three different scenarios, i.e. the NGFS Net Zero 2050, Delayed Transition and Current Policies scenarios. The results show that acute physical risk will lead to moderate to high damages on firms' physical capital in the long term, depending on the expected temperature increase of the scenario in question. By 2050, damages will be disproportionately higher in a Current Policy scenario relative to the other scenarios, leading to a maximum deterioration of 3% of firms' assets compared to a maximum deterioration of 1% in a Net Zero 2050 scenario. The results show that until 2050, the credit risk of borrowers most vulnerable to physical risk is around 25% higher in a Current Policy scenario relative to a Net Zero 2050 scenario.