



University of  
Zurich<sup>UZH</sup>



Eidgenössische Technische Hochschule Zürich  
Swiss Federal Institute of Technology Zurich

---

# Empirical Evidence on the Pricing of Physical Climate Risk in Financial Markets

---

MASTER THESIS

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF  
SCIENCE IN QUANTITATIVE FINANCE

AUTHOR

NADYA DETTWILER

SUPERVISOR

PROF. DR. STEVEN ONGENA

(UNIVERSITY OF ZURICH)

ASSISTANT

DR. JULIAN F. KOELBEL

DATE OF SUBMISSION: MARCH 17, 2020

## Executive Summary

Regulators and investors are increasingly aware of the risks emerging from climate change. Academic research has mainly investigated the pricing of transition risk in financial markets, less so physical climate risk because it is harder to isolate. I identified the thermal power sector and the physical risk that stems from increasing scarcity of cooling water as an appropriate setting to overcome this hurdle. For the analysis, I matched loan, company, power plant, country and drought data to develop a measure which accounts for this physical climate risk. The regression of the measure on loan spreads indicates a positive relationship between the exposure to physical climate risk and loan spreads. An increase of one standard deviation in exposure leads to an increase in the spread by 4.03 basis points. Applied to a loan of the size of the mean loan size in the sample this results in an increase in the cost of loan of USD 586,010. However, the statistical significance of the identified effect depends on the specification of the model. This finding implies that either markets are unaware of pricing implications stemming from the economic risk of water scarcity, it is seen as a rather long-term issue, or the companies are insured against such risk and it is thus not considered in the prevalent loan pricing models.