

Maximilian Fuchs

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I am a PhD candidate in financial economics at Copenhagen Business School and former research fellow at the European Central Bank. I have experience in banking, insurance, and research. My interests lie in the nexus of financial markets, climate change, and the broader economy where I enjoy solving problems with large data.

EDUCATION

Visiting Scholar

New York University, Stern School of Business 2023 – 2024
Sponsor: Johannes Stroebe

Ph.D., Financial Economics

Copenhagen Business School 2020 – Today
Advisors: Claus Munk, Jesper Rangvid

M.Sc., Finance and Investments *(among top 2% of my class)*

Copenhagen Business School 2018 – 2020
Exchange Semester: Shanghai Advanced Institute of Finance, China 2019

B.Sc., Business Administration and Economics *(among top 10% of my class)*

University of Passau 2013 – 2017
Exchange Semester: Southwestern University of Finance and Economics, China 2017

PROFESSIONAL EXPERIENCE

European Central Bank

Macprudential Policy and Financial Stability, Research Fellow 5/2023 – 4/2024

- Carried out a study on whether banks in the Euro area are pricing climate-related policy risks in their loan portfolios on the basis of large, granular credit register data in the Euro area. A draft is available upon request.

Climate Stress Test Modelling, Trainee 9/2022 – 4/2023

- I contributed to the economy-wide climate stress test with analysis on bank exposure to climate policy risks based on short-term scenarios including energy and other macroeconomic shocks.
- Analyzed financial and economic developments in the European energy sector around the Ukraine crisis for households and firms.

Allianz RE

Climate Risk Pricing 6/2021 – 9/2021

- I developed a model and metrics for the pricing of physical climate risks in real estate based on internal hazard models for, inter alia, sea level rise and river floods.

Nordea Bank

Market and Counterparty Credit Risk, Student Analyst 11/2018 – 4/2019

- I tested pre-transaction simulations to evaluate sensitivities on various Value at Risk measurement methods
- I managed to improve the data lineage of fixed income and FX securities

SKILLS

Programming	Expert: PYTHON, STATA, L ^A T _E X, SQL Intermediate: DASH
Databases	WRDS, DATASTREAM, ORBIS, CRSP, COMPUSTAT, 13F, BLOOMBERG
Languages	Native: GERMAN Fluent: ENGLISH Basic: MANDARIN
PhD Coursework	Empirical Asset Pricing with Machine Learning Application, Advanced Asset Pricing, Advanced Corporate Finance, Advanced Financial Econometrics

RESEARCH INTERESTS

Climate Finance, Carbon Markets, Asset Pricing, Policy, Financial Stability, Insurance and Pension

RESEARCH IN PROGRESS

3. **Carbon VIX: Carbon Price Uncertainty and Decarbonization Investments**

with Johannes Stroebel and Julian Terstegge

R&R at the Journal of Financial Economics

Abstract We study the effects of carbon price uncertainty on firms' decisions to decarbonize their operations. We first use information on the pricing of options on emission allowances in the European Emissions Trading System to create the *Carbon VIX*, a market-based high-frequency measure of carbon price uncertainty. Carbon price uncertainty is high, varies substantially over time, and experiences persistent shocks around major climate policy events. To explore the effects of carbon price uncertainty on expected aggregate decarbonization investments, we analyze its effect on the stock returns of firms that help other businesses decarbonize. We find that the stock returns of these carbon solution providers vary positively with carbon prices, but negatively with carbon price uncertainty. The effect of increases in carbon price uncertainty on our proxy for expected decarbonization investments is economically large and of similar magnitude as the effect of declines in carbon prices. These findings support predictions from real options theory that firms may delay investments in decarbonization when faced with uncertainty about the future costs of emissions.

2. **Climate Policy Action and the Pricing of Bank Loans**

with Martina Spaggiari

Abstract Using granular credit register data of Euro area banks, information on borrowers' greenhouse gas emissions and their countries' degree of climate action, we study whether banks price climate-related policy risk in their corporate loan portfolios. We find the risk of moving to a low carbon economy is priced only when polluting borrowers face high levels of climate action. The pricing of such transition risk is driven by loans originated after the adoption of the Paris Agreement and more pronounced for long maturity loans. Benefiting from bank-level survey results, we show that this effect is larger in terms of scope and magnitude if loans are provided by green banks who indicate to consider climate risks in their pricing processes.

1. **Polluters are Short-Lived: Climate Risk and the Timing of Cash Flows**

Abstract I construct a measure of cash flow duration at the firm level and link it to carbon emissions of the same firm. Firms that generate their cash flows in the near term emit more carbon, reflecting that short-term cash flows are relatively less exposed to regulatory climate risks. This relationship leads to high correlations of emission and duration premiums. Return differences are driven by emissions instead of duration and disappear after controlling for changes in investors' climate concerns. These changes, together with the novel link between duration and emissions, provide an intuitive empirical explanation for the recent underperformance of value.

Policy Work

1. **The Road to Paris: Stress Testing the Transition Towards a Net-Zero Economy.**

with Tina Emambakhsh, Simon Kordel, Charalampos Kouratzoglou, Chiara Lelli, Riccardo Pizzeghello, Carmelo Salleo, and Martina Spaggiari, ECB Occasional Paper, 2023

TEACHING & SUPERVISION

Average Evaluation: 4.5/5

Investments , M.Sc. Finance and Investments	2021 – 2022, 2024
Taught exercise classes and TA for Claus Munk	
Financial Markets & Instruments , M.Sc. Finance and Strategic Management	2022, 2024
Taught exercise classes and TA for Claus Munk	
Capital Market Theory , M.Sc. Applied Economics and Finance	2021, 2024
Taught exercise classes and TA for Claus Munk	
Bachelor & Master Theses , Supervision of theses in sustainable finance	2022 – 2024
M.Sc. Advanced Economics and Finance (2x), M.Sc. Applied Economics and Finance (5x), M.Sc. Finance and Investments (7x), B.Sc. International Business (1x)	

PRESENTATIONS

Climate Finance Conference, New York University & Fed New York*	May 2024
Climate Change Center, European Central Bank*	Jun 2023
Copenhagen Business School	Apr 2023
DGMF Seminar, European Central Bank	Jan 2023
World Finance Conference, University of Turin	Aug 2022
Nordic Finance Network Workshop, Stockholm School of Economics	May 2022
PhD Seminar, Copenhagen Business School	Nov 2021

* indicates presentation by co-author

GRANTS

William Demant Fonden	2023
Augustinus Fonden	2023
Otto Mønstedts Fond	2023
GTN Fonden	2023
COB Rejselegater	2023
European Central Bank	2022
Nordic Finance Network (NFN) Travel Grant	2022

OTHER

Affiliation & Memberships	Member of OS-Climate (2021): Open-source climate data and analytics Affiliated with the Danish Pension Research Center (PeRCent)
Volunteering	Speed Up Buddy (since 2020): Mentoring of undergraduate students without academic background in their families Help for Ukraine, with Birgitte Weber (since 2018) Collection and distribution of donations for children and families in need in Lviv, Ukraine

REFERENCES

Claus Munk	Jesper Rangvid
Professor of Finance	Professor of Finance
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