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 at the intersection of financial markets and climate change with applications to asset pricing and policy.

Education

Visiting Scholar
New York University, Stern School of Business — 2023 – 2024
Sponsor: Johannes Stroebel

Ph.D., Financial Economics
Copenhagen Business School — 2020 – Today
Thesis: Essays on Climate Finance and Carbon Markets
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
Thesis: Asset Allocation of Swiss Pension Funds in a Low Interest Rate Environment

B.Sc., Business Administration and Economics *(among top 10% of my class)*
University of Passau — 2013 – 2017

Professional Experience

European Central Bank
Research Fellow — 2023 – 2024
- Research in DG Macroprudential Policy and Financial Stability on the pricing of climate-related policy risks in banks' loan portfolios based on granular Euro area credit register data.

Climate Stress Test Modelling, Trainee — 2022 – 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 — 2021
- I developed a model for the pricing of 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 — 2018 – 2019
- I tested pre-transaction simulations to evaluate sensitivities on varying Value at Risk measurement methods
- I managed to improve the data lineage of fixed income and FX securities

Skills

Programming	Expert: Python, Stata, LaTeX, 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

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 for emissions 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 this uncertainty on expected aggregate decarbonization investments, we analyze its effect on the stock returns of firms that help other businesses decarbonize. To identify these "carbon solution providers", we extract common types of decarbonization investments from a large survey of firms, and assess which firms offer the associated goods and services. We find that stock returns of carbon solution providers vary positively with carbon prices, but negatively with carbon price uncertainty. This effect is quantitatively large: a 10 percentage point increase in uncertainty has the same negative impact on expected decarbonization activities as a 12 Euro decline in the carbon price. These findings support the prediction 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
Taught exercise classes and TA for Claus Munk

Financial Markets & Instruments, M.Sc. Finance and Strategic Management 2022
Taught exercise classes and TA for Claus Munk

Capital Market Theory, M.Sc. Applied Economics and Finance 2021
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 Mønsteds 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

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