Dr Moritz P. Schwarz

Curriculum Vitae

ORCID:
0000-0003-0340-3780
WoS h-index: 7
Google Scholar h-index: 8

E moritz.schwarz@scmo.eu
W moritzschwarz.org

Education

DPhil (PhD), University of Oxford, UK. 2019–2023
Dissertation: *What Actually Happened? Novel Econometric Methods to Improve Estimates of Climate Impacts and Policies*.
Supervisors: Prof Sir David Hendry, Prof Cameron Hepburn. Clarendon Scholar.
Affiliated with Climate Econometrics at Nuffield College and INET Oxford.

MSc, University of Oxford, UK. 2016–2017
Environmental Change & Management. Graduated with Distinction.

BSc, London School of Economics, UK. 2013–2016
Environmental Policy with Economics. First Class Honours.

Academic Appointments

Einstein International Postdoctoral Fellow, 2023–
Faculty of Economics and Management, TU Berlin,
Potsdam Institute for Climate Impact Research (PIK), Germany.

Associate, University of Victoria, Canada. 2023–2025
SSHRC grant on extreme weather impacts in developing countries

Associate, INET Oxford, University of Oxford, UK. 2023 –

Research Consultant, Columbia University, New York, USA. 2020–2021

Researcher / Associate, Climate Econometrics, Univ. of Oxford, UK. 2017–
Roles over time: Research Assistant, Doctoral Researcher, Associate Researcher (current).

Other Experience

Senior Climate Economist, Federal Ministry of Finance, Austria. 2021–
- Leading role in green budgeting framework and economic analysis; produced Austria's first empirical marginal abatement cost curve; macro-forecasting.
- EU Issue Lead on Long-Term Finance (UNFCCC); CBAM negotiation coordinator; negotiator on domestic climate and energy laws.

External Adviser, McKinsey & Co., UK/USA. Summer 2021

Austrian EU Presidency Coordinator, 2017 – 2019
Federal Ministry of Sustainability and Tourism, Austria.

Research Interests

Environmental economics; causal and reverse causal policy evaluation; time-series and panel econometrics; macro-forecasting; climate & biodiversity policy.

References

Prof Sir David Hendry — Nuffield College, Oxford david.hendry@nuffield.ox.ac.uk
Prof Cameron Hepburn — University of Oxford cameron.hepburn@smithschool.ox.ac.uk
Prof Felix Pretis — University of Victoria fpretis@uvic.ca
Prof Linus Mattauch — TU Berlin linus.mattauch@tu-berlin.de
Prof Robert Kaufmann — Boston University kaufmann@bu.edu

Research and Publications

Job Market Paper

JMP

Pretis, F., and **Schwarz, M.** (JMP). Discovering What Mattered: Detecting Unknown Treatment as Breaks in Panel Models.

Abstract: Effective policy design requires knowing which interventions have made a measurable difference. Yet policymakers and researchers often observe that outcomes such as emissions, productivity, or growth have changed without knowing which policies or shocks were responsible. Rather than evaluating the effects of a known policy or event, our approach starts from the outcome itself: we detect structural breaks in panel data and attribute them to possible causes. This provides a way to identify unknown interventions and their timing directly from the data and to bridge the gap between exploratory data-driven causal discovery and formal causal inference. Formally, we develop a framework for detecting unknown treatment assignment and timing as structural breaks in fixed-effects panel models. We show that conventional treatment evaluation of known interventions in a two-way fixed effects panel (often interpreted as difference-in-differences in a standard treatment set-up) is equivalent to allowing for heterogeneous structural breaks in the treated units' fixed effects. By estimating unit-specific breaks in fixed effects using machine learning or adaptive-LASSO selection, our method uncovers previously unknown heterogeneous treatment effects and generates hypotheses about their potential causes, thus linking structural-break detection to modern causal-inference frameworks. The framework offers a theory-based foundation for recent empirical work evaluating climate and policy shocks where the onset and effectiveness of interventions are uncertain. We illustrate the approach by identifying the economic impact of ETA terrorism on Spanish regional GDP per capita without prior knowledge of its timing. The methods are freely available in the open-source R package *getspanel*.

Peer-reviewed publications

2024

Mark, E., Rafaty, R., and **Schwarz, M.** (2024). Spatial-temporal dynamics of employment shocks in declining coal mining regions and potentialities of the 'just transition'. *Energy Policy* **195**: 114338.

2024

Stechemesser, A., Koch, N., Mark, E., Pretis, F., Ritter, N., **Schwarz, M.**, *et al.* (2024). Climate policies that achieved major emission reductions: Global evidence from two decades. *Science* **385**(6711): 884–892.
Selected media coverage: NYT, FT, CNN, WSJ, Economist, Le Monde, Spiegel, ORF.

2024

Jiao, X., Pretis, F., and **Schwarz, M.** (2024). Testing for Coefficient Distortion due to Outliers with an Application to the Economic Impacts of Climate Change. *Journal of Econometrics* **239**(1).

Abstract: Outlying observations can bias regression estimates, requiring the use of outlier-robust estimators. Comparing robust estimates to those obtained using ordinary least squares (OLS) is a common robustness check, however, such comparisons have been mostly informal due to the lack of available tests. Here we introduce a formal test for coefficient distortion due to outliers in regression models. Our proposed test is based on the difference between OLS and robust estimates obtained using a class of Huber-skip M-type estimators (such as Impulse Indicator Saturation or Robustified Least Squares). We show that our distortion test has an asymptotic chi-squared distribution by establishing the asymptotics of the corresponding Huber-skip M-estimators using an empirical process Central Limit Theorem recently developed in the literature. The test is valid for cross-sectional, as well as panel, and stationary or deterministically-trending time series models. To improve finite sample performance and to alleviate concerns on distributional assumptions, we explore several bootstrap testing schemes. We apply our outlier distortion test to estimates of the macro-economic impacts of climate change allowing for adaptation.

2023

Thalheimer, L., **Schwarz, M.**, and Pretis, F. (2023). Large weather and conflict effects on internal displacement in Somalia with little evidence of feedback onto conflict. *Global Environmental Change*.

2022

Koch, N., Naumann, L., Pretis, F., Ritter, N., and **Schwarz, M.** (2022). Attributing agnostically detected large reductions in road CO_2 emissions to policy mixes. *Nature Energy* **7**: 844–853.
Selected media coverage: FT Sustainable Views, ORF, DER STANDARD, Salzburger Nachrichten.

2022

Scheer, A., Hopkins, D., **Schwarz, M.**, and Caldecott, B. (2022). Stranded labour in Alberta, Canada: A mixed methods study on the employment impacts of oil price in a resource-rich province. *Climate Policy* **22**(8): 1016–1032.

2022

Benoit, P., Clarke, A., **Schwarz, M.**, and Dibley, A. (2022). Decarbonization in state-owned power companies: Lessons from a comparative analysis. *Journal of Cleaner Production* **355**: 131796.

2020

Cohen, F., **Schwarz, M.**, Li, S., Lu, Y., and Jani, A. (2020). The challenge of using epidemiological case count data: The example of confirmed COVID-19 cases and the weather. *Environmental and Resource Economics: Perspectives*.

2018

Pretis, F., **Schwarz, M.**, Tang, K., Haustein, K., and Allen, M. R. (2018). Uncertain impacts on economic growth when stabilizing global temperatures at 1.5°C or 2°C warming. *Philosophical Transactions of the Royal Society A* **376**(2119): 20160460.
Selected media coverage: Carbon Brief, The Independent, Daily Mail, El Pais

R&R, Working Papers & Ongoing Research

Schwarz, M., Kurle, J., Pretis, F., Martinez, A., and Harper, G. (R&R at *International Journal of Forecasting*). An Open-Source Empirical Macro (OSEM) Model for Economic and Emission Forecasting.

Abstract: Emissions forecasts and policy counterfactuals play a key role in evaluating progress towards achieving net-zero emissions targets. However, creating such forecasts is non-trivial. Existing forecasting models primarily focus on long-run (10+ year) policy scenarios, while political decision-making often takes place on 1-5 year horizons. Where short-run models do exist, these are primarily closed-source 'black boxes' that are often proprietary and rarely evaluated against actual realizations. Here we develop an opensource empirical macroeconomic ('OSEM') modelling platform to generate forecasts of sectoral carbon emissions as well as the wider macroeconomy. OSEM jointly considers macroeconomic, environmental, and energy variables and therefore can act as an empirical Integrated Assessment Model (IAM) that is explicitly data-driven-counter to most existing IAMs. The underlying estimated models are based on dynamic time series regressions matching a structural vector autoregression (SVAR) allowing for model selection, outliers, in-sample structural breaks, and automatic forecast evaluation. We present an illustrative example providing short-run sectoral greenhouse gas emission forecasts for Germany, France, Austria, and Denmark. The resulting modelling platform is available as an open-source R-package, can easily be ported across countries as well as updated in real-time when new data is released, and will improve transparency and flexibility in policy forecasts.

Schöngart, S., **Schwarz, M.**, Schwaab, J., Pretis, F., Pfleiderer, P., and Schleußner, C.-F. (Working Paper). Temporary warming, lasting losses: Economic damages from climate overshoot may be irreversible within this century.

Schwarz, M., and Pretis, F. (Working Paper). An empirical climate damage function accounting for climate extremes and adaptation. SSRN 4022690.

Schwarz, M. statIAM: Building a statistical emulator for Integrated Assessment Models.

Policy Papers and Reports

2025

Delgado, J., and **Schwarz, M.** (2025). Rückblick auf die 29. Weltklimakonferenz (COP29). *RWK – Reporting und Wirtschaft kompakt* 1/2025. Linde Verlag.

2025

Castle, J., Mark, E., Hendry, D. F., **Schwarz, M.**, and Pretis, F. (2025). Net zero: Strategy and tactics. *Newsletter of the Royal Economic Society*, Issue 208.

2024

Delgado, J., Haider, K., Lamprecht-Pühra, I., and **Schwarz, M.** (2024). Tracking von Klima- und Umweltschutzauszahlungen – der Bundesansatz. *SWK – Steuer und Wirtschaftskartei* **99**(6). Linde Verlag.

2022

Schwarz, M., Benoit, P., and Clark, A. (2022). Decarbonising state-owned power companies: A framework for applying policy actions. Smith School Working Paper No. 23-01.

2020

Cohen, F., Ives, M., Srivastav, S., **Schwarz, M.**, Lu, Y., Mealy, P., Bento Maffei De Souza, P., Jackson, P., and Hepburn, C. (2020). Emerging markets and self-interested climate action. A report prepared for Pictet AM by the Oxford Smith School of Enterprise and the Environment.

2020

Hepburn, C., and **Schwarz, M.** (2020). Climate change: Answers to common questions. Oxford Smith School of Enterprise and the Environment. A report prepared for Pictet AM.

2019

Mattauch, L., Creutzig, F., Franks, M., Funke, F., Jakob, M., Sager, L., **Schwarz, M.**, *et al.* (2019). Antworten auf zentrale Fragen zur Einführung von CO_2-Preisen. *Diskussionsbeiträge der Scientists for Future* **2**: 10.5281/zenodo.3371150.

2017

Mattauch, L., Roesti, M., **Schwarz, M.**, and Siegmeier, J. (2017). Wirtschaftswachstum und Klimawandel: Chancen und Herausforderungen auf dem Weg zur klimafreundlichen Gesellschaft. *Wirtschaftspolitische Blätter* **3**/2017.

Awards & Grants

2024: Best Paper Award for Junior Scholars, TU Berlin (Faculty VII).

2023: Einstein International Postdoctoral Fellowship, TU Berlin (~EUR 339k).

2023: British Academy Postdoctoral Fellowship offer (GBP 342k) – declined in favor of Einstein Fellowship.

2021: Insight Development Grant (Canada), co-recipient (CAD 60k).

2019–2023: Clarendon Scholarship, University of Oxford (~GBP 100k).

2017: ECI MSc Prize for Top Overall Performance & Best Dissertation, University of Oxford.

2016: George & Hilda Ormsby Prize (Best Undergraduate Dissertation), LSE.

Teaching

TU Berlin: Lecturer: Causal Inference (PhD level, design & instruction). Contributed to Environmental Economics teaching (MSc/BSc level).
Co-supervision of two BSc theses and one MSc thesis.

University of Oxford: Lecturer: "New Environmental Economic Thinking" (MSc), TA: Environmental Economics (MSc), Quantitative Methods (MPhil).
Co-supervision of two MSc theses (both were subsequently published).

University of Nottingham: Designed & delivered R/tidyverse econometrics training (multi-day).

Policy & Outreach (selected)

Software Development: Contributor to and maintainer of the indicator saturation part of the `gets` R-package and maintainer of the `getspanel` and the `osem` R-package. Over 87,000 total downloads.

Domestic Policy: Green budgeting, empirical MAC curve development, macro-forecasting. Research results featured in Austrian National Energy and Climate Plan. Policy exchanges with institutions including the German Chancellery, Ministry of Finance and Economics Ministry; Austrian Environment Agency; Climate Neutrality Forum (Brussels).

EU/UNFCCC: Issue Lead for Long-Term Finance; CBAM technical coordinator for negotiations.

Coalition of Finance Ministers for Climate Action: Report on effectiveness of climate policies using results from the Science paper. Participation in the Green Macro Modelling Initiative with OSEM to improve policy modelling for policy-makers.

IPCC citations: Research prominently featured in SR1.5 and AR6.

Media: Coverage in major international outlets for multiple papers.

Presentations (selected)

Conferences: EAERE (2018, 2024); Dynamic Econometrics (2024); VfS (2024); IIPF (2024); Int. Symposium on Forecasting (2024); EGU (2018, 2020, 2022, 2024); Econometric Models of Climate Change (2017, 2021, 2022, 2023, 2024, 2025); NOeG (2023, 2024).

Invited Economics Seminars: CEU Vienna (2025); IIEEE Lund (2025); University of Turin (2023); ETH Zurich (2026); Birkbeck London (2026).

Languages

German (native); English (C2); French (conversational).