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PhD Candidate

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Teaching and Research Fields

International Climate Policy, Environmental Economics and Natural Resource Economics

Dissertation Title: Climate Policy and Financial Markets

Education:

PhD Economics, University of Gothenburg, 2014 to present
Supervisors: Professor Thomas Sterner and Professor John Hassler (Institute for International Economic Studies, Stockholm University)
Expected Completion Date: January 2020

University of Oxford, January 2017 and February - March 2019
Visiting PhD Student at Climate Econometrics, Nuffield College, University of Oxford
Host: Professor Sir David Hendry

MCom Economics (*Dissertation with distinction*), University of Cape Town, 2011
BCom (Honours) Economics, University of Cape Town, 2009
B.Sc. Economics, University of Zimbabwe, 2007

Published Papers:

“Evaluating the Prospects of Benefit Sharing Schemes in Protecting Mountain Gorillas in Central Africa” (with Birgit Bednar-Friedl, Edwin Muchapondwa, and Precious Zikhali), *Natural Resource Modeling*. 2013. 26(4), 455-479.

Working Papers:

“Climate Policy: Effects of the Trump Election on Fossil Fuel Commodity Markets” [**Job Market Paper**].

“Do Markets Trump Politics? Fossil Fuel Market Reactions to the Paris Agreement and the US Election” (with Thomas Sterner), *Scandinavian Working Papers in Economics (S-WoPEc)* 728 (March 2018), *Resources for Future (RFF) Working Paper* 18-24 (October 2018).

Media coverage: Les Echos, The Economist, S&P Global Market Intelligence, Axios Generate

“Recreation Demand and Optimal Pricing for International Visitors to Kruger National Park” (with Edwin Muchapondwa and Eyoual Demeke), Economic Research Southern Africa (ERSA) Working Paper 743, (May 2018).

“Coordinated Carbon Taxes or Tightened NDCs: Distributional Implications of Two Options for Climate Negotiations” (with Thomas Sterner).

Work in Progress:

“Climate Policy and Fossil Fuel Firm-Level Investment Decisions.”

Book Contributions:

“Macroeconomics: Global and Southern African Perspectives” (Olivier Blanchard and David R. Johnson; Akoto, W., Alsemgeest, L., Bhoola, F., Biyase, M., Dikgang, J., Essop, H., Malokane, C., May, C., Mokoka, T., Mukanjari, S., Rama, N., Serfontein, B., Theoduloz, T., and van Zyl, C.). 2014. Pearson, South Africa.

“The Quest for Gender Equity through Internationalisation Strategies at Higher Education Institutions in the Western Cape, South Africa” (with Marko Kwaramba). In C. Schoole, and J. Knight (Eds.), *Internationalisation of African Higher Education*. 2013. (53-72). Sense Publishers, Rotterdam.

Fellowships, Honors and Awards:

Adlerbert Research Foundation, research grant, 2020

Partnerprogrammets Internationaliseringsstöd, proofreading grant, 2019

Center for Collective Action Research (CeCAR), research grant, 2018/2019

Swedish International Development Cooperation Agency PhD Scholarship, 2014-2019

Paul and Marie Berghaus Donation Fund Travel Grant, 2016

Adlerbert Scholarship Foundation Travel Grant, 2016

Best Masters Thesis on Environmental Policy (Environmental Policy Research Unit, University of Cape Town), research award, 2011

Postgraduate Scholarship (University of Cape Town), study grant, 2009-2011

Teaching Experience*:

Guest Lecturer, Environmental Economics (postgraduate level), University of Johannesburg, 2016/2017

Lecturer, Management Economics and Principles of Economics (undergraduate level), Cape Peninsula University of Technology, 2012-2014

Lecturer and Course Convenor, Economics for Non-specialists (undergraduate level), University of Cape Town, 2013

Tutor, Quantitative Methods in Economics (undergraduate level) and Econometrics (postgraduate level), University of Cape Town, 2009-2011

*PhD fellowship did not require any teaching duties.

Conference and Seminar Presentations:

2019: Institute for International Economic Studies (Stockholm University), Nuffield College (University of Oxford).

2018: FSR Climate Annual Conference (Florence), 6th World Congress of Environmental and Resource Economists (Gothenburg).

2017: 11th Environment for Development Annual Meeting (Addis Ababa), University of Zimbabwe

Economics Seminar, University of Cape Town School of Economics Seminar, European Association of Environmental and Resource Economists (EAERE) Pre-conference Workshop on Climate Policy and Stranded Assets (Athens), 23rd Annual Conference of the EAERE (Athens), 11th Conference on the Economics of Energy and Climate Change (Toulouse), 14th ENVECON: Applied Environmental Economics Conference (London).

2016: 1st Conference on Econometric Models of Climate Change (Aarhus).

Academic Visits:

Institute for International Economic Studies (Stockholm University), August 2019

Professional Affiliations:

European Economic Association, European Association of Environmental and Resource Economists and African Association of Environmental and Resource Economists

Languages:

Shona (native), English (fluent)

Other Activities:

Organizer of the Environmental Economics Seminars, Department of Economics, University of Gothenburg, 2018

Ad-Hoc Refereeing: The Energy Journal, Climatic Change

Thesis Examination: University of Cape Town (Masters level – *twice*)

References:

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Dissertation Abstract

In a few decades, the entire energy sector, large parts of the business, building and transport sectors must be converted into fossil-free operations (IPCC, 2014). This requires large investments in climate adaptation, renewable energy, energy storage, new vehicles, building stock and many industrial sectors such as steel and cement (IEA and IRENA, 2017). The OECD (2017) estimates annual infrastructure investments for the period 2016 to 2030 would need to reach \$6.9 trillion (10% higher than the business as usual scenario), for average global temperatures to remain below 2°C with a 66% chance. This dissertation seeks to understand the effects of politics on the transition in energy that is necessary to meet the climate goal of limiting global temperature increases to below 2°C above preindustrial levels. The first two papers study the impact of global climate policymaking by using event studies for two recent high visibility events. In the first paper, we examine the reaction of fossil and renewable firm assets (stock prices) to the announcement of the Paris climate agreement

and the US Election. In the second paper, I explore the mechanisms through which the US Election was anticipated to affect the fossil fuel industry by analyzing commodity price effects. Commodity futures markets provide an ideal setting for analyzing the effect of the election outcome because of their first-order importance for firm decision-making. The third paper focuses on the distributional implications for two different ways of strengthening the Paris climate agreement: either by incorporation of carbon pricing or through tightening of the Nationally Determined Contributions (NDCs) which outline national goals for greenhouse gas emission reductions.

In Chapter One, **Do Markets Trump Politics? Fossil Fuel Market Reactions to the Paris Agreement and the 2016 US Election** (with Thomas Sterner), we ask whether world climate policies are ambitious. Environmentalists claim too little is being done. Industry argues policy is too interventionist and warns that stranding significant assets could lead to financial instability. We evaluate the impacts of global climate policymaking in an event study for two high-profile events, the election of President Trump and the Paris climate agreement, on the stock market value of energy sector firms. To identify the stock price changes due to the two events, we exploit the differential impacts of the events on fossil fuel and renewable energy firms. Using the impulse-indicator saturation method, we find that both events had large and significant effects on the value of renewable energy firms, positive for Paris and negative for the Trump election. The effects on fossil fuel firms have, as expected, the opposite signs.

Chapter Two, **Climate Policy: Effects of the Trump Election on Fossil Fuel Commodity Markets** [Job Market Paper], analyzes how coal and natural gas commodity markets reacted to the surprise election of Donald Trump. The unexpected election of Donald Trump shifted expectations on several dimensions, including lower corporate taxes, (re-)reform of the healthcare system, and changes to immigration and trade policies. Within the fossil fuel industry, environmental regulations were expected to be substantially weakened. Earlier work has shown that the election led to increased profit expectations among fossil fuel firms. This paper seeks to nuance the picture and understand whether Trump was expected primarily to help *mine* more coal or *burn* more coal. While both supply- and demand-side policies boost profits, they would have different effects on the futures market for coal. We use the differential impact of the touted changes in climate policy and other environmental regulations to identify the price changes due to expectations regarding the path of climate policy under Trump. Using event study analysis, we find large price effects in coal and natural gas futures markets. Over the 21-day post-election period, which includes the nomination of the Environmental Protection Agency (EPA) administrator, we observe cumulative average abnormal returns of up to -27% for coal and 19% for natural gas. Further analysis shows a marked increase in uncertainty and intracommodity return spreads post-election. In addition, the reaction by futures contracts of different maturities suggests market participants anticipated that the proposed policies would be implemented shortly after Trump took office.

Chapter Three, **Coordinated Carbon Taxes or Tightened NDCs: Distributional Implications of Two Options for Climate Negotiations** (with Thomas Sterner). The Paris climate agreement represents a transition in international climate negotiations from a binding top-down model to a decentralized pledge-and-review agreement. The main advantage has been to achieve (quasi) unanimity around rather ambitious goals. It is unlikely, however, that the agreement will be able to achieve these goals without strengthening. One of the greatest obstacles to a stronger treaty comes from concerns about fairness among (and within) countries. The focus of this paper is to study the distributional implications of two different ways of strengthening the treaty, either by incorporating carbon pricing or through tightening of the nationally determined contributions (NDCs), which outline national goals for greenhouse gas emissions reductions. We quantify a number of different burden-sharing principles that have been proposed by representatives from various countries. Our

results suggest that both carbon pricing and tightened NDCs are viable mechanisms that are less extreme and therefore more acceptable than grandfathering, which favors the most fossil-intensive economies, or equal per capita allocation, which favors low-income countries that use less fossil fuel.

Bibliography

IEA, IRENA. 2017. *Perspectives for the Energy Transition: Investment Needs for a Low-Carbon Energy System*. Technical Report. The International Energy Agency (IEA), International Renewable Energy Agency (IRENA), Paris, Bonn.

IPCC. 2014. *Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp.

OECD. 2017. *Investing in Climate, Investing in Growth*. OECD Publishing, Paris.