

The Economics of Corporate Climate Change

Application for funding from the EPRU-network. (Resubmitted by request)

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Background

Greenhouse gas (GHC) emissions from corporations have a major impact on global climate changes and have been labelled the biggest market failure the world has ever seen by Professor Stern and others (Stern 2007).

While much research has been done of regarding the reductions of CO₂ emissions and the lack of reliable forecasts regarding the costs and benefits associated with alternative emissions scenarios (Stern 2007), to our knowledge no previous empirical literature has made systematic firm level link between reducing corporate greenhouse gas emission and the corporate finance implications.

Objectives

The overall objective of the research project “Corporate Climate Change” is to provide new evidence on the corporate costs and benefits of reducing greenhouse gas emissions and to use this as a foundation for re-evaluating how economic politics can be designed to help corporations reducing their emissions with the least possible costs. For this we will construct a firm level database for corporate emission levels.

On the economic side it is the aim of the project to identify which factors have the largest impact on emission reductions in corporations. We also aim at estimating the economic cost and economic benefits of reductions in major greenhouse gases and in energy and water consumption. Finally, we will try to understand the importance of individuals in reduction of emission gasses by linking the actual emission numbers and the economic outcomes to the answers to a directed questionnaire.

On the policy side, greenhouse gasses are the largest externality that humanity has ever faced. We will investigate which policy instruments that have the largest effect on emission reduction at the least possible economic cost. Ultimately, this will provide economic policy channels through which it will be less difficult for Denmark to live up to its international obligations with respect to greenhouse gas emissions.

Description of the Database:

No previous literature has previously linked actual emission levels and personal drivers for corporate emission strategies to accounting data on firm level. For this reason we believe that the database will be the first of its art both in Denmark and in the rest of the world. When finished the database will have a number of key components:

- a) Firm level greenhouse emission data from the Danish Green Accounts, which will be delivered from “Erhvervs- og Selskabsstyrelsen”. The green statements for a Danish corporation do contain detailed information on the emission of greenhouse gasses such as for example CO₂. It splits the source of emission into different parts of the production process. There are also detailed numbers for the consumption of electricity, water and heat in the production. The green accounts have been obtained from the Ministry of Business and Economics. However, the data has to be transferred into an electronic database by hand. This part of the work (appr. 30.000 green accounts hand transferred) will be outsourced to Capacent in Vietnam.
- b) A firm level database for personal and corporate determinants for corporate emission strategies. This part will be based on a survey (mail and phone) to CEOs and/or owners of all firms that have green statements. This part of the database identifies variation in decision makers’ perspective on greenhouse emission and global climate consequences. We will ask about drivers and constraints for special corporate climate strategies both on the level of the corporation and on the level of the individual decision makers.
- c) Accounting, ownership and management data for all firms that provide green statement are collected from Experian and the Ministry of Business. We will obtain financial data from 1990 through 2008.
- d) Finally, given the individual information we obtain in part d) we can get background variables for individual CEO’s and owners at the Danish Statistic. This allows us to further investigate determinants of corporate climate strategies. We will look at variables such as education, political activity and social background.

Methodology: Our projects combine theories from global climate change and corporate finance.

Our database measures: Individual firms consumption of *energy, electricity and water and the*

emission of specific greenhouse gasses like CO₂. On the corporate finance side, theory tend to focus on real outcomes such corporate performance, growth, asset use and financial structures.

A major challenge will be to control for productivity differences across firms. We approach this from three sides: The first is to control for all firm and sector level observables. The second is by using matching methods to match similar firms. The third is to use the survey to extract direct information about production and productivity from the firms.

Research questions to be addressed:

- **The Corporate Finance of Corporate Climate Change.** In this project we investigate the corporate finance implications of reducing energy consumption and emission of greenhouse gasses in Danish firms. We look at how variation in actual energy consumption and actual emissions of greenhouse gasses affect firm's profitability, growth and financial situation.
- **The Economics of Corporate Climate Changes:** In this project we look at broader corporate implications of changes in energy consumption and emission of greenhouse gasses. We look at consequences for labour hiring and labour firing; implications for changes in human capital levels; changes in different job categories and changes in organizational structures of corporation.
- **The Economic Policy of Corporate Climate Change.** We estimate how specific political initiatives have affected the actual level of energy consumptions and emissions of greenhouse gasses in corporations. We wish to identify the consequences of changes in greenhouse taxes, regulation of corporate emission policy and softer measures of initiatives for advising and reporting corporate climate standards. As an identification strategy, we aim at controlling for all sector level observables and to use matching methods on firms.
- **Strategies of Corporate Climate Change.** We identify what drives effective strategies of corporate changes in energy consumption and greenhouse emissions. We identify both corporate and industry determinants focusing on individual characteristics of CEOs and owners. These individual characteristics will contain both socio economic background variables and subjective variables extracted from the conducted survey.

Deliverables & expected results: We expect each of these projects to deliver a significant contribution and hopefully they together will provide a foundation for a new methodology to

analyze corporate climate change. For this reason we have high expectations to publish the resulting working papers in top international economics journals.

To be specific, if we obtain a grant from the EPR-network, we promise to deliver the following output:

- A unique database for future research on the economic consequences of reduction in greenhouse gasses.
- A working paper on the economic costs and benefits of reduction in greenhouse gases. This paper will we aim to publish in a top international economic journal.
- A working paper on the effect of green taxes and other policy instruments on corporate costs and corporate reduction in greenhouse gases.
- A non-technical paper in Danish, which summarises the conclusions and relevant policy implications. This paper should aim at being published as a discussion paper in National Økonomisk Tidsskrift.

Budget:

We apply the EPR-network for the amount of 410.000 kr. to cover expenses to buy data from Købmandstandens Oplysningsforbund and to hire student assistance for five months to work with the data:

Data expenses:

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| • Buying green account data from E&S | 55.000 dkr. |
| • Handtyping data from 30000 green accounts in Vietnam (Capacent) | 120.000 dkr |
| • A directed questionnaire about attitudes towards global climate change | 75.000 dkr. |
| • Research Assistance in Copenhagen 12 months | 100.000 dkr. |
| • Travels, hardware, workshop, | 60.000 dkr. |

Total Amount Applied from EPR-network : **410.000 dkr.**

Participants

Mario Daniele Amore, PhD student, CBS.

Morten Bennedsen, The André and Rosalie Hofmann Chair in Family Business and Professor in Economics at INSEAD.

Birthe Larsen, Associate Professor at CBS.

Morten Bennedsen – a mini CV.

Morten Bennedsen is the André and Rosalie Hoffmann Chaired Professor of Family Enterprise and Professor of Economics and Political Science at INSEAD.

He obtained a PhD in economics from Harvard University in 1998, a Master Degree with Distinction from London School of Economics and a Bachelor Degree from University of Copenhagen. His area of teaching includes family business governance, corporate governance, applied microeconomics and firm theory.

Morten Bennedsen's main research area is the governance of family firms and other closely held corporations in a global context. He has done research on family firms, closely held corporations, capital structures, venture capital, investor protection, ownership structures and privatization. His work has been published in top finance and economics journals, such as Journal of Financial Economics, Journal of Political Economics, Quarterly Journals of Economics and Journal of Public Economics.

Morten Bennedsen has won a number of research and teaching prizes, such as winner of the Danish part of the Euryi competition (2004), the FUUH price for best teaching and course development at Copenhagen Business School (2006) and the biggest Danish individual research prize - EliteForsk 2008 - from the Danish Ministry of Science.

He has served as an advisor to the Danish Ministry of Business in the area of family firms and succession politics in particular and more generally on corporate financial policy. He has done advisory and consultancy work for a.o. the Danish association of private equity funds, the Danish Ministry of Foreign affairs, the World Bank and Novo Nordic foundation. He frequently gives talks to family firms, corporate finance institutions, investment banks and private equity funds on the governance of family firms and the economic consequences of succession.

Morten Bennedsen's research has been cited in many international newspapers including Wall Street Journal, International Herald Tribune and business newspapers in Germany, Nederland, Portugal, Norway and Denmark.

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Birthe Larsen – a mini CV.

Birthe Larsen is an associate professor at Copenhagen Business School, Department of Economics. At present she is also a part time visiting research fellow at Insead.

She obtained her PhD in economics from University of Copenhagen in 1999. She has a Master Degree from London School of Economics as well as a Master Degree from University of Copenhagen. She teaches personnel economics, macroeconomics and international economics.

Birthe Larsen's main research area is labour-macroeconomics, focusing on unemployment. She has published papers on minimum wages and unemployment, training and unemployment, the black economy and is presently doing research on labour supply and causes and consequences of xenophobia implying a shift into empirical work. Her work has been published in good economic journals, such as European Economic Review, Scandinavia Journal of Economics, Labour, and European Journal of Political Economics.

Birthe Larsen won the Copenhagen Business School's communication price jointly with other professors from her department for a number of radio programmes in 2007.

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