### MISTRA FINANCIAL SYSTEMS Research Webinars

# **Academic References**

Decarbonization and sustainable investments: Data requirements and complementary policies around the EU taxonomy and climate benchmarks

<u>Gustav Martinsson</u> Associate Professor KTH Royal Institute of Technology Swedish House of Finance

#### Andreas Hoepner

Professor University College Dublin EU, Technical Expert Group (TEG) on Sustainable Finance Swedish House of Finance

# Carbon pricing and firm level CO2 abatement: Evidence from a quarter of a century long panel

Gustav Martinsson, Sajtos, Strömberg and Thomann

# Motivation and what we do

- "Research must consider practical dimensions of optimally designing and implementing such policies (*read: carbon pricing*). First, more rigorous ex post empirical analysis of energy and environmental policies will be critical. Policies such as carbon pricing schemes, tradable obligations, fuel taxes, renewable portfolio standards. and energy efficiency standards are already in use in different countries and will become more common as countries try to operationalize their pledges in the United Nations Framework Convention on Climate Change process. <u>But there is often little empirical</u> <u>evidence on individual- or market level responses to these</u> <u>policies</u>." (Burke et al., Science, 2016 – (On climate change economics))
- We evaluate the relationship between carbon pricing and firm level CO2 emission abatement in Sweden over a quarter of a century .

# **Related literature**

- Theoretical work on climate policy and macro (mostly with a carbon tax).
  - E.g.. Acemoglu et al., AER, 2012; Acemoglu et al., JPE, 2016; Golosov et al., Econometrica, 2014; Nordhaus, AER, 1993.
- Economics of climate change:
  - E.g.. Nordhaus, 1991; 1994; 2014. Nordhaus and Boyer, 2000; Nordhaus and Yang, 1996; Mendelsohn et al., AER, 1993; Stern, 2007; Hassler et al., 2016; 2018, etc.
- Empirical work on carbon taxation:
  - Global auto industry: Firms tend to innovate more in clean (and less in dirty) technologies when they face higher tax-inclusive fuel prices (Aghion et al., JPE, 2016).
  - UK carbon tax  $\rightarrow$  lower energy intensity and use (Martin et al., J Publ Ec, 2014).
  - EU/ETS → more patenting in treated plants (Calel and Dechezlepretre, ReStat, 2016).
- Related work on the Swedish carbon tax: macro perspective with narrower focus.
  - Brännlund and Lundgren, 2010; (Porter Hypothesis); Brännlund. Lundgren, and Marklund. 2014 (Decoupling); Andersson, 2019 (transportation sector emissions).

# Data and sample: sources

- Emissions data from Swedish Environmental Protection Agency (SEPA and IVL): 1990-2016
- Accounting data from UC: 1990-1996
- Accounting data from Serrano/FRIDA: 1997-2015
- Data on tax rates and exemptions manually collected from legal texts and government documents.
  - Firm-level tax records unavailable.
- Prices are deflated using four-digit PPI series



### GHG data for Climate Transition (i.e. Paris-Aligned) Investing

## Andreas G. F. Hoepner

Notes: The underlying EU TEG work is based on the excellent and tireless efforts of Claudia Bolli, Manuel Coeslier, Delphine Dirat, Steffen Hoerter, Jean-Christophe Nicaise Chateau, Sebastien Lieblich, Sara Lovisolo, Veronique Menou, Cesare Posti, Chantal Sourlas and Jean-Yves Wilmotte. Andreas also gratefully acknowledges scientific support on the EU TEG work from Theodor Cojoianu, Saphira Rekker, Fabiola Schneider and Theresa Spandel.

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#### **Recommendations for climate benchmarks: Minimum Standards**

The TEG recommends minimum standards for the EU Climate Transition Benchmark and the EU Paris-aligned Benchmark: 2-factor Greenwashing Protection

Climate Scenario	Relative decarbonization	Self decarbonization	Equity Allocation Constraint	Activity Exclusion	
IPCC 1.5°C with no or limited overshoot	CTB: -30% PAB: -50% Minimum reduction in GHG emissions intensity (GHG/EVIC) compared to market index	-7% Minimum on average per annum reduction in GHG emissions intensity until 2050	<b>= or &gt;</b> AH: Degree of Exposure to "asset heavy" sectors compared with investable universe [Equities Only]	1) Coal (1%+ rev.) 2) Oil (10%+ rev.) 3) Natural Gas 4) Electricity producers with carbon intensity of lifecycle GHG emissions higher than 100gCO2e/kWh (both 50%+ rev)	
$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$		
$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	$\checkmark$	

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EU CTB

EU

PAE



### Key Objective of the Climate Benchmarks (2/3)

(8) A decarbonisation based only on Scope 1 and Scope 2 (GHG) emissions could lead to counterintuitive results. It should therefore be clarified that the minimum standards for EU Climate Transition Benchmarks and EU Paris-aligned Benchmarks should not only consider direct emissions from companies, but also emissions assessed on a life-cycle basis and thus including Scope 3 (GHG) emissions. However, due to the insufficient quality of the data currently available for Scope 3 GHG emissions, it is necessary to set out an appropriate phase-in timeline. That phase-in timeline should be based on the list of economic activities set out in Regulation (EC) No 1893/2006.

Source: European Commission Ref. Ares(2020)1993773 - 08/04/2020



### **Absolutely Sustainable Investing =**



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#### **GHG emissions: Scope 3 is Key!**

# GHG emissions should be considered using Life-Cycle Analysis with scope 3 being phased-in during a four year period

Period considered	NACE Level 2 (L2) Sectors considered	Suggested metric to be used by order of priority	Potential reduction target	
At the date of implementation	At least energy (O&G), mining (i.e. NACE L2: 05, 06, 07, 08, 09, 19, 20)	Scope 3 emissions, Fossil fuel reserves (volume or revenue data)	30% for CTBs, 50% for PABs	
Two years after implementation	At least transportation, construction, buildings, materials, industrial activities (i.e. NACE L2: 10-18, 21-33, 41- 43, 49-53, 81)	Scope 3	30% for CTBs, 50% for PABs	
Four years after implementation	Every sector	Scope 3	30% for CTBs, 50% for PABs	

#### Double counting can be addressed by 'Footprinting Scope 1' and separately 'Benchmarking Scope 2 & 3', with at least 7% reductions on both



### Key Objective of the Climate Benchmarks (3/3)

Article 12

#### **Transparency requirements for estimations**

In addition to the requirements laid down in Annex III to Regulation (EU) 2016/1011, administrators of EU Climate Transition Benchmarks or of EU Paris-aligned Benchmarks shall comply with the following requirements:

- (a) administrators of EU Climate Transition Benchmarks or of EU Paris-aligned Benchmarks that use estimations that are not based on data provided by an external data provider, shall formalise, document and make public the methodology upon which such estimations are based, including:
  - the approach that they have used to calculate GHG emissions, and the main assumptions and the precautionary principles underlying those estimations;
  - (ii) the research methodology to estimate missing, unreported, or underreported GHG emissions;
  - (iii) the external data sets used in the estimation of missing, unreported or underreported GHG emissions;

Source: European Commission Ref. Ares(2020)1993773 - 08/04/2020



### **The GHG Data Underreporting Challenge**

Only 21 firms worldwide report 100.0% of their Scope 1 GHG emissions in the view of the Mistra funded academic intiative <u>www.climatedisclosure100.info</u>. Only Bloomberg is publicly known to have corrected for years for this underreporting (i.e. ES074)



#### **Top 21 Climate Disclosure Leaders**

Abbvie	Deutsche Bank	KGHM	Safestore Holdings
Adidas	Equinor	Microsoft	Saipem
Aviva	Fiat Chrysler	Norske Skog	Tokio Marine
Beni Stabili	Henkel	Northern Trust	Unibail-Rodamco Westfield
Cofinimmo	IRPC	Royal Dutch Shell	Verisk Analytics
			LSExchange



### **Scope 1 GHG Reporting Challenge**

**Good news:** Thousands of firms report a number for their Scope 1 GHG emissions.

**Challenge:** Collecting 100.0% GHG emissions is technically and practically very challenging for most corporations (e.g. lack of communications with small offices abroad; small office in large office building with uninterested landlord).

**Consequence:** Most corporations claim to report the majority of Scope 1 GHG emissions but do not make a 'Quantitative Statement of Completeness' (such as 'We collected GHG emissions for 98.7% of our revenue lines')

**Bad News:** Only 43 firms worldwide disclosed 100.0% Scope 1 GHG emissions in 2016, over 30% of these are from the Financials Sector. Another 25 firms disclose at least 95% Scope 1 GHG emissions. (Bloomberg, ES074)

**Tragic Development:** The 100% and >95% Scope 1 GHG disclosing firms are not only less than 5% of all reporting firms; they also decreased since 2015, since firms currently have little economic incentive to invest resources in GHG data collection just to appear worse than a less diligent competitor.



### **British Airways Sustainability Report 2013**







### **Volkswagen Sustainability Report 2014**



CQ-equivalents are calculated on the basis of the specific global on a location's production volume, relatively large fluctuations warming potentials of individual, emitted refrigerants. Since may arise over a time series. such emissions do not occur continuously and are not dependent



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### **General Electric Online Sustainability Report 2015**

"If specific years are not adjusted for acquisitions, but the data is normally adjusted for "divestments and acquisitions", what does that 'mean' for these years?"

Read more about our sustainability subtegy as it relates to energy an

	Baseline (2004)	2012	2013	2014
GE Greenhouse Gas Emissions and Energy (a)				
GE Operational GHG Emissions (million metric tons of CO2 equivalent emissions) (b)	7.3	4.88	4.98	5.03
GE Operational GHG Intensity (metric tons per \$ million revenue) (b)	59	33.1	34.1	33.7
GE Operational Energy Intensity (MMBtu per \$ million revenue)	494	325	336	334
GE Operational Energy Use (million MMBtu)	61.1	48	49.1	49.4

Footnotes:

**Energy and Climate** 

(a) For GHG and energy-related metrics, each year GE adjusts its 2004 baseline inventory to account for divestments and acquisitions. For water- and waste-related metrics, each year of the account for divestments and acquisitions and acquisitions.

(b) For GHG and energy-related metrics, each year GE adjusts its 2004 baseline inventory to accounter divestments and acquisitions. For 2011, 2012 and 2013, GHG and energy-related data were not collected for new acquisitions. As a result, adjusted results for 2011, 2012 and 2013 are not available. For water and waste-related metrics, eac year GE adjusts its 2006 baseline inventory to account for divestments and acquisitions are not available. For water and waste-related metrics, eac year GE adjusts its 2006 baseline inventory to account for divestments and acquisitions. As a result, adjusted results for 2011, 2012 and 2013, water and waste-related data were not adjusted for 2014 divestments and acquisitions. As a result, adjusted results for 2011, 2012 and 2013 are not available. Complete water and waste data were not collected before 2006, 2014 hazardous and non-hazardous wastes generated were higher than in 2006, largely due to non-routine events at a few large sites, for example, building demolition and construction.



#### Word Cloud of GHG data uncertainties as self-reported to CDP





#### 10 "perceived" Climate Leaders with approved Science-Based Targets and how they report Scope 1 GHG emissions in various breakdowns

Name	Scope1	Sum of Breakdown by					
		Region	Business Division	Facility	GHG types	Activity	
Sony Corporation	324,130	324,130	324,130		161,914		100.187%
Symrise AG	105,830	131,378					24.141%
General Mills Inc.	316,437	278,280	278,282			263,015	20.311%
SAP SE	160,674	160,672	135,570	160,674	160,674	160,674	18.517%
Wal-Mart Stores	6,107,244	6,107,244	6,107,245		5,369,779	5,929,283	13.734%
Biogen Inc.	57,574	57,574		60,574			5.211%
AstraZeneca	335,130	328,030	335,129		335,130	335,130	2.164%
Komatsu	90,248	90,248		91,377			1.251%
Carlsberg Group	644,076	641,077					0.468%
Autodesk	2,042	2,041				2,042	0.049%



#### AH: Is this GHG reporting challenge a classic a sell-side vs. buy-side issue?





#### Related Special Issue Deadlines: JBE 30/11/20 & AF 15/07/22



Journal of Business Ethics

Journal home > Journal updates > Call for Papers - Corporate GHG Emissions' Esti...

Call for Papers - Corporate GHG Emissions' Estimation, Reporting, Accountability and Integrity

Submission deadline: November 30, 2020

**Guest Editors** 

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Andreas G. F. Hoepner, Smurfit Graduate Business School, University College Dublin

Giovanna Michelon, Department of Accounting and Finance, University of Bristol

Joeri Rogelj, Grantham Institute for Climate Change and the Environment, Imperial College London [1]

"[T]he consequences for climate policy and for sharing the responsibility of reducing global CO<sub>2</sub> emissions can only be drawn in combination with judgments about equity, fairness, the value of future generations

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CALL FOR PAPERS Special Issue of Accounting Forum



#### Accounting for the EU Green Taxonomy<sup>1</sup>

#### Guest Co-Editors:

Lucia Alessia, Theodor Cojoianub,c, Andreas G. F. Hoepnerb,d,e, Giovanna Michelonf

<sup>a</sup> Joint Research Centre of the European Commission, Italy
<sup>b</sup> Michael Smurfit Graduate School of Business, University College Dublin, Republic of Ireland
<sup>c</sup> School of Management, Queen's University Belfast, United Kingdom
<sup>d</sup> EU Technical Expert Group on Sustainable Finance, European Commission
<sup>e</sup> Mistra Financial Systems, Stockholm School of Economics, Sweden
<sup>f</sup> School of Accounting and Finance, University of Bristol, United Kingdom

The current global greenhouse gas (GHG) emissions trajectory indicates that the world is likely to experience catastrophic consequences due to climate change, unless swift action is taken towards funding green solutions and the defunding of fossil fuel activities (IPCC, 2018). There is wide scientific consensus that achieving a net zero carbon economy by 2050 is the key to stabilizing the rise in global temperatures under 1.5°C (IPCC, 2018; Matthews & Caldeira, 2008; UN, 2019).

In this respect, accounting for green economic activities is an essential enabler for policymakers, investors, companies, scientists and other stakeholders to gain a nuanced understanding on the most effective ways to transition to a net zero carbon economy in a timely manner. For example, traditional GHG accounting for corporate activities and both voluntary and mandatory GHG disclosure initiatives have yet to ensure robust GHG reporting practices of companies based on which investors and policymakers could act upon in a meaningful way (e.g. Liesen et al., 2017). The pro-bono academic initiative <u>www.ClimateDisclosure100.info</u> finds that only 21 listed companies worldwide report on 100% of their organizational boundary when disclosing their GHG emissions.

In seeking to solve these challenges, the Technical Expert Group on Sustainable Finance set up by the European Commission has proposed a <u>Taxonomy of environmentally sustainable economic activities</u> from a climate change mitigation and adaptation perspective (Slevin et al., 2020). This new approach deemphasizes aggregate company level emissions on Scope 1, 2 or 3, and instead, focuses on the teasing out of the environmentally sustainable activities out of the numerous activities that companies undertake. The EU Taxonomy will be further developed by the Platform on Sustainable Finance.<sup>2</sup>





#### Climate Transition (i.e. Paris-Aligned) Investing: absolutely sustainable.

#### "Thank you for your attention. I would love to learn from your questions and comments."

# Andreas G. F. Hoepner

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