



# **The financial performance of firms under the EU Emissions Trading Scheme (EU ETS)**

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# Introduction

- ❑ The **European Union Emissions Trading Scheme (EU ETS)** is regarded as **the cornerstone of the EU climate policy.**
- ✓ **Its objective:**
  - ‘promote greenhouse gas (GHG) reductions in a cost-effective and economically efficient manner’ (European Commission, 2003).
- ✓ It covers around **45% of the EU’s GHG emissions.**
- ❑ There have been considerable debates regarding the **EU ETS effects on the environmental and economic performance of firms.**



# Subject of Research

□ The study evaluates:

- ✓ the profitability of the firms under the EU ETS
- ✓ the effect of the EU ETS on firm profitability

$$\textit{Profitability} = \textit{Operating P/L [=EBIT]} / \textit{Total assets}$$

- **Economic, environmental and energy-related data** of a large sample of EU firms covered by the EU ETS are used.



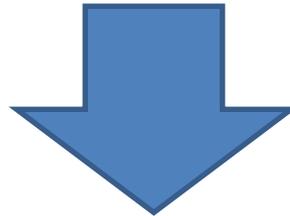
**European Union Emission  
Trading Scheme (EU ETS)**



# Dataset

## □ Dataset (22.776 firm-year observations)

- ✓ 19 EU countries (at least 10 firms covered by the EU ETS)
- ✓ 2006 to 2014
- ✓ 8 main industrial sectors



**About 4.128 European firms**

**Note:** Croatia, Cyprus, Denmark, Ireland, Latvia, Lithuania, Luxembourg and Norway are excluded from the analysis



# Dataset

✓ The industrial sectors and the number of firms per sector

Main sector	Number of firms
A - Agriculture, forestry and fishing	25
B - Mining and quarrying	85
C - Manufacturing	2773
D - Electricity, gas, steam and air conditioning supply	920
E - Water supply; sewerage, waste management and remediation activities	64
F - Construction	64
G - Wholesale and retail trade; repair of motor vehicles and motorcycles	141
H - Transportation and storage	56

❖ **Manufacturing and Electricity** represent **90%** of the sample



# Dataset

## ✓ Regional distribution of firms

Country	Country (ISO Code)	Number of firms per country	Country share in total firms (%)
Austria	AT	82	1.99
Belgium	BE	169	4.09
Bulgaria	BG	71	1.72
Czech Republic	CZ	219	5.31
Finland	FI	115	2.79
France	FR	280	6.78
Germany	DE	595	14.41
Greece	GR	10	0.24
Hungary	HU	104	2.52
Italy	IT	654	15.84
Netherlands	NL	17	0.41
Poland	PL	208	5.04
Portugal	PT	162	3.92
Romania	RO	132	3.20
Slovakia	SK	118	2.86
Slovenia	SI	53	1.28
Spain	ES	632	15.31
Sweden	SE	171	4.14
United Kingdom	GB	336	8.14

❖ Account for about half of our sample:

✓ Germany

✓ Italy

✓ Spain



<b>Abbrev.</b>	<b>Explanation</b>	<b>Sources</b>
CR	$\text{Current\_Ratio} = \text{Current Assets} / \text{Current Liabilities}$	Orbis
SR	$\text{Solvency\_Ratio} = (\text{Shareholders Funds} / \text{Total Assets}) * 100$	Orbis
EBITTA	$\text{EBIT\_TO\_Tot\_Assets} = \text{EBIT} / \text{Total assets}$	Orbis
SZ	$\text{Size} = \ln(\text{Total assets})$	Orbis
NETTA	Number of employees / Total assets	Orbis
ORTTA	Operating revenue / Total assets	Orbis
GDPGR	GDP growth (%)	World Bank
MER	Number of main electricity retailers	Eurostat
AGRFP	Annual growth rate of future price	ICE Database
EFPS	Energy efficiency policies score for industry	MURE Database
AF	Allocation factor = Allowances allocated/Verified emissions	EUTL
VETS	Verified emissions/ Sales	EUTL & Orbis



## □ Effect of the EU ETS on profitability

➤ **Alloc\_Factor (Allocation Factor):** Allowances Allocated / Verified Emissions

○ **AF > 1** => entity has received allowances that exceed its emissions

➤ **Under-cap firms**

○ **AF < 1** => entity either has to buy additional emissions allowances or abate some of its emissions

➤ **Over-cap firms**



- ✓ Regression analysis in STATA
- ✓ 5 settings for the variables (M1, M2, M3, M4, M5)
- ✓ Dependent Variable: EBITTA

Abbrev.	Variable	M1	M2	M3	M4	M5
CR	Current_Ratio	✓	✓	✓	✓	✓
SR	Solvency_Ratio	✓	✓	✓	✓	✓
EBITTA	EBIT_TO_Tot_Assets	✓	✓	✓	✓	✓
SZ	Size	✓	✓	✓	✓	✓
NETTA	No_Empl_TO_Tot_Assets	✓	✓	✓	✓	✓
ORTTA	Oper_Rev_TO_Tot_Assets	✓	✓	✓	✓	✓
GDPGR	GDP_Growth	✓	✓	✓	✓	✓
MER	Number of Main Electr. Retailers		✓	✓	✓	✓
AGRFP	Annual Growth Rate of Future Price		✓	✓	✓	✓
EFPS	Energy_Efficiency_Policies_Score		✓	✓	✓	✓
AF	Alloc_Factor			✓		✓
VETS	Ver_Emiss_TO_Sales				✓	✓



## ✓ Model 1 (M1)

$$EBITTA_{itk} = \alpha + \beta \mathbf{x}_{it-1} + \gamma GDPGR_{kt-1} + u_i + \varepsilon_{it}$$

*EBITTA is the profitability of firm  $i$  from country  $k$  in year  $t$ ,  $\mathbf{x}_{it-1}$  is the vector with the financial data for firm  $i$  (CR, SR, SZ, NETTA, ORTTA) for year  $t-1$ ,  $u_i$  denotes the firm-specific effect, and  $\varepsilon_{it}$  is the idiosyncratic error term.*

## ✓ Model 2 (M2)

$$EBITTA_{itk} = \alpha + \beta \mathbf{x}_{it-1} + \gamma \mathbf{z}_{kt-1} + \delta AGRFP_{t-1} + u_i + \varepsilon_{it}$$

*$\mathbf{z}_{kt-1}$  is the vector with the country level data on GDPGR, MER, and EFPS for country  $k$  in year  $t-1$ .*



## ✓ Models 3 & 4 (M3 & M4)

M3 considers the allocation factor (AF) indicator and M4 uses the verified emission to sales (VETS).

## ✓ Model 5 (M5)

$$EBITTA_{itk} = \alpha + \beta \mathbf{x}_{it-1} + \gamma \mathbf{z}_{kt-1} + \delta AGRFP_{t-1} + \zeta AF_{it-1} + \theta VETS_{it-1} + u_i + \varepsilon_{it}$$



# Estimation Results

	(M1)	(M2)	(M3)	(M4)	(M5)
	EBITTA	EBITTA	EBITTA	EBITTA	EBITTA
<b>CR</b>	-0.0013*	-0.0012	-0.0012	-0.0010	-0.0010
<b>SR</b>	0.0002**	0.0002**	0.0002**	0.0002**	0.0002**
<b>SZ</b>	0.0047**	0.0048**	0.0046**	0.0036*	0.0032
<b>NETTA</b>	-1.2520***	-1.3160***	-1.3100***	-1.3290***	-1.3200***
<b>ORTTA</b>	0.0246***	0.0250***	0.0249***	0.0237***	0.0233***
<b>GDPGR</b>	0.0012***	0.0008***	0.0008***	0.0008***	0.0008***
<b>MER</b>		0.0003	0.0003	0.0008	0.0008
<b>AGRFP</b>		0.0190***	0.0186***	0.0199***	0.0192***
<b>EFPS</b>		0.0003***	0.0003***	0.0003***	0.0003***
<b>AF</b>			-0.0016*		-0.0026***
<b>VETS</b>				-0.0006***	-0.0007***
<b>Const.</b>	0.0504**	0.0530**	0.0547**	0.0609**	0.0646***

Note: \* p < 0.1, \*\* p < 0.05, \*\*\* p < 0.01



# Conclusions

- ❑ Both economic and energy-related attributes affect the firms' profitability.
  
- ❑ **Highly profitable** the firms that experience a **higher**:
  - ✓ GDP growth
  - ✓ operating revenue to total assets ratio
  - ✓ solvency ratio
  - ✓ average growth rate of the CO<sub>2</sub> future price
  - ✓ energy efficiency score



# Conclusions

**Highly profitable** the firms that experience a **lower**:

- ✓ ratio of employees' number to total assets
- ✓ ratio of allowances allocated to verified emissions
- ✓ ratio of verified emissions to sales

**Profitable is not affected by:**

- ✓ current ratio
- ✓ size of firms
- ✓ liberalization of the countries' energy market



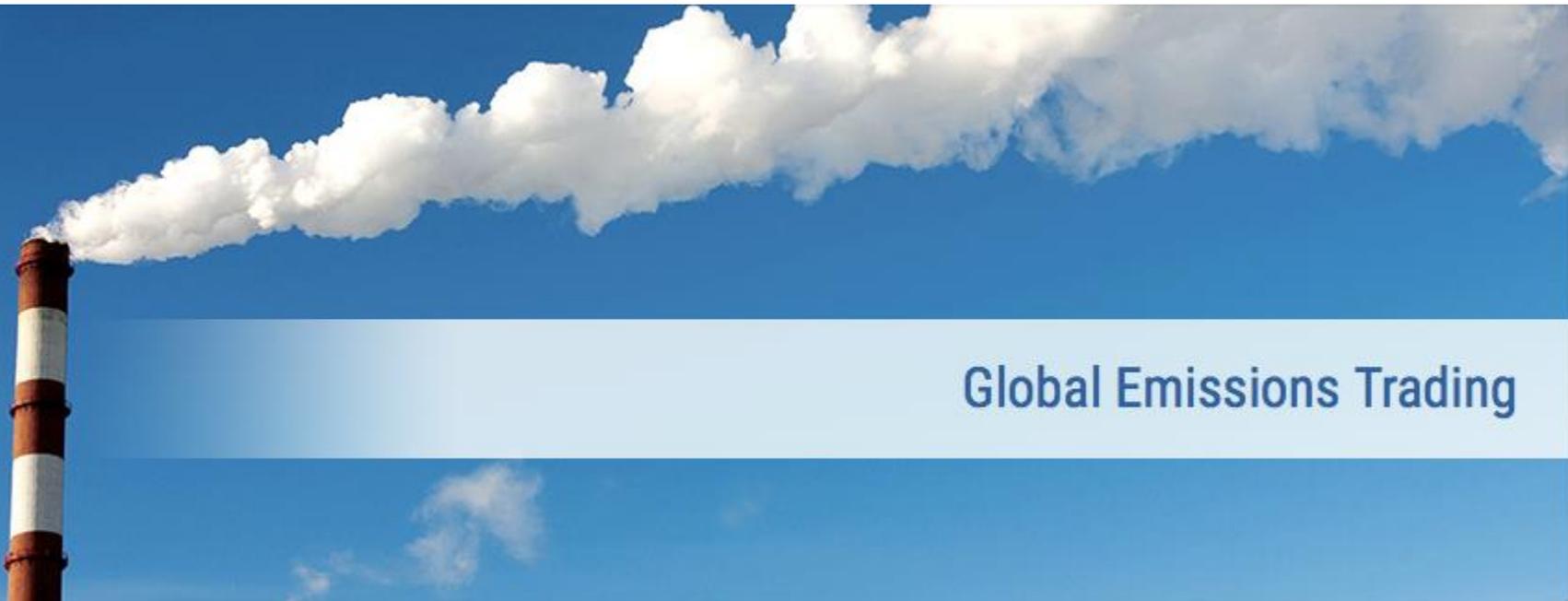
## Next Steps

### □ Future research:

- enrichment of the data set with firms that are not participating in EU ETS
- analysis on different groups (under- versus over-allocated firms)
- a more extensive time period (up-to-date data)
- examination of more economic, environmental and energy-related characteristics



# Thank you for your attention!



Global Emissions Trading