Discussion of Känzig, Marenz & Olbert "Carbon Leakage to Developing Countries"

by Ralf Martin

All views expressed are the presenter's alone

Background

- Europe has been pushing ahead with climate policy for a number of years
- ETS + carbon pricing
- Leakage = it could all be pointless
- Previous research no strong evidence for leakage
- Carefully done new piece of work exploiting slightly different variation

- Do we have to change the view?
- Not so fast

Context

- Various forms of leakage
- EU producers could lose market share to foreign producers (of emission intensive products)
- Here: MNEs move carbon intensive parts of supply chain to un-regulated countries….we examined same question in:

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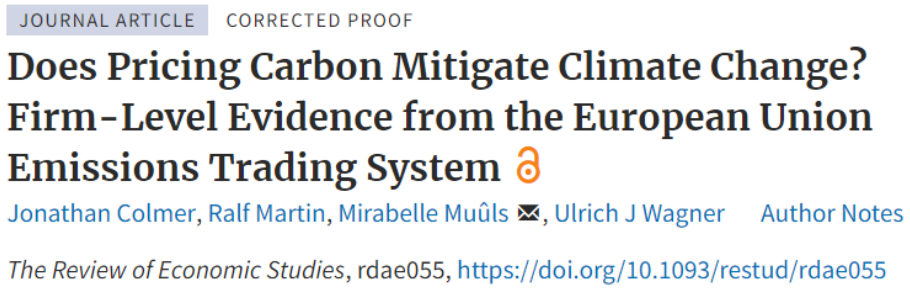
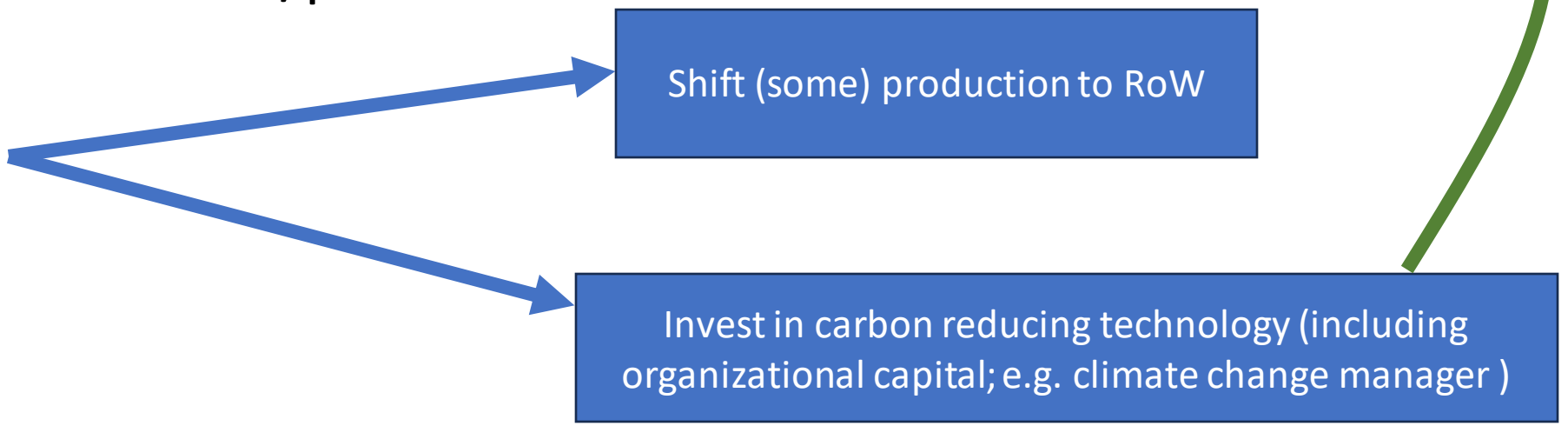


- **No net leakage:** EU reduction bigger than RoW increase
- Firms invest in carbon reducing equipment in Europe

A brief theory of MNE carbon leaks (and halos)

- MNE produces final product $Q = CES(K_{EU}, K_{RoW})$
- K_{EU} & K_{RoW} are not perfect substitutes
- EU introduces carbon tax/price τ
- MNE choice:



What exactly happens is highly non-linear in price

Fig. 1. Marginal profits for different parameter values.Notes: Visualization of profit equation for various parameter assumptions.

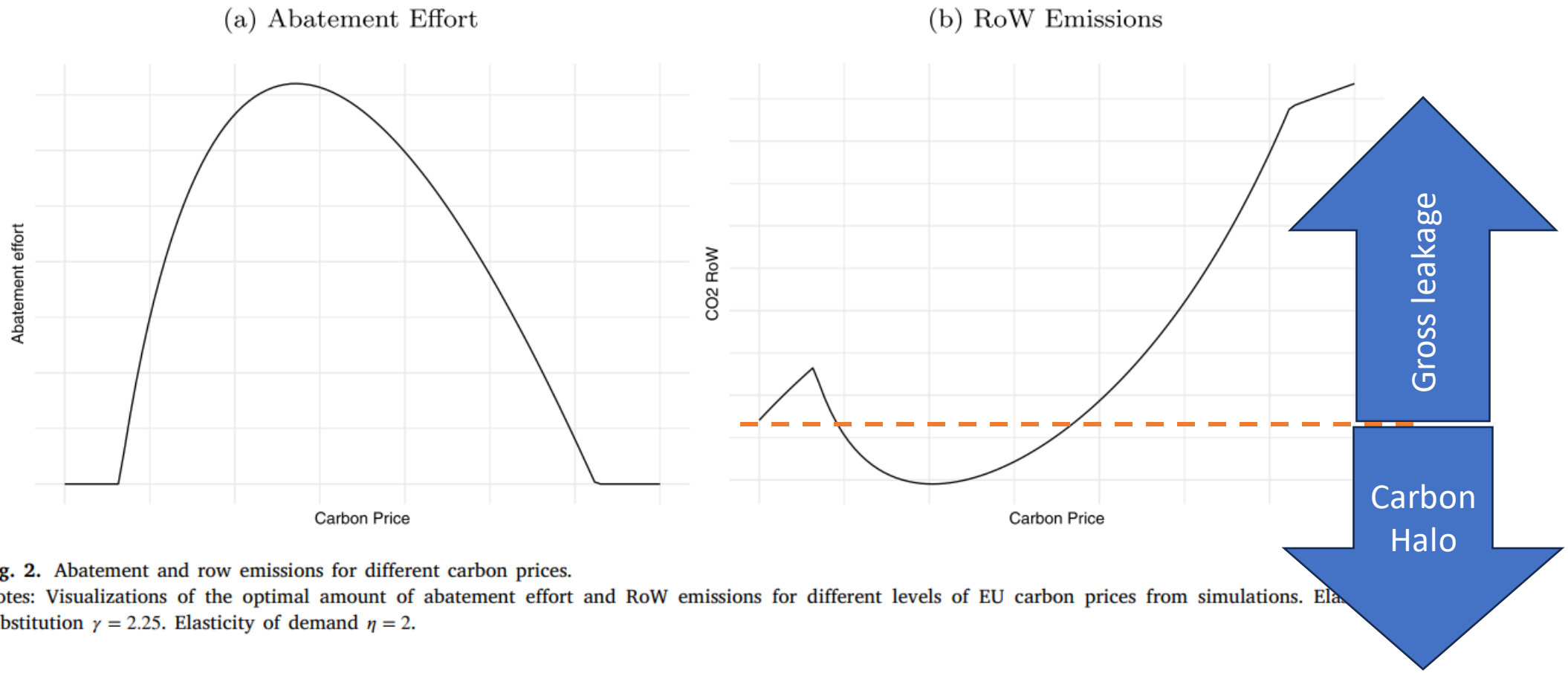


Fig. 2. Abatement and row emissions for different carbon prices.
Notes: Visualizations of the optimal amount of abatement effort and RoW emissions for different levels of EU carbon prices from simulations. Ela
substitution $\gamma = 2.25$. Elasticity of demand $\eta = 2$.

Reconciling Känzig et al with Martin et al

- Time
- Sample

Time

Suggestion: explore non linear price response?

Reconciling

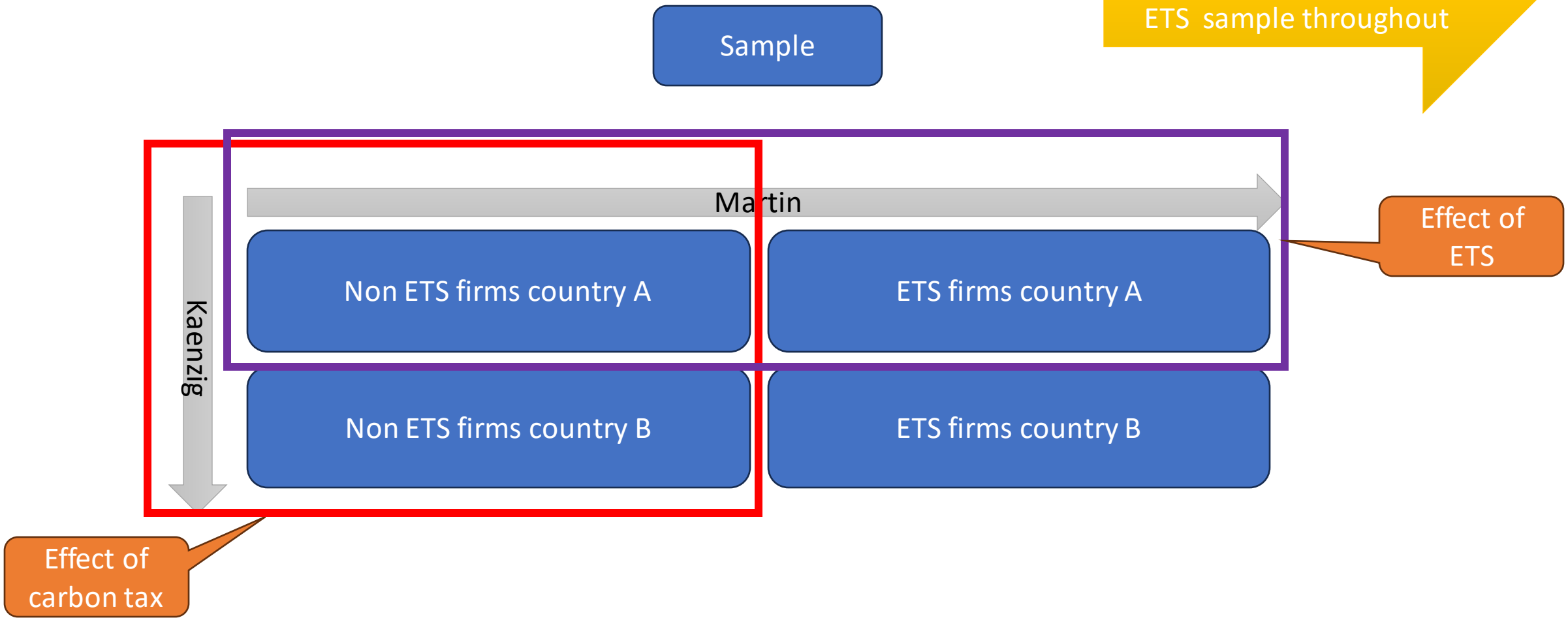
Kaenzig et al	**Martin et al**
2010-2019	<2015
Carbon tax increases of up to 40 Euro	Smaller carbon price (<20 Euro)

Different time period with higher impact carbon price?

Reconciling Känzig et al with Martin et al

- Time/Level of price change
- Sample

Suggestion: might be cleaner to work with non ETS sample throughout



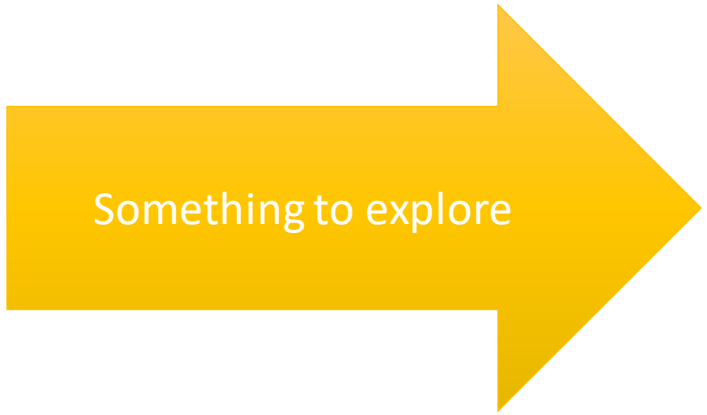
Does it make sense to have more leakage in the non ETS sector?

No

- Less carbon intensive

Yes

- Plenty of free permits in our sample period
- Less pass through?



Other issues

- Measurement: Do we really have carbon at 0.1 degree grid cell?

3. Spatial allocation of emissions on 0.1 degree by 0.1degree grid cells.
A geographical database was built using spatial proxy datasets with the location of energy and manufacturing facilities, road networks, shipping routes, human and animal population density and agricultural land use, that vary over time. The input datasets where point, line and area grids at various resolutions and using GIS techniques for conversion, resampling and aggregation the dataset have been included on a 0.1°x0.1° grid. National sector totals are then distributed with the given percentages of the spatial proxies over the country's area.

Maybe not? Does this mean time variation is entirely driven by aggregate variation?

Other remarks

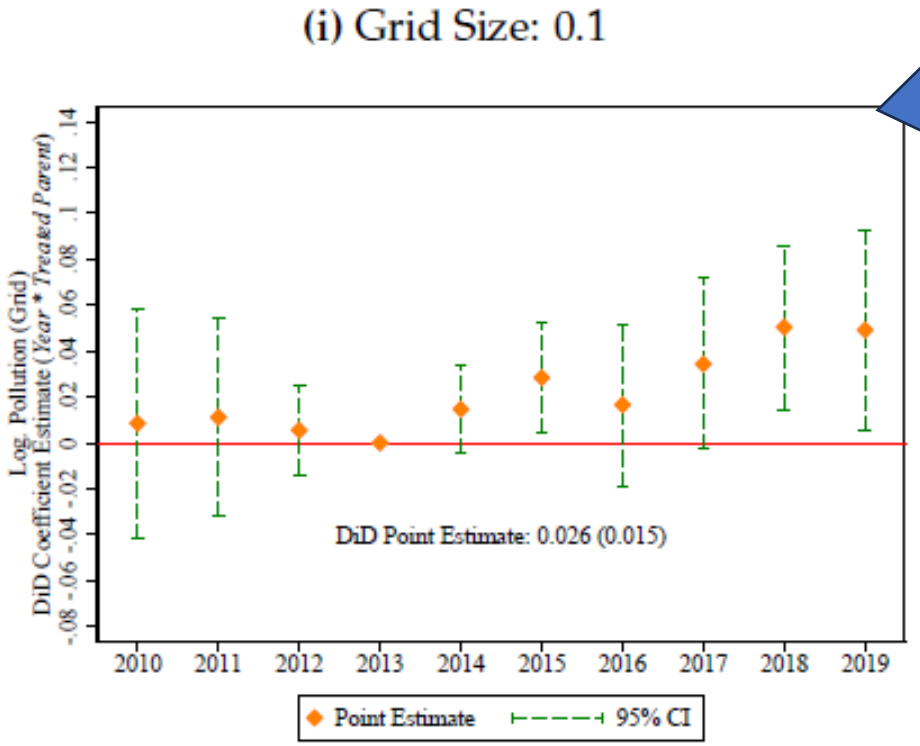
- Align EU subsidiary & Africa RoW subsidiary

- Try to get estimates of emission reduction in Europe and how it compares to increases elsewhere

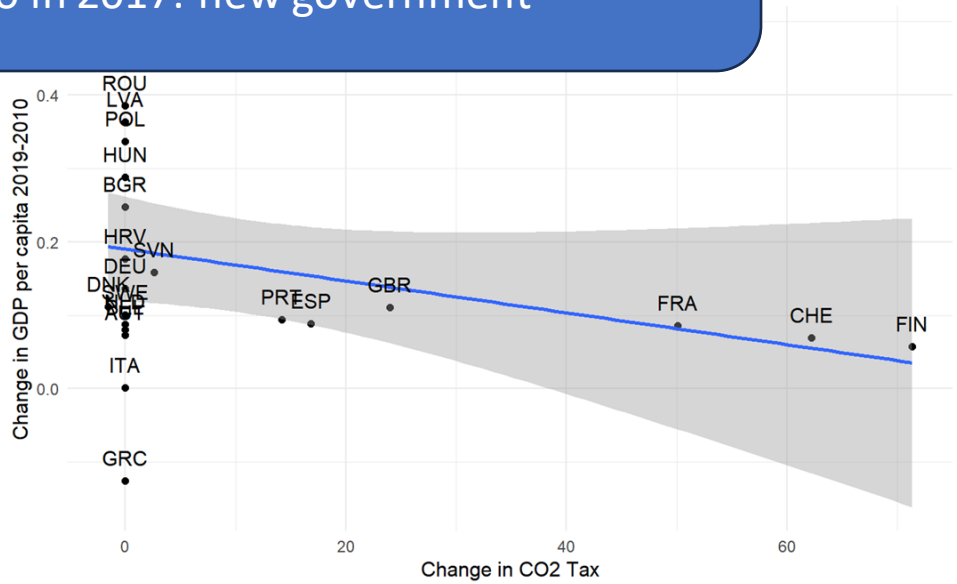
Noise in Consolidated results might hide net CO2 savings

Panel B	ln(Scope 1 Emissions)	ln(Scope 1+2 Emissions)	ln(Scope 1 Em. Intensity)
Carbon Policy Exp. (FTanA)	-0.0124	-0.0483	-0.0545
	(0.0785)	(0.0690)	(0.0727)
Obs.	1,906	1,906	1,906
Adj. R2	0.955	0.961	0.929
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

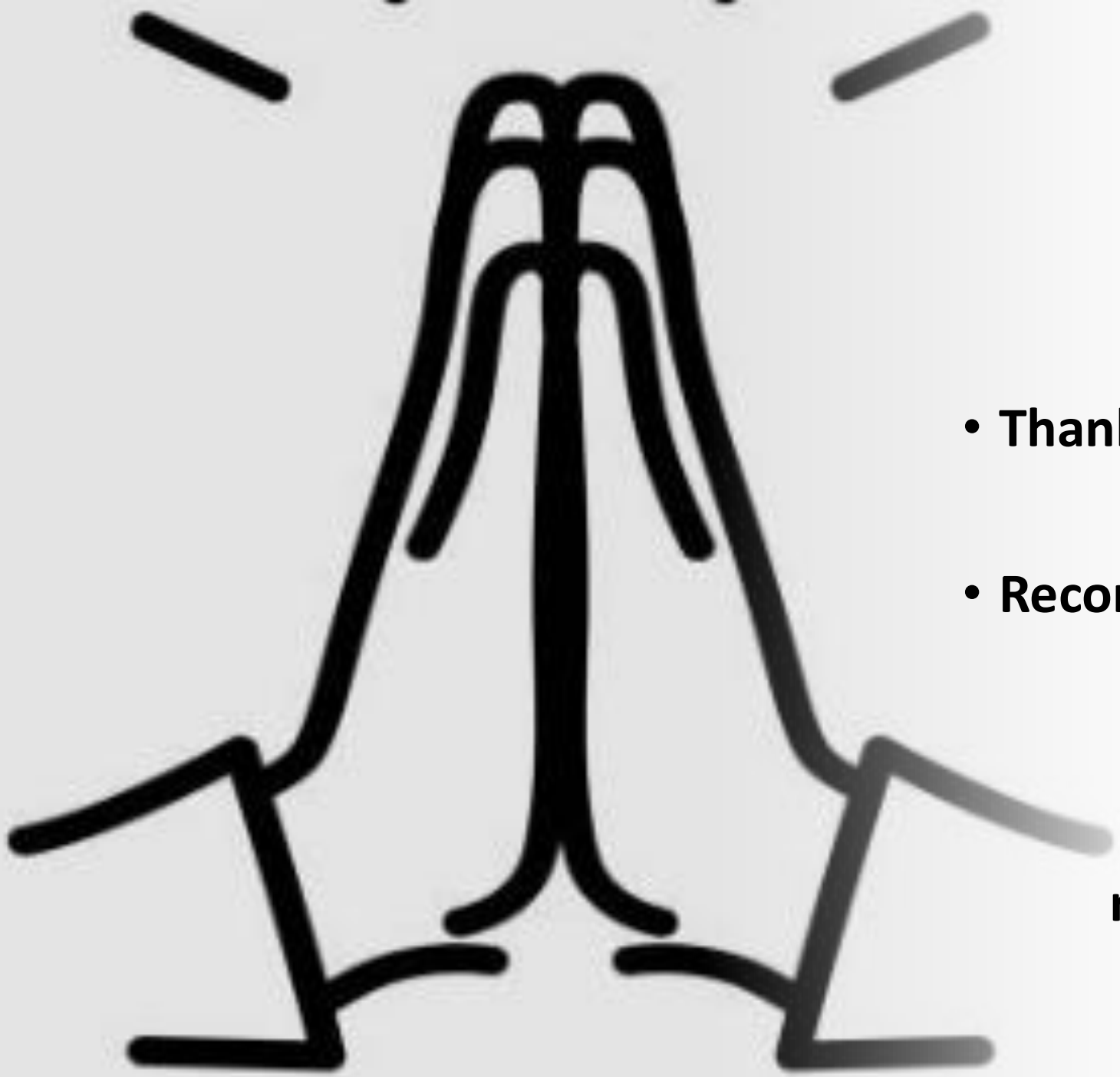
Other controls at EU country level



Carbon tax introduced 2014 but increases only in 2017/18 to 40 Euro
Also in 2017: new government



$$Other\ drivers\ In\ EU\ countries = \sum_{d \in D} w_{id} \times Other_{dt}$$



- **Thanks for an interesting paper**
- **Reconciliation is possible!**

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Table 8: CARBON LEAKAGE TO LOWER-INCOME COUNTRIES AT THE MACRO LEVEL

	(1)	(2)	(3)	(4)	(5)
	ln(CO2 Country)				
Sample:	Full	Full	Upper Middle	Lower Middle	Low Income
Carbon Policy Exp. (Macro, Trade)	0.025	0.026	0.007	-0.003	0.045***
	(0.02)	(0.02)	(0.08)	(0.05)	(0.01)
ln(GDP)	0.610***	0.625***	0.791***	0.191	0.323**
	(0.12)	(0.14)	(0.13)	(0.22)	(0.15)
GDP Growth	-0.001**	-0.001**	0.001	-0.000	-0.000
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
ln(Exports)	0.053**	0.077***	0.034	0.009	0.113***
	(0.03)	(0.03)	(0.08)	(0.03)	(0.04)
ln(Population)	0.229	0.149	-0.222	0.188	-0.440
	(0.18)	(0.24)	(0.42)	(0.45)	(0.38)
Obs.	1105	1095	367	436	185
Adj. R2	0.998	0.998	0.998	0.998	0.995
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes				
Year × Region FE		Yes	Yes	Yes	Yes

Table 7: THE EFFECT ON EMISSIONS AND ACTIVITY AT THE CONSOLIDATED LEVEL

	(1)	(2)	(3)
Panel A	ln(Fixed Tan. Assets)	ln(Total Assets)	ln(Employees)
Carbon Policy Exp. (FTanA)	-0.0199	-0.0050	-0.0052
	(0.0262)	(0.0202)	(0.0242)
Obs.	6,006	6,041	5,665
Adj. R2	0.959	0.978	0.954

Panel B	ln(Scope 1 Emissions)	ln(Scope 1+2 Emissions)	ln(Scope 1 Em. Intensity)
Carbon Policy Exp. (FTanA)	-0.0124	-0.0483	-0.0545
	(0.0785)	(0.0690)	(0.0727)
Obs.	1,906	1,906	1,906
Adj. R2	0.955	0.961	0.929
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes