



# **THE DECOUPLING PHENOMENON: DO POSTAL OPERATORS PLAY A ROLE ON IT?**

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# Outline

- Green growth and decoupling
- Decarbonization and decoupling indicators
- Testing decoupling in the postal sector
- Postal decoupling? Empirical findings
- Conclusion and discussion

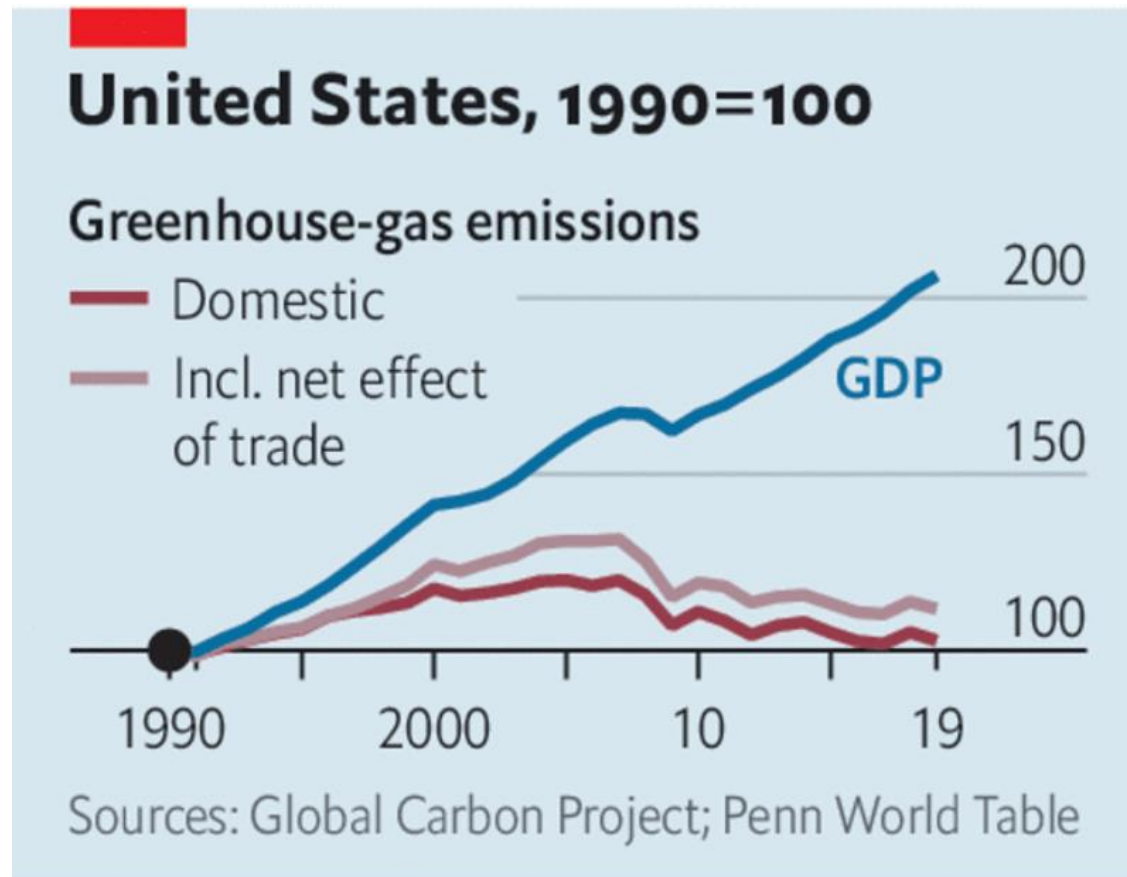


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# Emissions vs economic growth

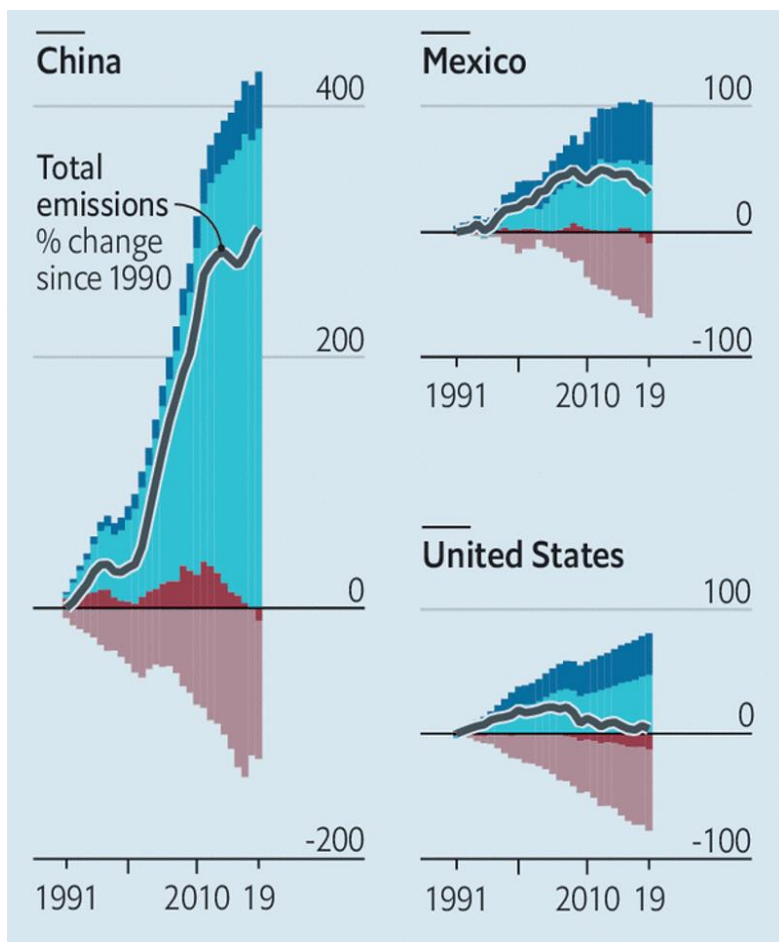


The Economist

- 4 - The Decoupling Phenomenon:  
Do Postal Operators Play A Role On It? / 25<sup>th</sup> May 2023



# Decoupling emissions from GDP/cap growth

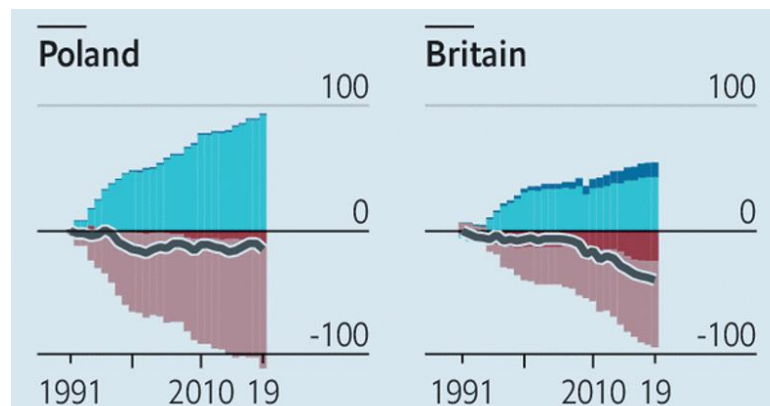


## Going down well

Contribution to greenhouse-gas emissions\*

CO<sub>2</sub> equivalent, percentage-point change since 1990

Population  
GDP per person  
CO<sub>2</sub> intensity of energy supply  
Energy supply per unit of GDP



\*Territorial

Sources: Penn World Table; Global Carbon Project; IEA; UN;  
"Drivers of declining CO<sub>2</sub> emissions in 18 developed economies",  
by C. Le Quéré et al., 2019

The Economist



# Green growth and decoupling

## Continued economic expansion compatible with the planet's ecology

Green economy that simultaneously grows income and improves human well-being while significantly reducing environmental risks and ecological scarcities (UNEP, 2011)

**Decoupling of GDP growth from resource use and carbon emissions at a sufficient rate to prevent dangerous climate change**

## Different types of decoupling picture environmental sustainability achievements

**Absolute decoupling** when environmentally relevant variable stable or decreasing while the economic driving force is growing: more than 1bn people living in 33 countries with falling emissions and growing economies (2022, The Economist)

**Relative decoupling** when growth rates of the resources used or environmental impacts lower than the growth rate of the economic driving force: the most common case



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# Decarbonization: Tapio decoupling indicator

Economic output growth rate (1)	CO <sub>2</sub> emissions growth rate (2)	Decoupling (Tapio) (2)/(1)	Decoupling state
> 0	< 0	< 0	Strong decoupling
> 0	> 0	[0; 0.8]	Weak decoupling
> 0	> 0	[0.8; 1.2]	Expansive coupling
> 0	> 0	> 1.2	Expansive negative decoupling
< 0	< 0	> 1.2	Recessive decoupling
< 0	> 0	< 0	Strong negative decoupling
< 0	< 0	[0; 0.8]	Weak negative decoupling
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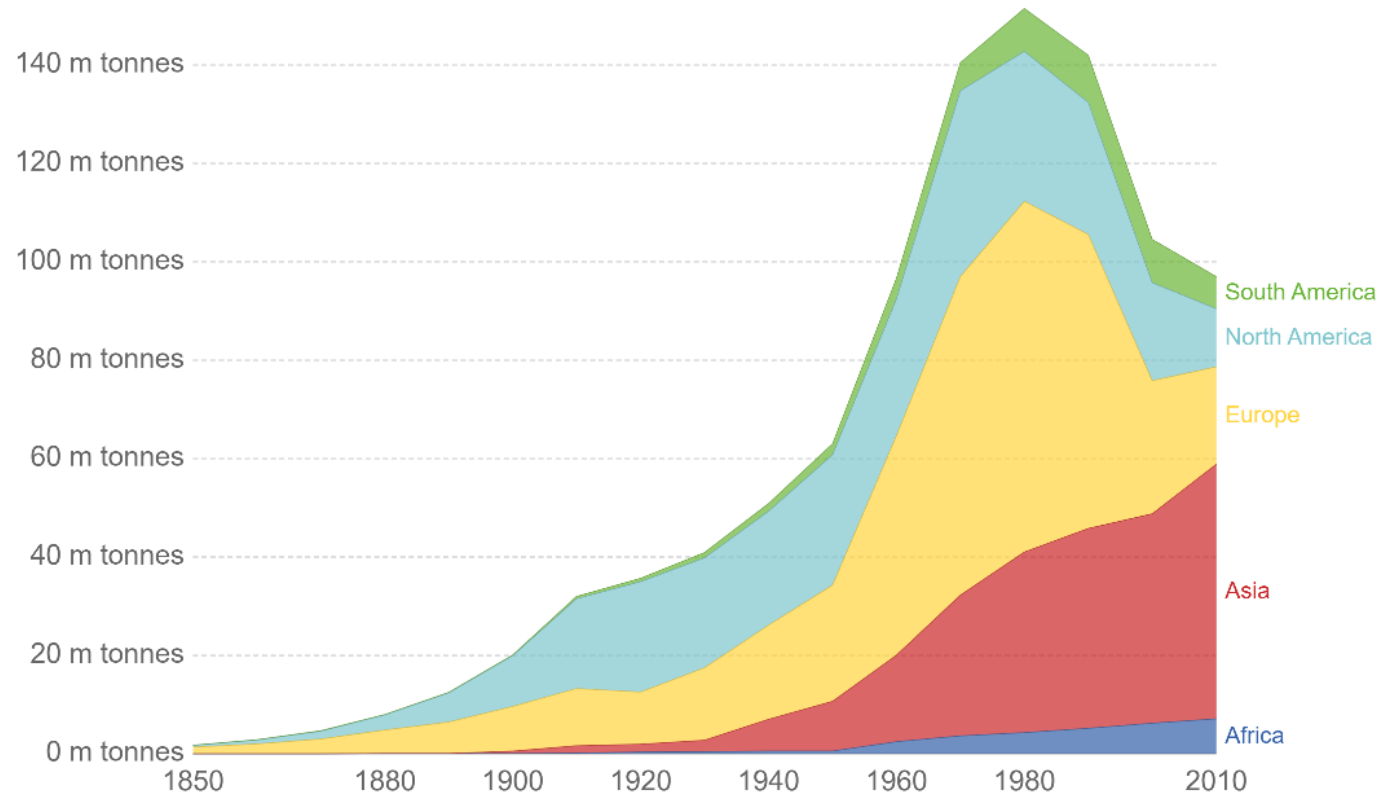


# Environmental Kuznets curve

SO<sub>2</sub> emissions, by world region (in million tonnes)

Annual sulphur dioxide (SO<sub>2</sub>) emissions in million tonnes

Our World  
in Data



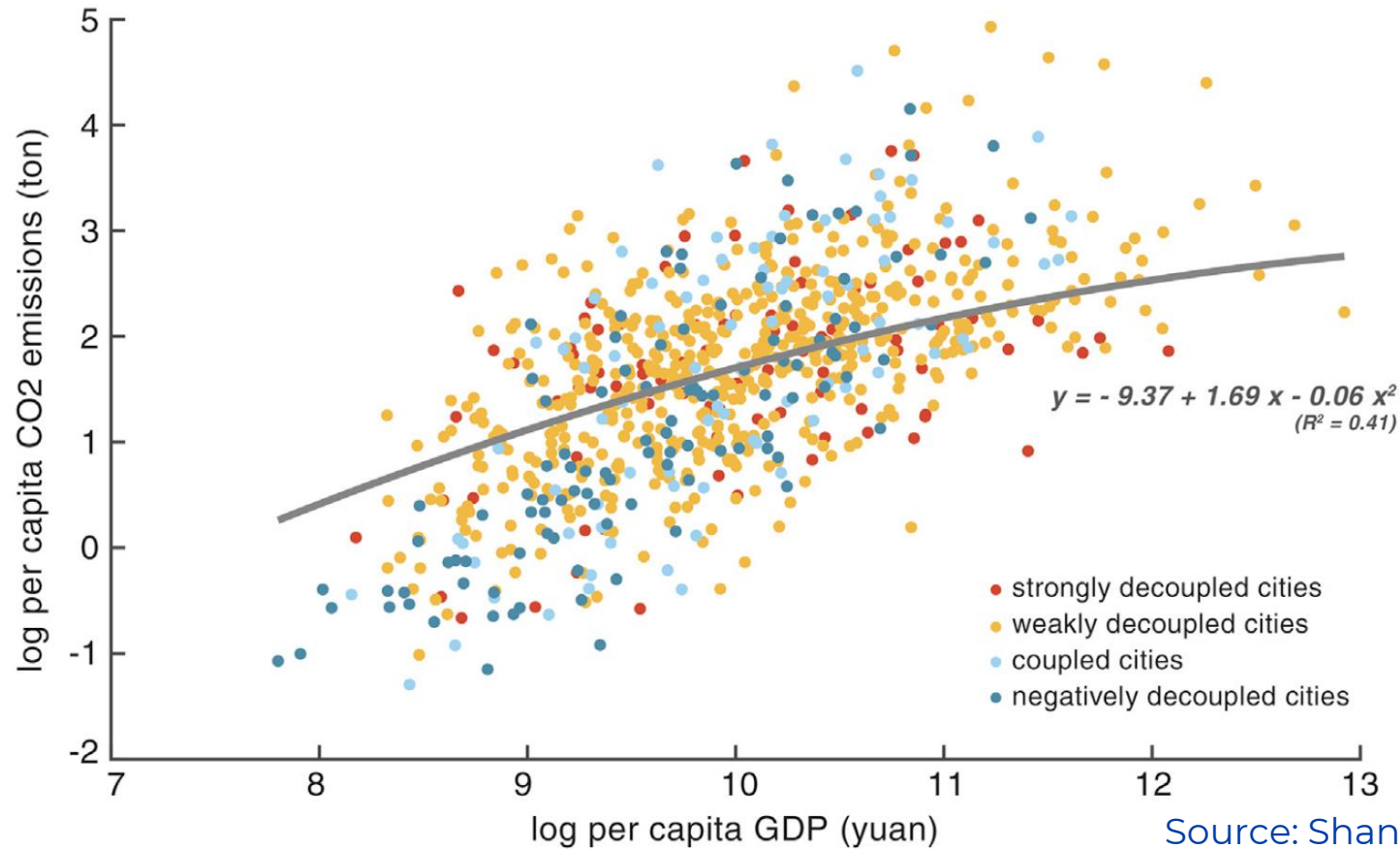
Source: Clio Infra; Klimont, et al (2013)

Note: Data from 1850-2000 based on Clio Infra datasets. Data extended to 2010 using data from Klimont et al. (2013) publication: "The last decade of global anthropogenic sulfur dioxide: 2000-2011 emissions", which applies the same methodology for emissions estimation.

OurWorldInData.org/air-pollution/ • CC BY-SA



# Environmental Kuznets curve



Source: Shan et al. (2021)



# Outline

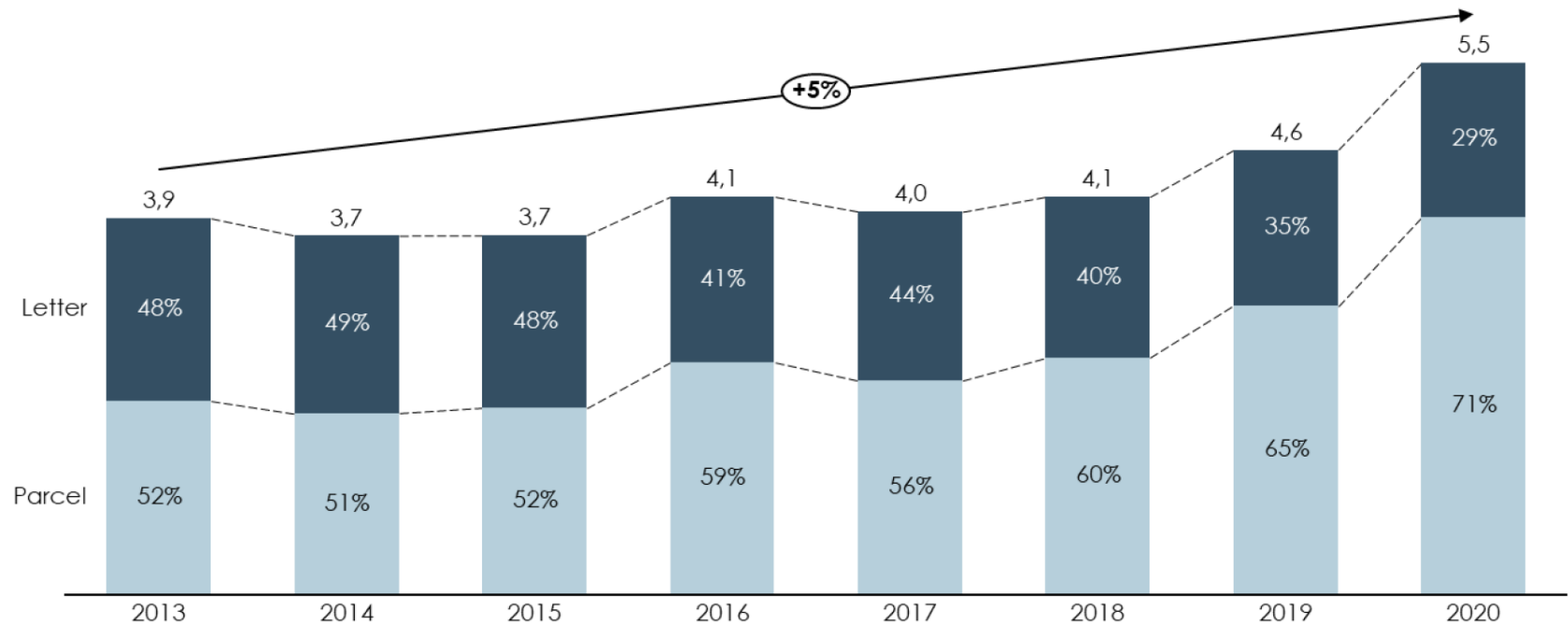
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# Before testing postal decoupling... green facts

## CO2 emissions from domestic letter and parcel delivery in EU27

Million tonnes CO<sub>2</sub>, change is reported as compound annual growth rate (CAGR).



Note: Includes Scope 1, 2 and 3 emissions; cross-border deliveries not included.

Source: Copenhagen Economics estimation based national market volume data and emission estimates from IPC.



# Testing decoupling in the postal sector

Tapio's postal decoupling indicators for all items, letter-post and parcel-post

$$D_{all} = \text{Postal elasticity to CO2 emissions} = \frac{\text{Variation of postal CO2 emissions}}{\text{Variation of postal deliveries}}$$

$$D_{letter-post} = \text{Letter elasticity to CO2 emissions} = \frac{\text{Variation of letter-post CO2 emissions}}{\text{Variation of letter-post deliveries}}$$

$$D_{parcel-post} = \text{Parcel elasticity to CO2 emissions} = \frac{\text{Variation of parcel-post CO2 emissions}}{\text{Variation of parcel-post deliveries}}$$

Decoupling period: 2017-2020

Data: UPU OSCAR and IPC EMMS



# Testing decoupling in the postal sector

Delivery elasticities, postal environmental Kuznets curves and postal vs general decoupling correlations

$$\ln(\text{Postal CO2 emissions}/cap_{all,i}) = \alpha_{all} + \beta_{all} \ln(\text{Postal Items}/cap_{all,i}) + \varepsilon_{all,i}$$

$$\ln(\text{Letter post CO2 emissions}/cap_{l,i}) = \alpha_l + \beta_l \ln(\text{Letter post Items}/cap_{l,i}) + \varepsilon_{l,i}$$

$$\ln(\text{Parcel post CO2 emissions}/cap_{p,i}) = \alpha_p + \beta_p \ln(\text{Parcel Items}/cap_{p,i}) + \varepsilon_{p,i}$$

Cross-sectional decoupling for the year 2020

Data: UPU and IPC



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# Testing Tapio's postal decoupling

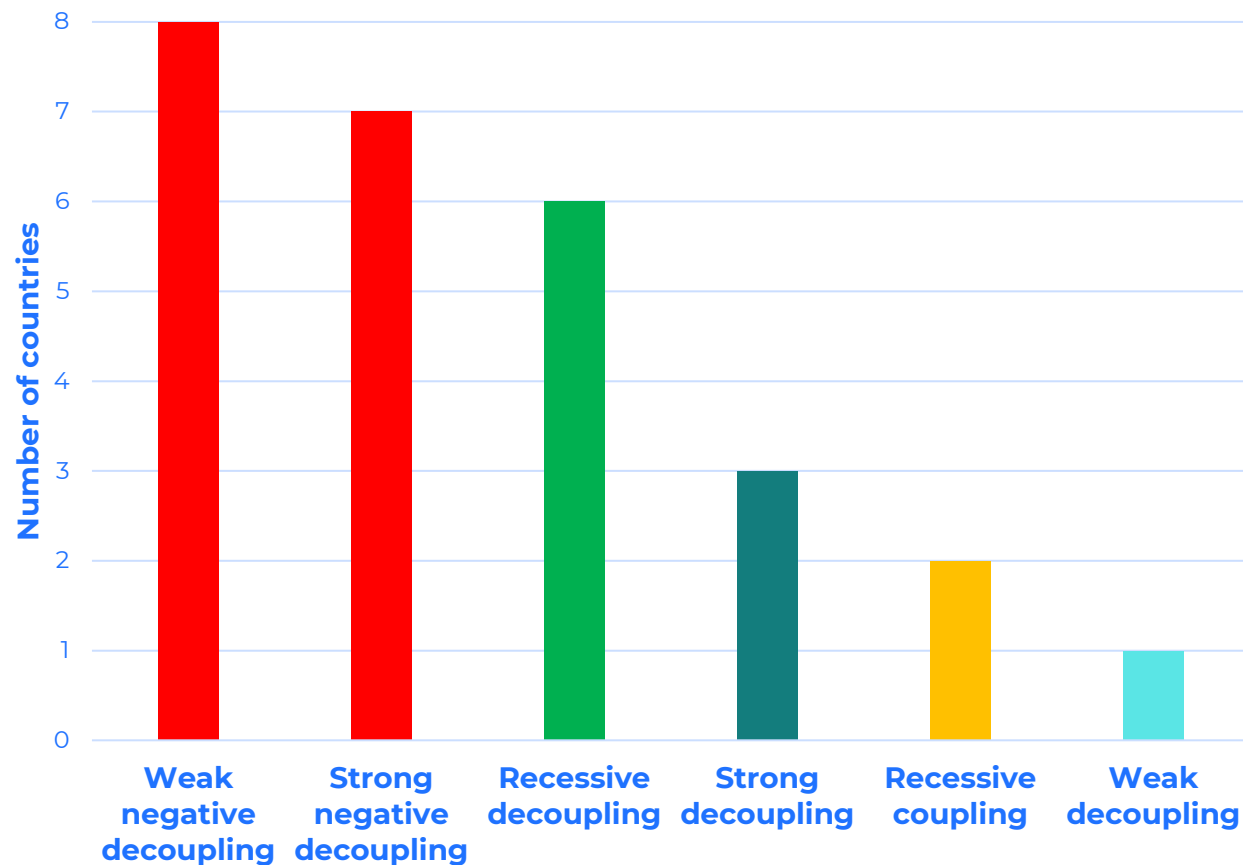
Postal traffic growth rate (1)	CO <sub>2</sub> emissions growth rate (2)	Postal decoupling (Tapio) (2)/(1)	Postal decoupling state
> 0	< 0	< 0	Strong decoupling
> 0	> 0	[0; 0.8]	Weak decoupling
> 0	> 0	[0.8; 1.2]	Expansive coupling
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# Decoupling in postal items delivery?

Mixed postal traffic decoupling patterns across postal operators



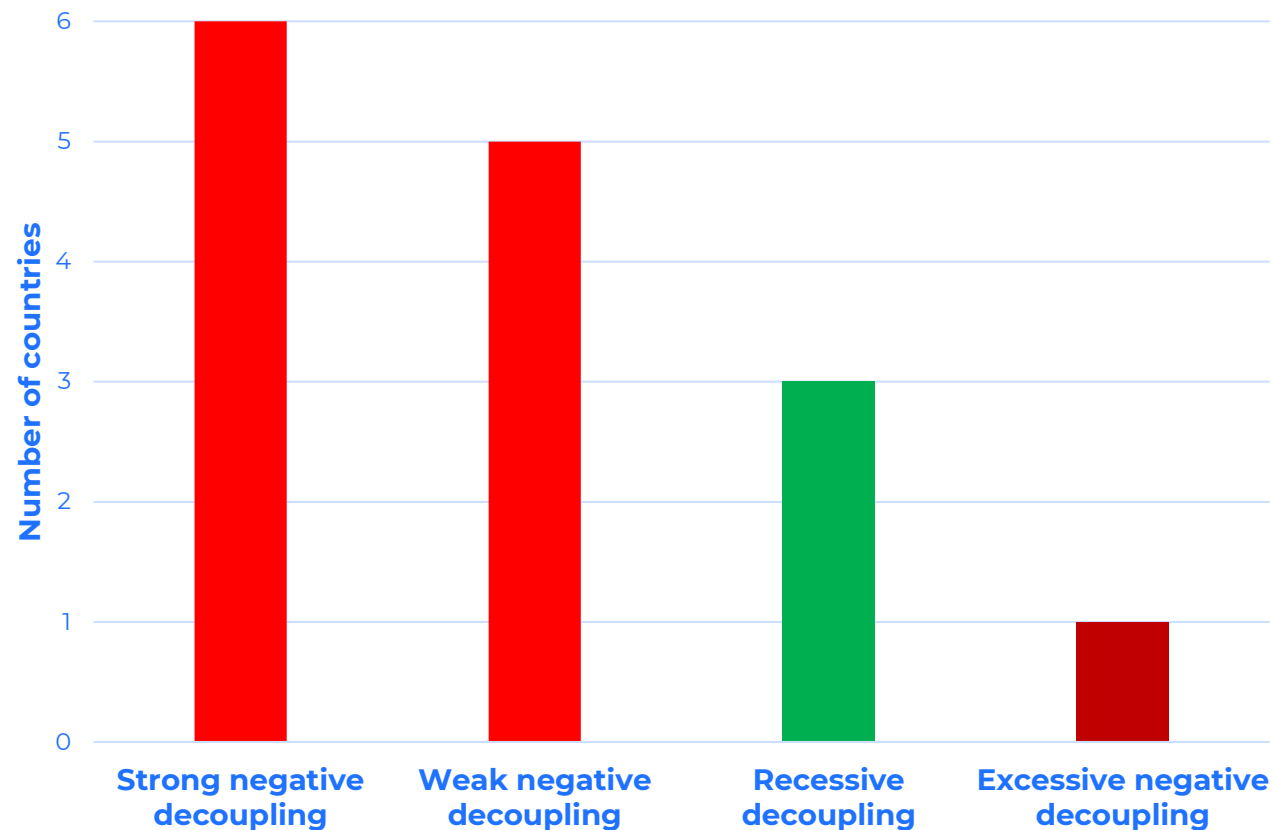
For the period 2017-20, most postal networks still in weak or strong **negative decoupling** in spite of recent important investments and efforts in decarbonization actions and projects

**Decoupling of total postal traffic from carbon emissions still at an insufficient rate to stop damaging climate in the majority of countries in our sample**



# Decoupling in letter-post delivery?

**Big challenges for achieving decoupling in this postal activity segment**

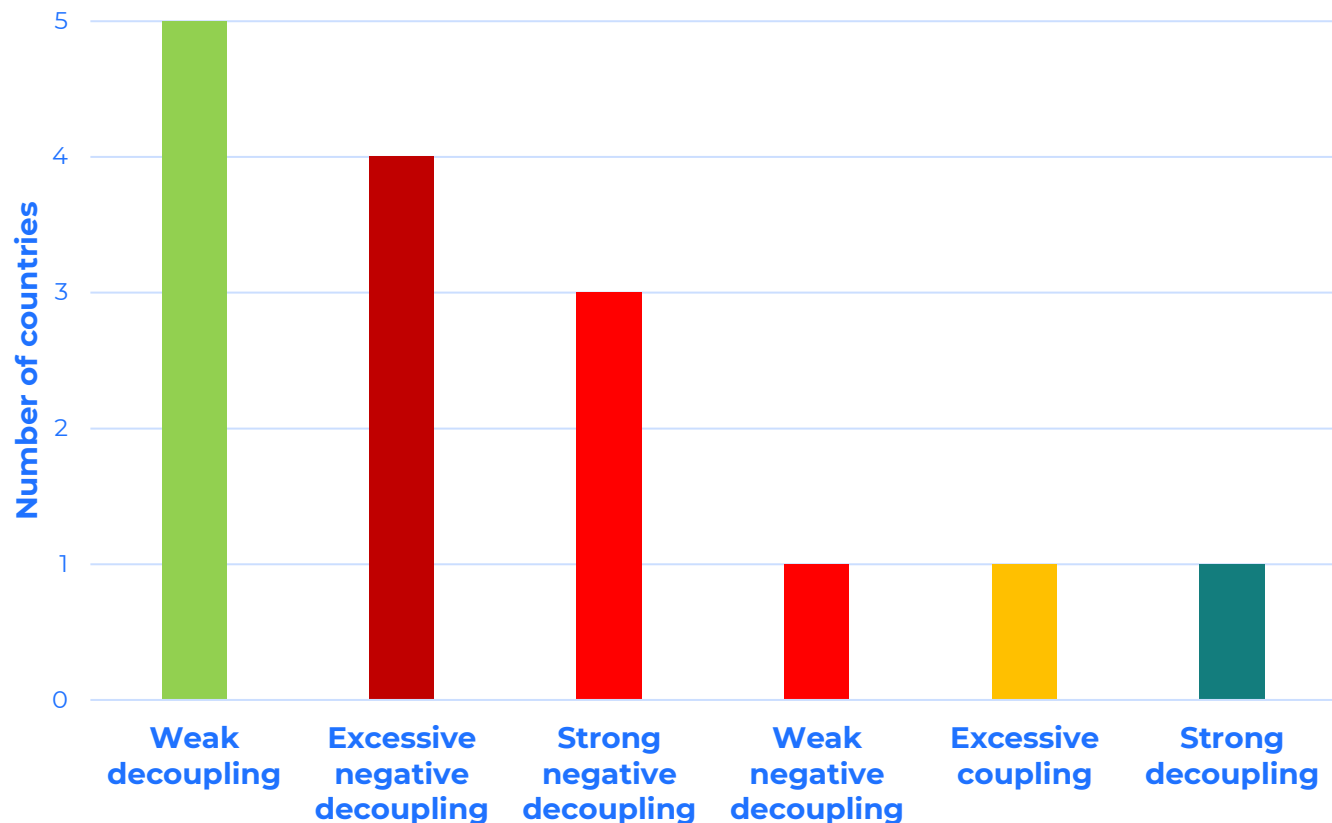


For the period 2017-20, only three operators in recessive decoupling meaning the rate of decline of carbon emissions of the postal activity higher than the rate of decline of letter-post volumes



# Decoupling in parcel-post delivery?

**Most positive signals of decoupling found in this segment of postal activity**

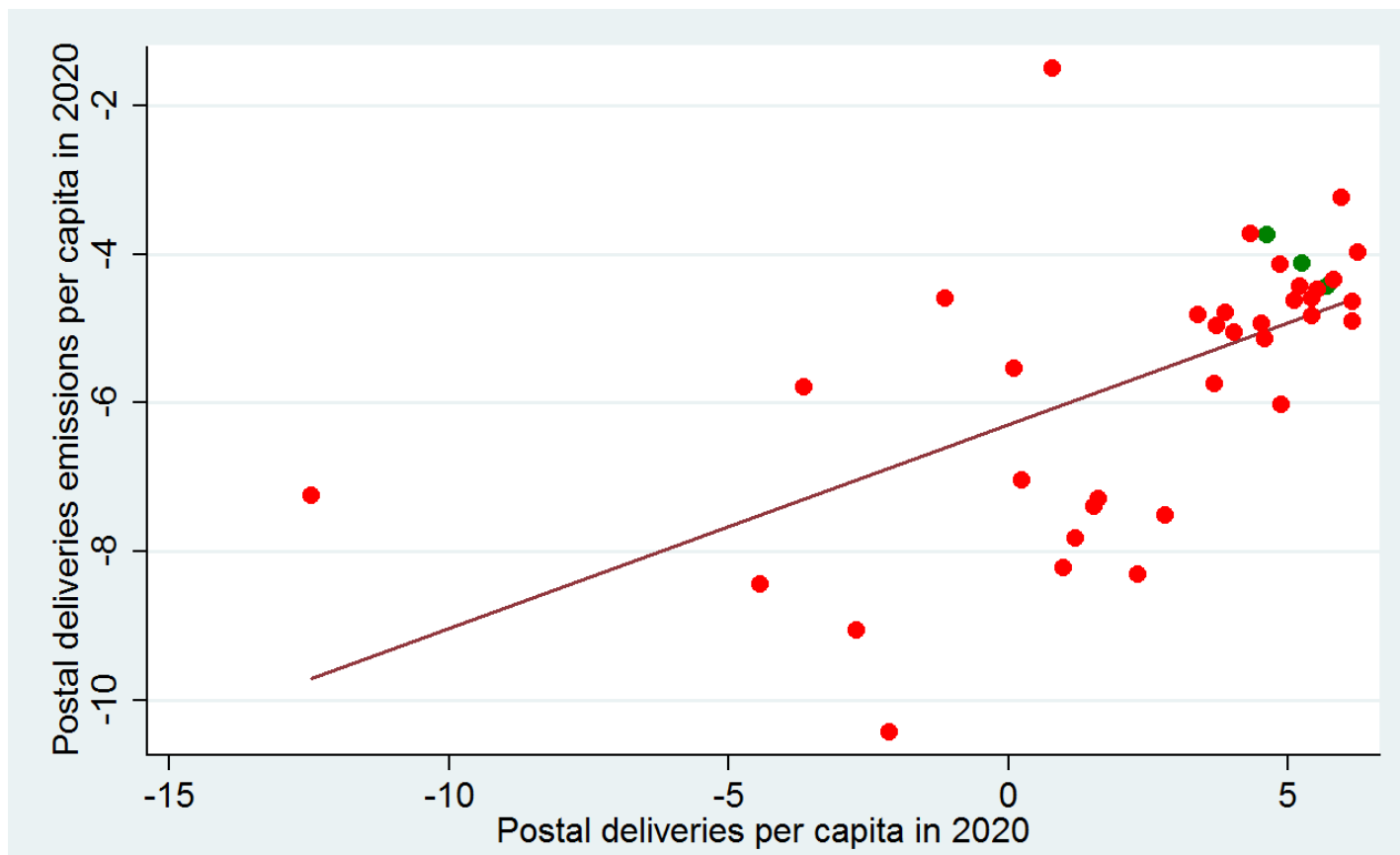


For the period 2017-20, the weak decoupling case is the mode of the distribution but expansive negative decoupling where emissions grow faster than parcel volumes is also observed



# Delivery elasticity for all delivered items

Delivery elasticity estimates for all postal items well below one suggesting some kind of decoupling



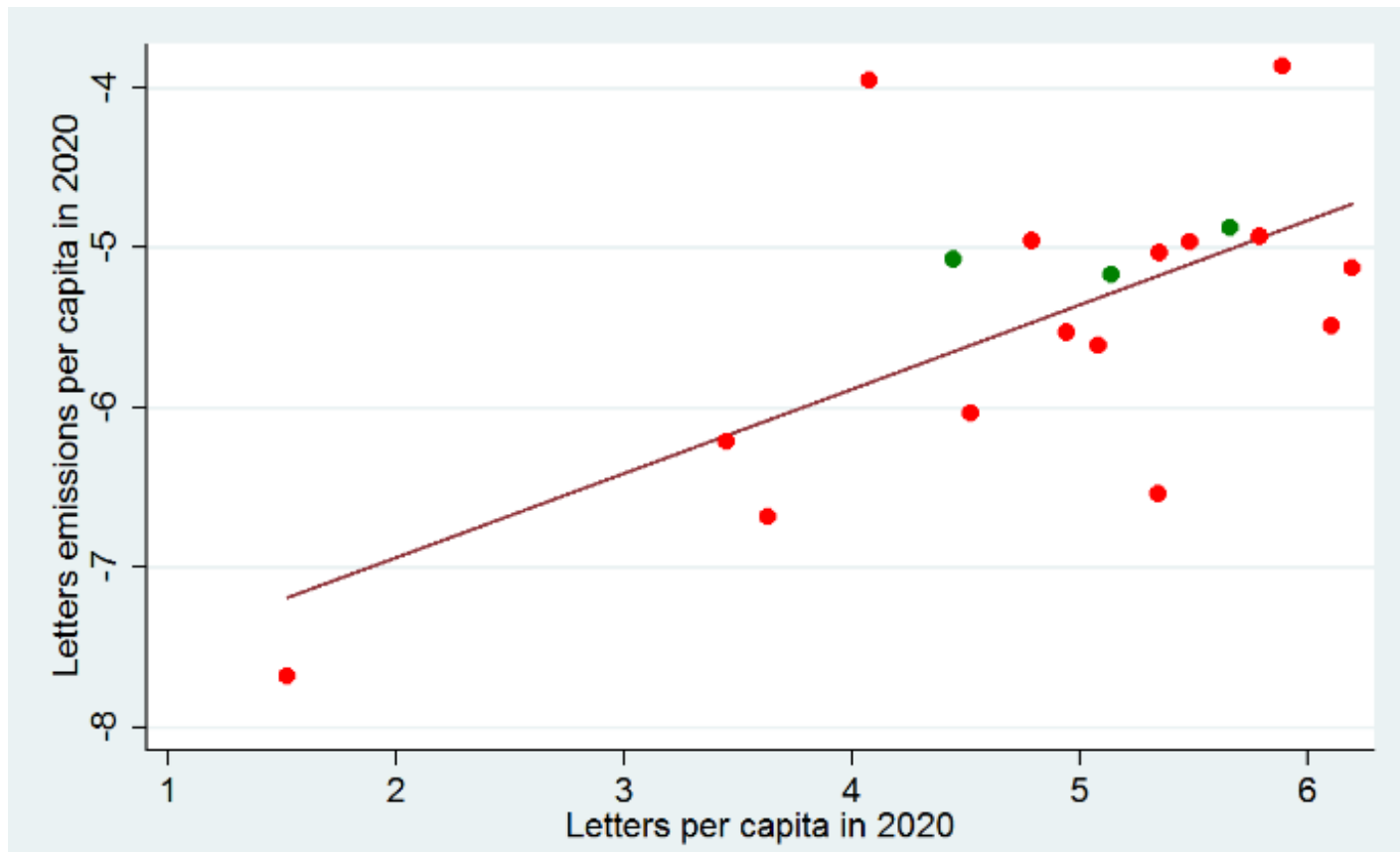
A 10% surge in the number of postal items being delivered leads to an increase of 3.2% in total postal emissions

Indicates a less-than-proportional impact of total postal volumes on emissions, suggesting **some level of decoupling across countries in 2020**



# Delivery elasticity for letter-post items

Delivery elasticity estimate for this postal service suggests some kind of decoupling



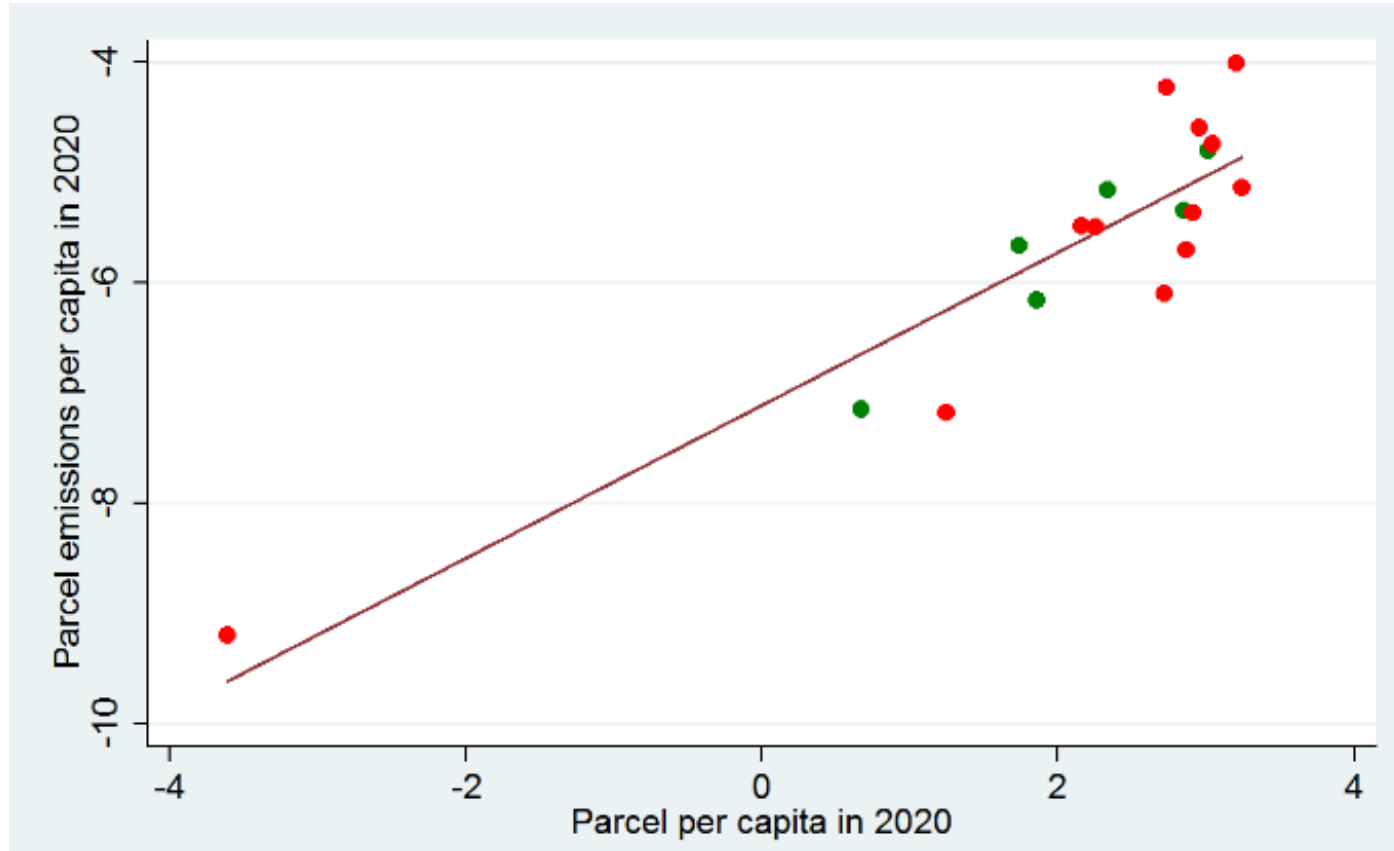
A 10% surge in the number of postal items being delivered leads to an increase of 5.3% in total postal emissions

Indicates a less-than-proportional impact of letter volumes on emissions, suggesting **some level of decoupling for letter-post across countries in 2020**



# Delivery elasticity for parcel-post items

Delivery elasticity estimate of one for this postal service suggests no decoupling across countries yet



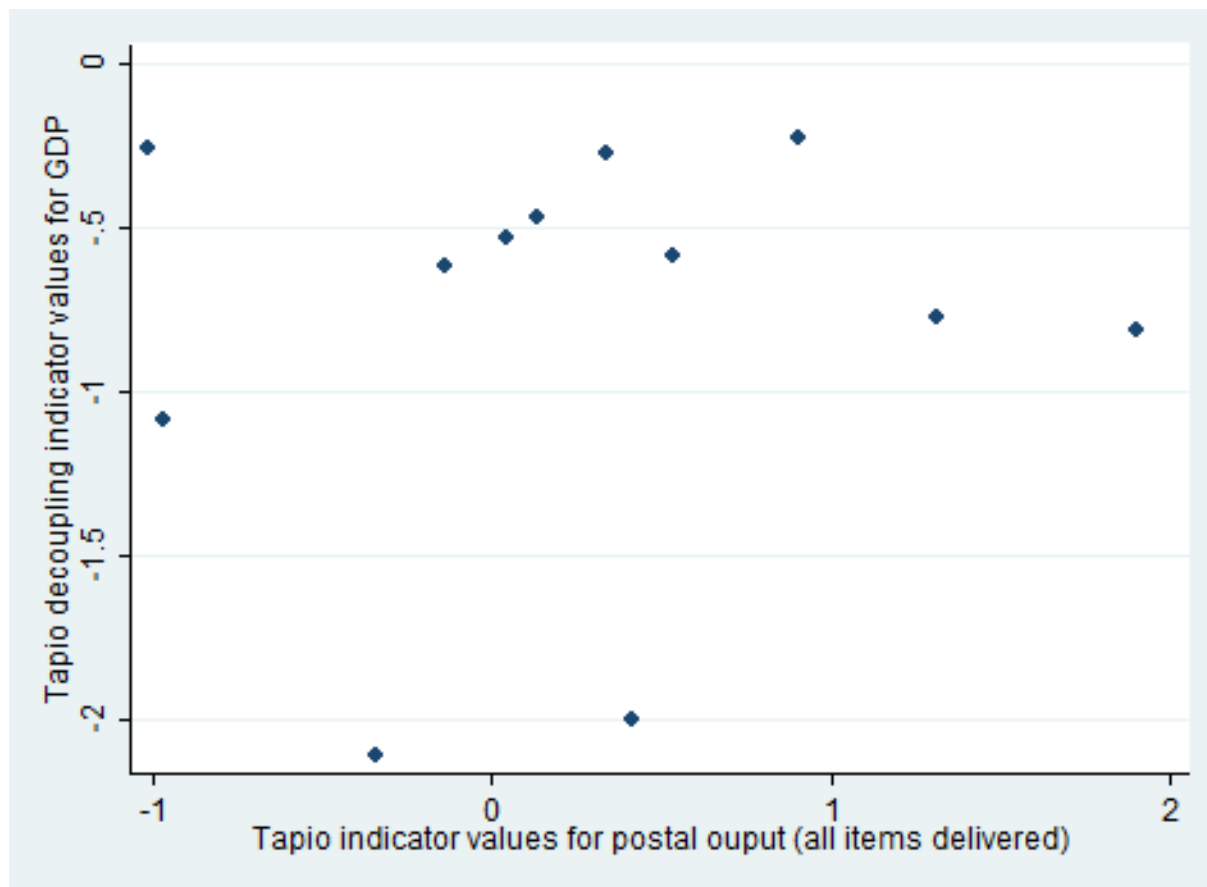
A 10% surge in the number of parcel items being delivered leads to an increase of 10% in postal emissions related to parcel delivery

Indicates a strictly proportional impact of parcel volumes on emissions, suggesting **no general decoupling for parcel-post across countries in 2020: pandemic effect?**



# Postal and general decoupling

There is no correlation between postal and general economic decoupling yet



No postal environmental Kuznets **curve** could be identified so far

Initial research only covers a **limited period of time** between 2017 and 2020

The **effects of the pandemic** on postal volumes and activities could have well impacted the results

But already **some operators with positive outcomes in terms of decoupling**



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# Conclusion and discussion

## An open postal decoupling challenge for the next decade

Comprehensive analysis of the decoupling phenomenon in the postal sector, revealing a complex picture with both **progress and challenges**

**Some postal operators with significant strides towards decoupling**, but there is still much work to be done for “greening” postal activities across the world

## Successful decarbonization requires supportive regulatory frameworks

**Updating USO requirements** by removing outdated delivery obligations for letter-post services

**Finding the right incentives mechanisms** encouraging “greener” parcel delivery practices both from delivery operators and consumers



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