The role of interdependence in the adoption of environmental provisions in preferential trade agreements: a spatial econometric approach

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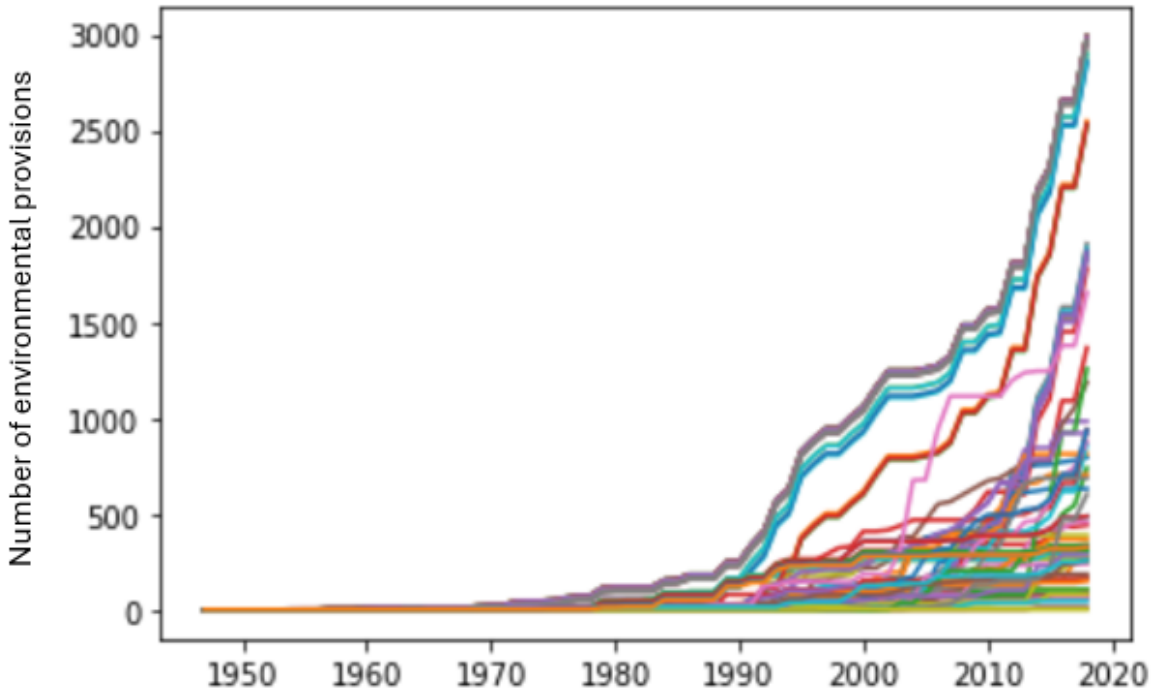
Introduction

- Greater concern for environment
  - $\Rightarrow$ More regulation in several areas to protect the environment
- Also with international trade
- A lot of trade takes place within trade agreements

- Trade agreements
  - number have been increasing
  - are "wider": not only trade issues, but also include labour issues, human rights, etc.
  - . . . and clauses regarding environmental protection

Context (2)

Figure 1: Evolution of the number of environmental provisions signed by countries from 1950 to 2018 for a set of 80 countries



Source: Own representation using data on 80 countries from the Trade and Environmental Database (TREND) built by Morin et al. (2018).

What do we mean with "Environmental protection"?

- Environmental protection
  - can potentially mean different things
  - has different dimensions
- Empirical estimation $\Rightarrow$ Need a concrete, quantitative measure
- To measure the degree of environmental protection adopted by countries in trade agreements, we follow the work by Morin et al. (2018)

Environmental protection according to Morin et al. (2018)

Morin and co-authors

- Analyzed the text of 725 different trade agreements
- Identified statements or clauses related to environmental protection
- Classified these clauses/provisions
- They identify 15 broad categories
- Each of these 15 categories are subdivided into more specific aspects
  - $\Rightarrow$ 295 different types of environmental provisions
- For each trade agreement, information whether a particular environmental provision has been signed or not

Why would countries adopt environmental provisions in trade agreements?

2 broad reasons have been identified in the literature

- Genuine concern for the environment
- "Green protectionism"

Our research quesion:

- What are the determinants of the adoption?
- Is there interdependence between countries?

Interdependency

- As trade between countries could be affect by norms, countries influenced potentially by other countries
- influence will depend on intensity of link
- Environmental policy: strategic complements or strategic substitutes? As other countries include more environmental provisions in their agreements, do countries follow (strategic complements) or less (strategic substitutes) or independent (neither)?

Contribution to the literature

Two strands of literature related to our analysis

1. Adoption of environmental provisions in PTAs:
   - Major factors that explain inclusion of provisions such as power of the country, commitment to environmental protection and the cost of adoption (Allee and Elsig, 2016 ; Milewicz et al., 2016)
   - Electoral pressure (Morin et al., 2018 ; Blümer et al., 2020)
   - Characteristics of environmental provisions (Blümer et al., 2020)

2. Interdependence of PTAs:
   - Existence of interdependence in PTA formation (Egger and Larch, 2008 ; Baldwin and Jaimovich, 2012)

Measuring interdependence

- Policy choices by other countries potentially influence trade between countries
- Influence only if countries are somehow linked to one another
- interdependence due to trade between countries
- intensity of link measured by level of bilateral exports between 2 countries

Trade partner

Reference country

$$\begin{bmatrix} 0 & x_{ab} & x_{ac} \\ x_{ba} & 0 & x_{bc} \\ x_{ca} & x_{cb} & 0 \end{bmatrix}$$

Determinants

Existing literature has identified potential determinants at the country level

- gdp per capita
- democracy
- existing domestic regulation

- Measure of previous adoption: Implementing measure is "costly". However, this cost will be lower with time

- Level of bilateral existing exports
  - Access to partner country's market.

Our dependent variable

Measure of a country's willingness to include environmental provisions in its trade agreements?

Simplest measure: cumulative number times a particular provision has been signed by a country up to a time t

Measured at the most detailed level $\Rightarrow$ 295 different measures

Data

Observations:

- 295 different norms
- between 1980 and 2018
- 80 countries in the sample
  - countries are observed if and when they have sign a trade agreement
  - all years, but different number of countries each year

Empirical equation

This leads us to the following spatiotemporal autoregressive model:

$$\begin{aligned} CumAdoption_{j,t}^{Provision} =& \beta_1 GDPPerCapita_{j,t} + \beta_2 ShareRegulations_{j,t} \\ &+ \beta_3 Democracy_{j,t} + \beta_4 CumAdoption_{j,t-1}^{Provision} \\ &+ \rho \sum_{k=1}^{N} W_{jk,t}^{Export} CumAdoption_{k,t}^{Provision} \\ &+ \alpha_j + \omega_t + \epsilon_{j,t} \end{aligned} \tag{1}$$

Expected signs

- β_1 and β_4: positive
- β_2 and β_3 : positive ?
- ρ interdependence: positive (complements), negative (substitutes), insignificant (neither)

Estimation

- 295 different environmental provisions $\Rightarrow$ 295 estimates of equation (1)
- "Unbalanced" number of observations and a lagged variable:
  - Use the method proposed by Hays et al. (2010), conditional maximum likelihood
  - Weighting matrix : "stacking" periods

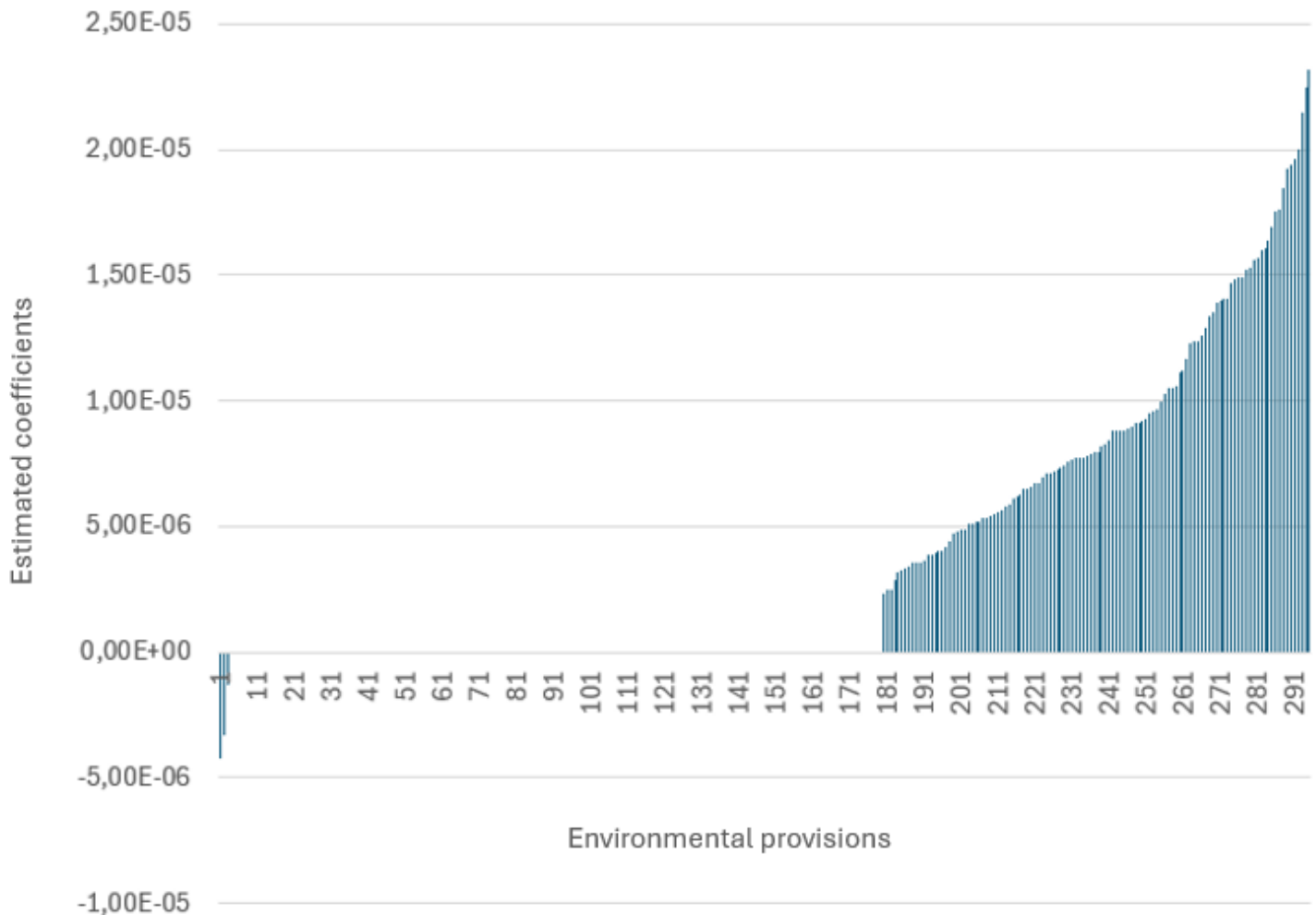
$$W_{jk,t}^{Export} = \left[\begin{array}{ccc|cc} 0 & 4 & 19 & 0 & 0 \\ 5 & 0 & 3 & 0 & 0 \\ 10 & 2 & 0 & 0 & 0 \\ \hline 0 & 0 & 0 & 0 & 6 \\ 0 & 0 & 0 & 4 & 0 \end{array}\right] \begin{array}{l} \\ \\ \\ \text{t=1} \\ \\ \text{t=2} \end{array}$$

Results

- Estimated the effects for 295 provisions separately
  - Independence?
  - Per provision, 8-10 hours required to carry out estimation
- For each of the 5 variables, we have 295 results
- A priori, either positive and significant, or negative and significant or not significant
  - If not significant, considered as there being no effect, and set the coefficient to zero

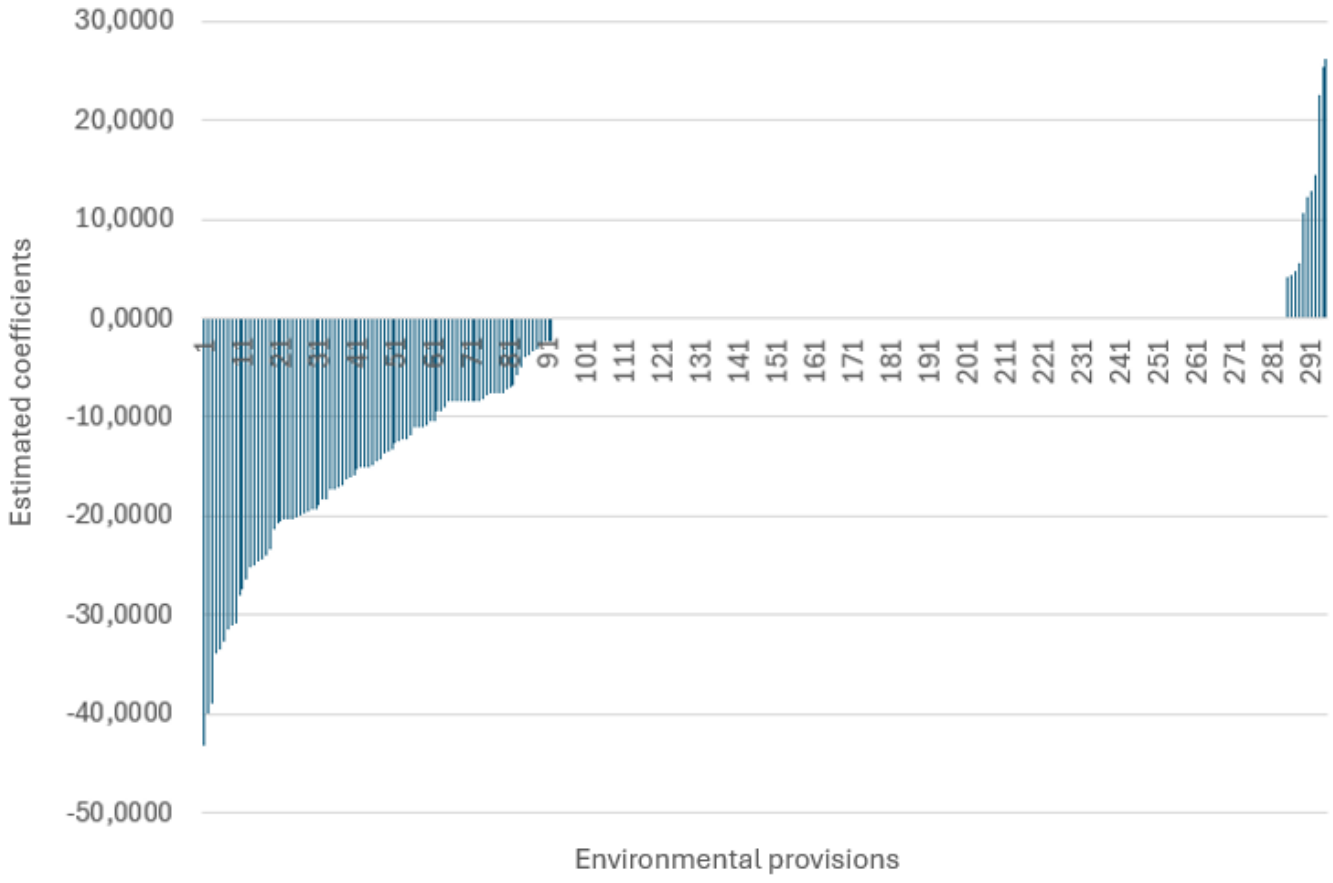
Empirical results (2)

Figure 2: Results obtained for **GDP per capita** for each of the 295 environmental provisions available in the TREND database



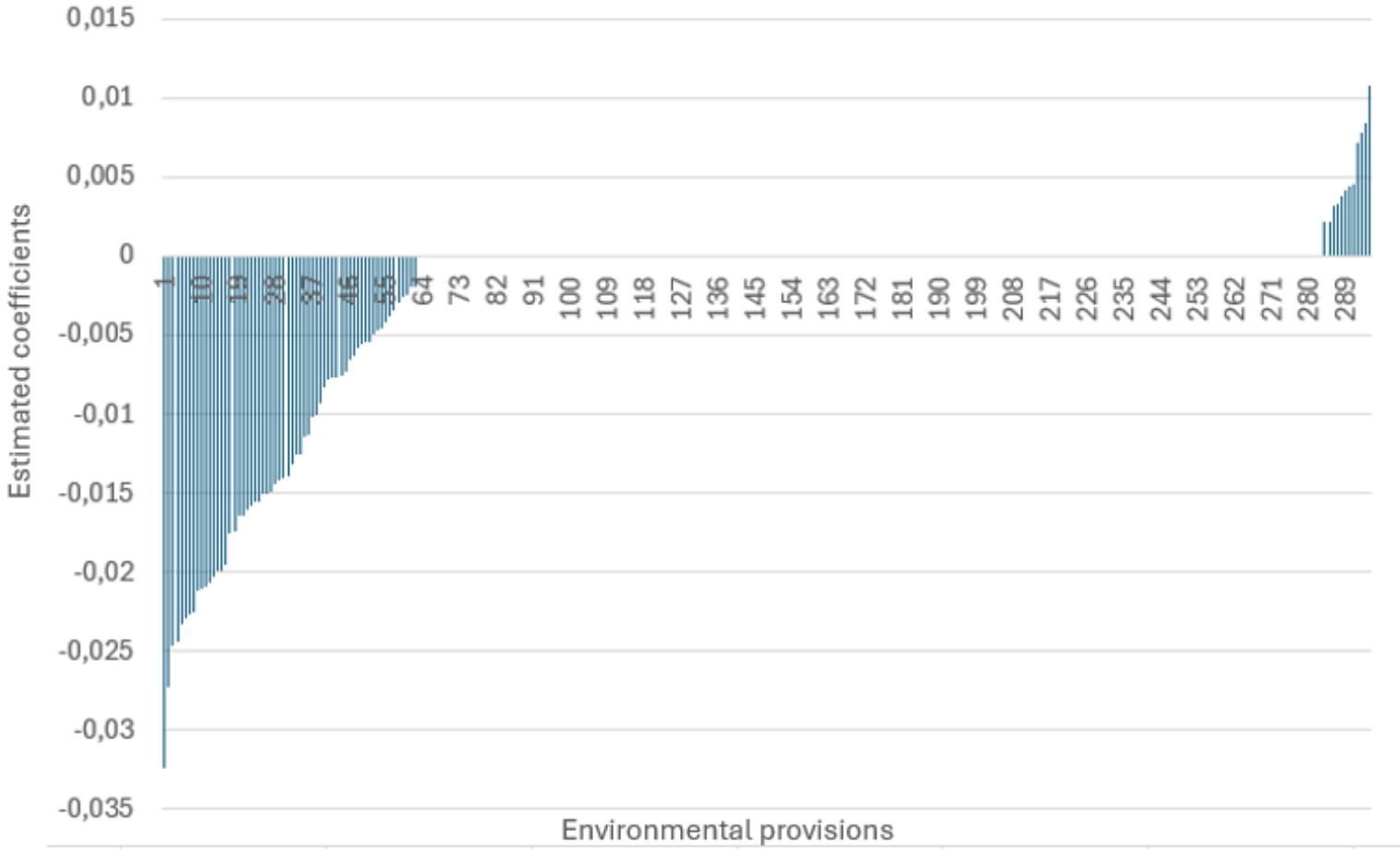
Empirical results (3)

Figure 3: Results obtained for the **commitment to environmental protection** for each of the 295 environmental provisions available in the TREND database



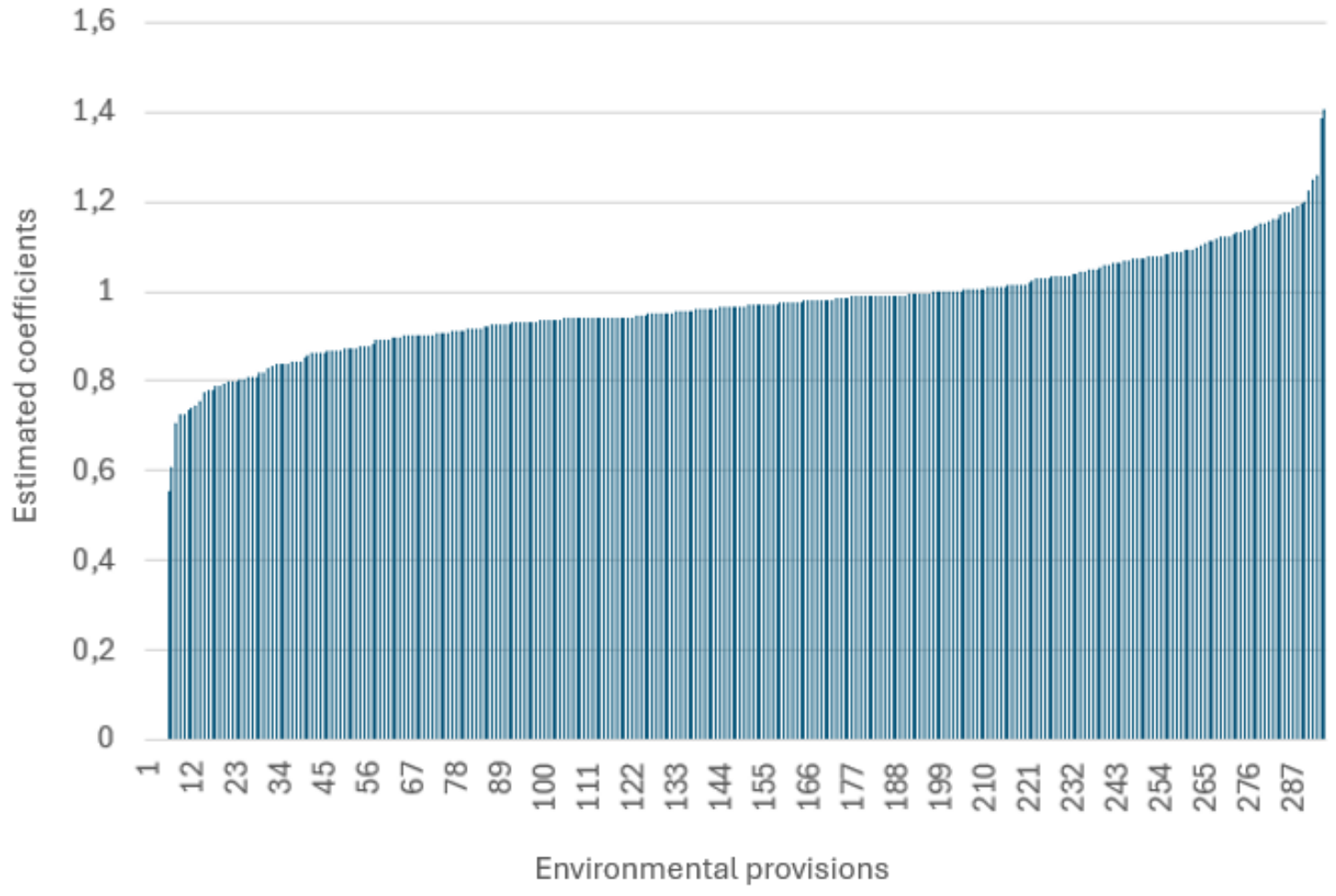
Empirical results (4)

Figure 4: Results obtained for **level of democracy** for each of the 295 environmental provisions available in the TREND database



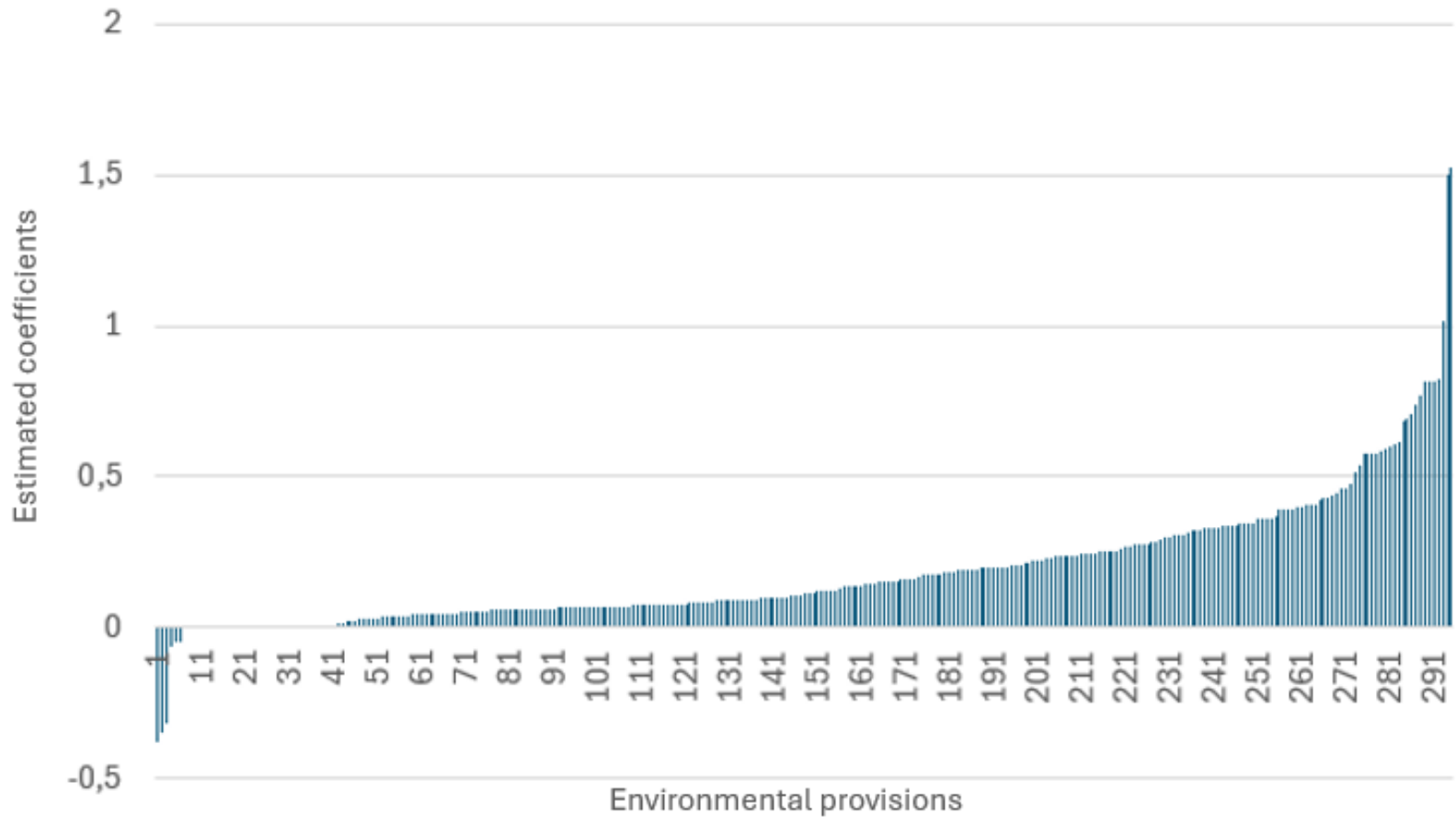
Empirical results (5)

Figure 5: Results obtained for the **lag of dependent variable** for each of the 295 environmental provisions available in the TREND database



Empirical results (6)

Figure 6: Results obtained for the **spatial interdependence effect** (ρ) for each of the 295 environmental provisions available in the TREND database



Conclusion

Existence of interdependence between countries when adopting environmental provisions in free trade agreements:

- Countries to have access to partner country's market adopt similar environmental provisions
- Countries are using trade and more particularly exports to impose some environmental provisions to other countries

Conclusion

Effects are heterogeneous across provisions
$\Rightarrow$ not general conclusion possible

Still some trends:

- gdp per capita : positive or no effect
- democracy and domestic regulation: depends on provision
- cost of adoption: decreases with number of times adopted
- trade: for most, positive effect

Would imply a gradual diffusion over time of these provisions

Thanks for your attention !

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Appendix

Albania	China	Finland	Kenya	Singapore
United Arab Emirates	Côte d'Ivoire	France	Lithuania	Slovakia
Argentina	Cameroon	UK	Latvia	Slovenia
Australia	Congo	Georgia	Morocco	Sweden
Austria	Colombia	Greece	Madagascar	Tunisia
Burundi	Costa Rica	Guatemala	Mexico	Turkey
Belgium	Cuba	Honduras	Netherlands	Taiwan, Province of China
Burkina Faso	Cyprus	Croatia	Norway	Uganda
Bangladesh	Czech Republic	Haiti	Nepal	Ukraine
Bulgaria	Germany	Hungary	New Zealand	Uruguay
Bolivia	Denmark	Indonesia	Panama	United States of America
Brazil	Algeria	India	Poland	Viet Nam
Central African Republic	Ecuador	Ireland	Democratic People's Republic of Korea	Yemen
Canada	Egypt	Italy	Portugal	South Africa
Switzerland	Spain	Jamaica	Russian Federation	Zambia
Chile	Estonia	Japan	Saudi Arabia	Zimbabwe