IMPACTS OF CBAM ON EU TRADE PARTNERS

Consequences for developing countries

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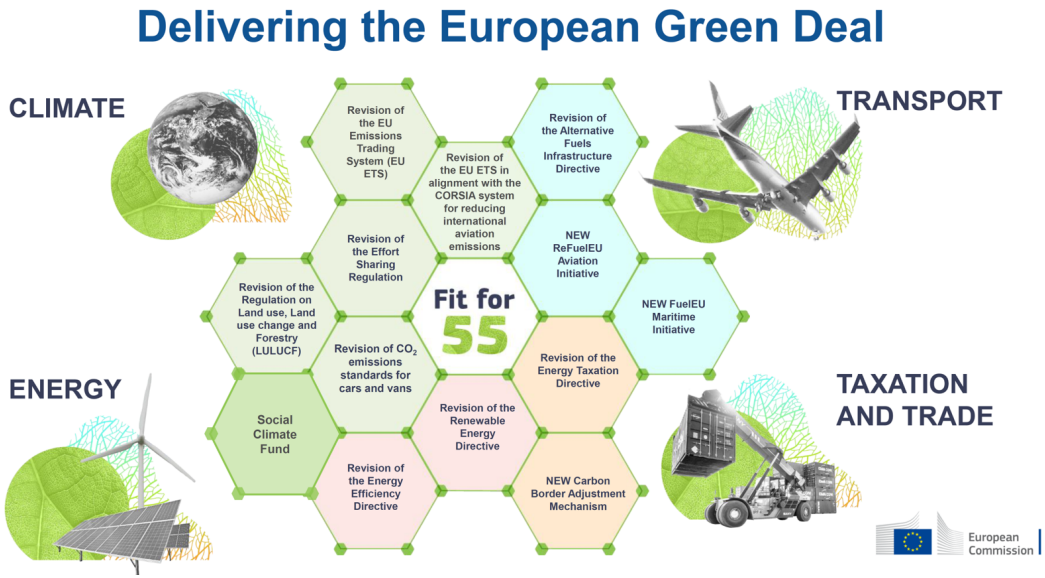
Political context of CBAM

A political objective for the French Presidency of the EU

"Now, we have to move from intention to action. Transforming our industries, investing in technologies of the future, whether it be batteries or hydrogen, is the very aim of the pact. The Commission has put forward ambitious proposals and we now have to implement a number of them together in the coming weeks. Urge all the actors in Europe and across the globe to meet this environmental requirement. **That is the very meaning behind the *border carbon adjustment mechanism* that we have long been waiting for.**" Emmanuel Macron, *Speech at the European Parliament in Strasbourg*, January 19th, 2022

EU-ETS and CBAM

The *Fit for 55* package - EU-ETS strengthening



- Strengthening of ETS for stationary installations (power, centralized heat, industry): decrease of quotas from -2.2% per year to -4.2% per year
- Inclusion into ETS of buildings, road transports, maritime transport and aviation
- Free allowance phase-out over a 10 year period starting in 2026

Specifics of CBAM

- covers imports (no parallel export CBAM).
- restricted to 5 (direct) emission intensive sectors: electricity, cement, aluminium, fertilizer, iron and steel.
- carbon intensity of imported products is assumed to be 10% lowest of the same sectoral EU emission, except if the country can prove it has a better carbon intensity.
- adjusted carbon price: difference between EU-ETS price and exporting country carbon price.

Key (recent) literature on CBAM impacts

Systematic/meta-analysis

- Branger and Quirion [2014], articles from 2004-2012: a CBAM could indeed reduce the rate of carbon leakage (Armington elasticities are a key)
- Böhringer et al. [2022], systematic literature review: legal feasibility and practical implementation more than fundamental theory.

Multidimensional exposure assessment

- Eicke et al. [2021]: specific analysis of CBAM impacts on countries from the "Global South"

CGE modelling of internal/external impacts

- Kuusi et al. [2020], Bellora and Fontagné [2021]: different assumptions on CBAM scope and recycling using GTAP/MaGE-MIRAGE models
- Commission [2021]: impact assessment (JRC-GEME3)
- Stede et al. [2021]: risk of resource shuffling of between 50% and 80% for the aluminium sector.
- Lim et al. [2021]: retaliation effects from other economies

Research question and method

Research questions

- What is the exposure of developing and emerging economies to CBAM's impacts in terms of:
  - net raise of foreign currency
  - wage and employment
  - output
- What rules could be used for the recycling of CBAM's proceeds to the developing and the emerging world?

Complementarities with the existing literature

- A new dataset for the emission intensities (EORA-EXIO) and EORA-26 for the intersectoral linkages
- The multidimensional exposure approach allows to highlight the potential disequilibrium that may emerge without using too many assumptions (on price elasticities, capacity to adapt, ...)

Data

Export data

Based on EU countries' import by sector and partner (COMTRADE), we calculate partners' exports to EU countries. The sectors we considered are:

- Cement: Portland cement, aluminous cement (ciment fondu), slag cement, supersulphate cement and similar hydraulic cements, whether or not coloured or in the form of clinkers (2523)
- Electricity: Electrical energy (2716)
- Fertilizers: Fertilizers (31)
- Iron and steel: Iron and steel (72)
- Aluminium: Aluminium and articles thereof (76)

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Multi-Regional Input-output (MRIO) matrices

- Cabernard and Pfister [2021] merged the EORA-26 and the EXIO MRIO tables into a Regionalized MRIO (RMRIO) table, and it provides data on emissions by product and country
- Moreover, we use EORA-26 MRIO database Lenzen et al. [2012] Lenzen et al. [2013] to calculate the indirect impacts

Methods (1)

Emission-intensity

The emission-intensity by product and country is calculated as the summation of the emissions of the sectors related to the product under consideration divided by the summation of total output, as follow:

$$e_{i,k} = \frac{\sum_{j}^{j \in i} emissions_{j,k}}{\sum_{j}^{j \in i} output_{j,k}} \tag{1}$$

where e is the carbon-intensity, i is each one of the five products in CBAM, k is the country under consideration and j is the sector in the RMRIO (which is in the CBAM products, as presented in Table 1).

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Carbon revenues

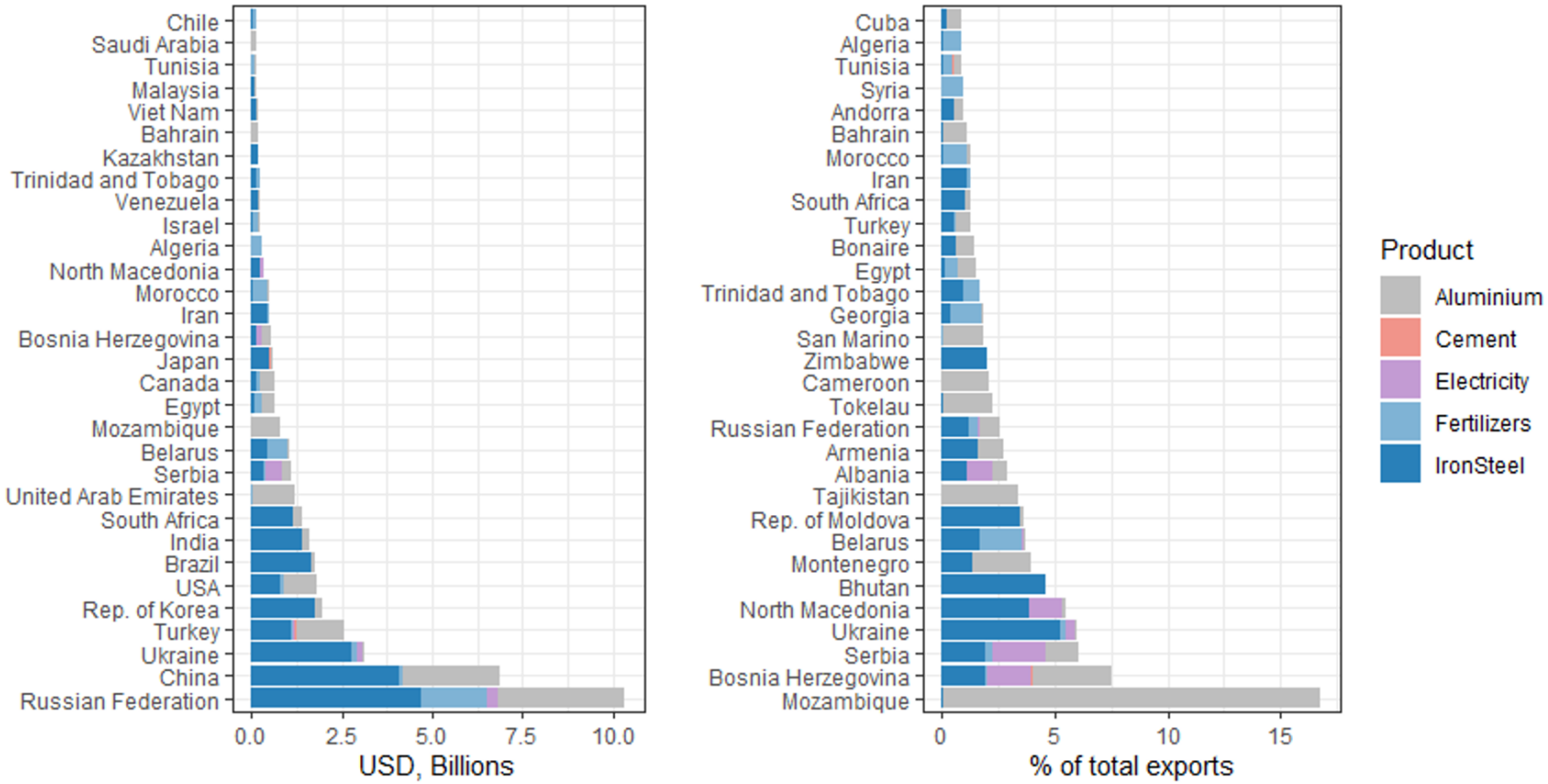
We then can calculate the carbon revenue (CR), as follows:

$$CR_{i,k} = \hat{e}_{j,k} EX_{j,k}^{EU} \tag{2}$$

where (EX^{EU}) is the exports of product j by country k to the EU, and $\hat{e}$ is the lowest value between the actual carbon-intensity of the country and the worst 10% carbon-intensity among the EU countries.

Impact on countries' exports

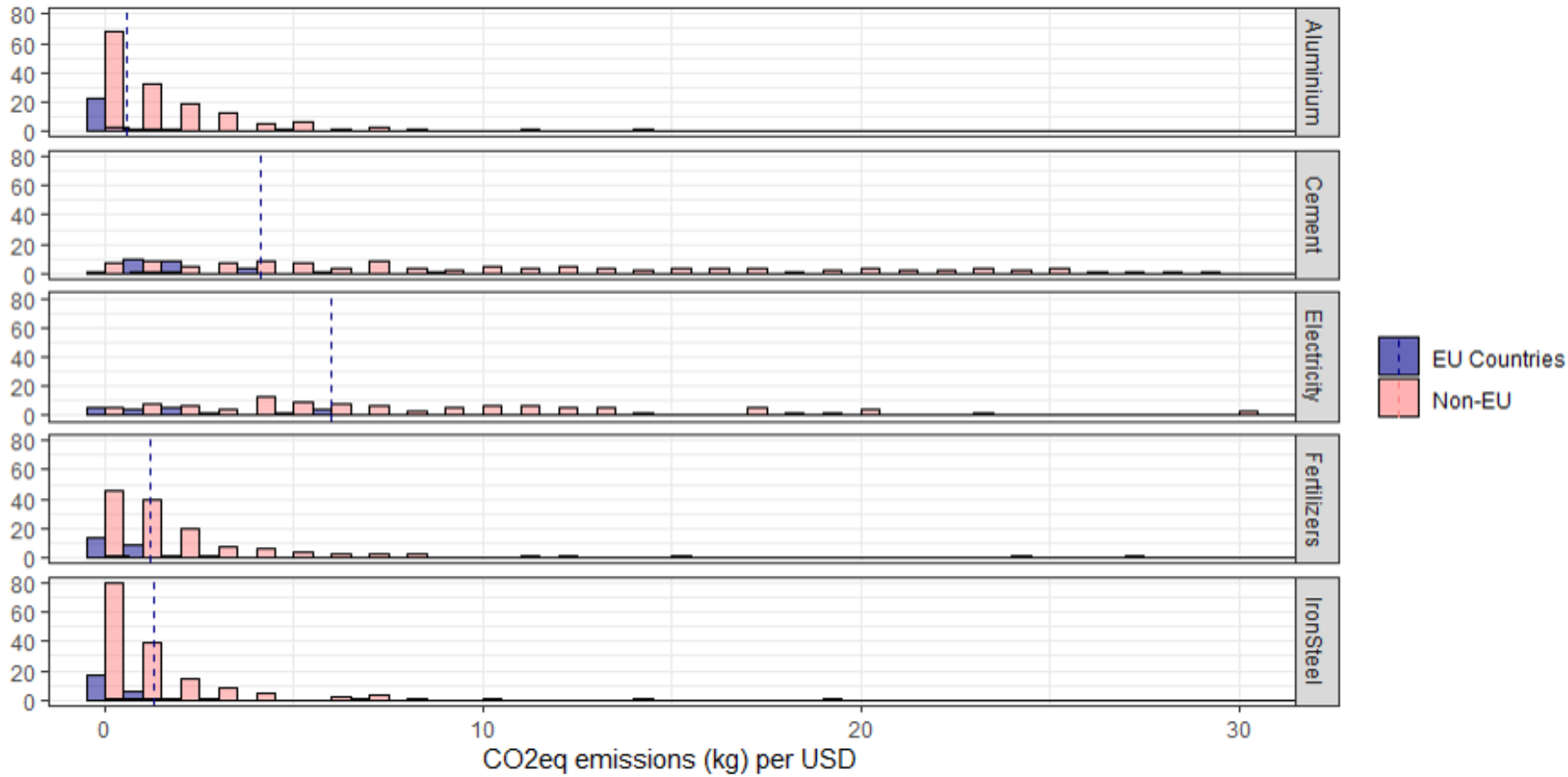
Figure: Exports of CBAM products to EU countries, by country (2015)



Source: authors' elaboration based on COMTRADE data

Emission-intensity

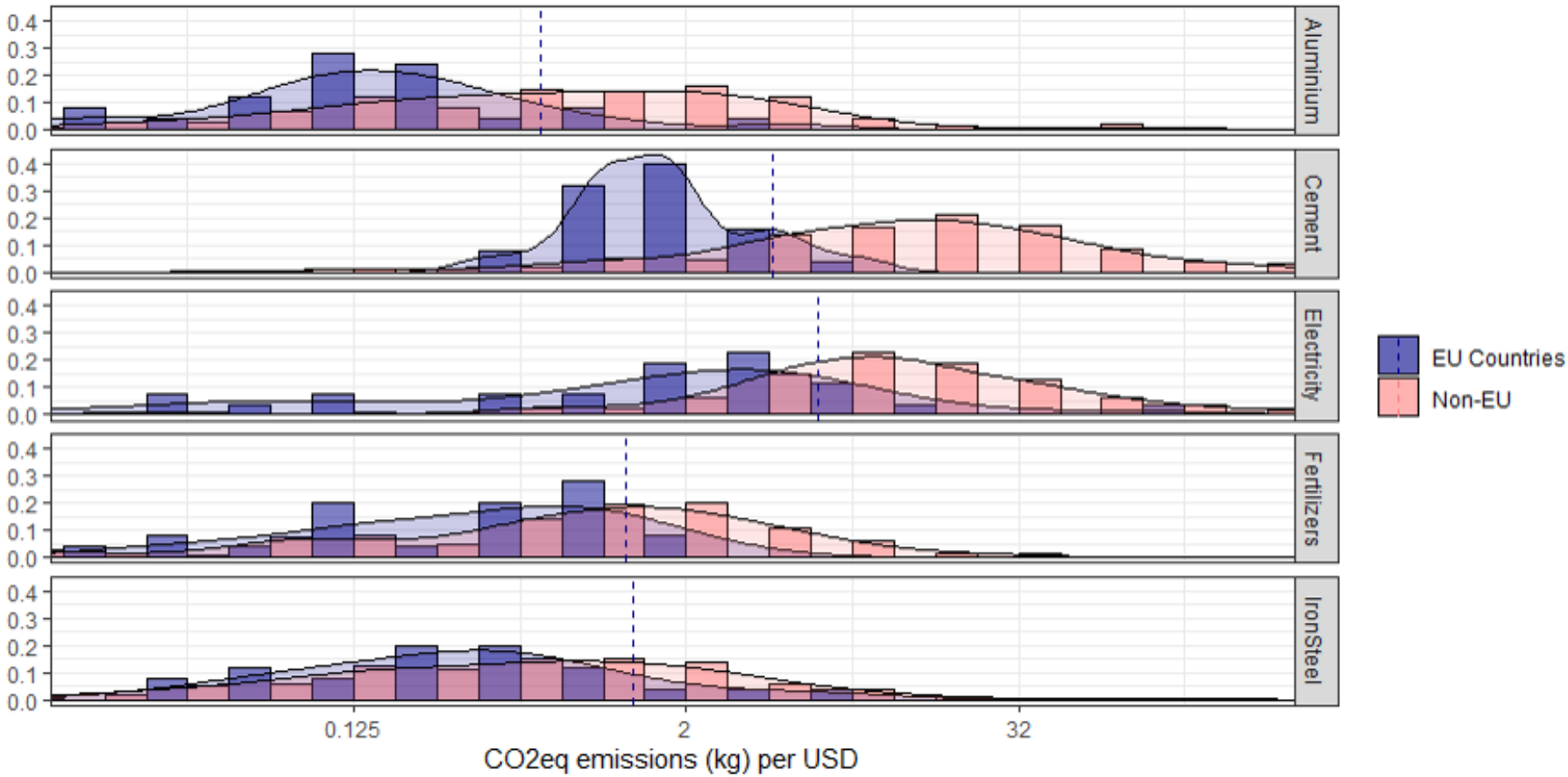
Figure: Distribution of emission-intensity, by product (2015)



Source: authors' elaboration based on COMTRADE and RMRIO data

Emission-intensity

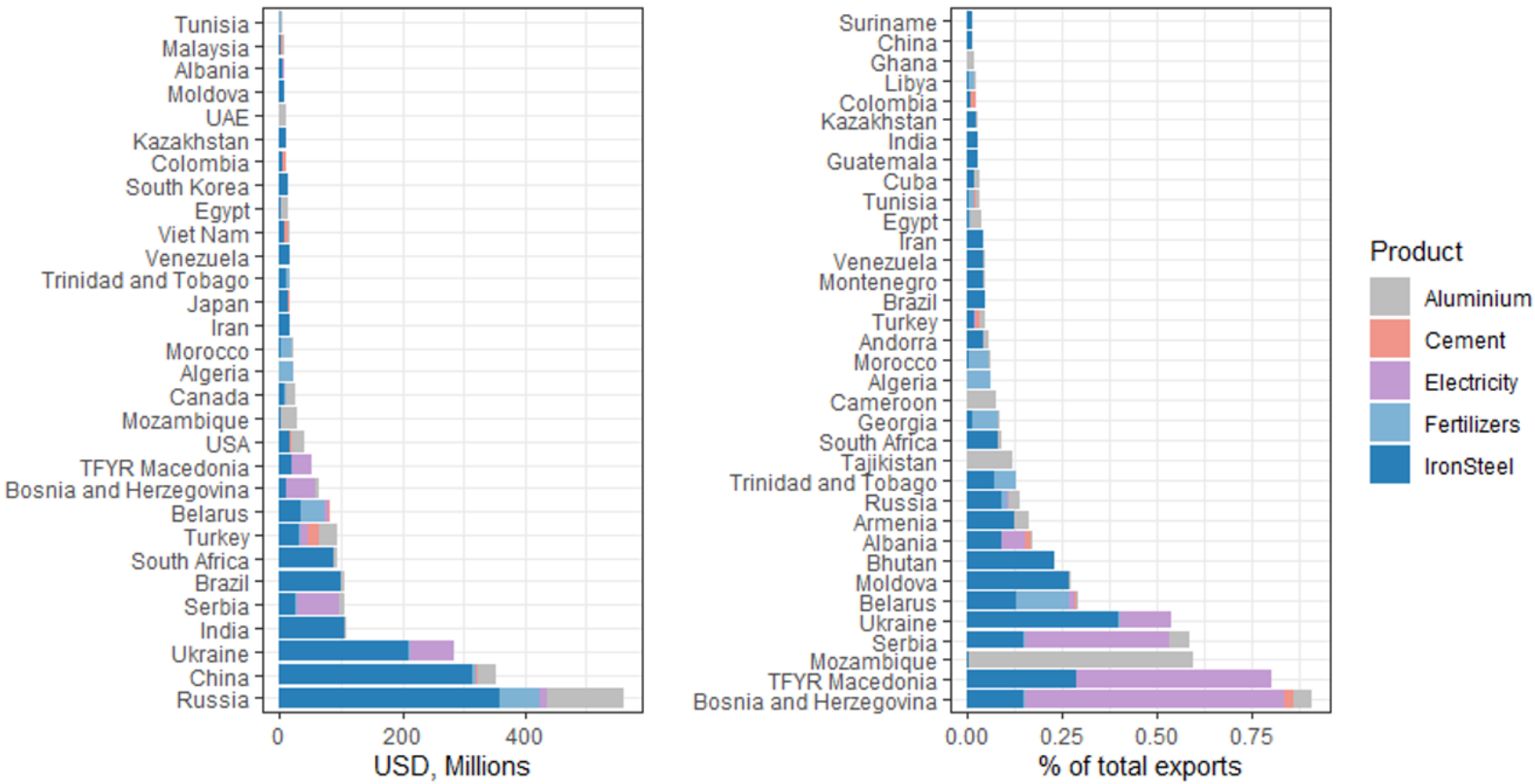
Figure: Distribution of emission-intensity, by product (2015), in logarithm



Source: authors' elaboration based on COMTRADE and RMRIO data

Carbon revenue

Figure: Potential carbon revenue, by country (2015)



Source: authors' elaboration based on COMTRADE and RMRIO data

Methods (2)

Direct and indirect impact on output

The total output (direct and indirect) potentially impacted by the introduction of CBAM is given by:

$$\Delta \mathbf{X} = (\mathbf{I} - \mathbf{A})^{-1} \Delta \mathbf{Y} \tag{3}$$

where $\Delta \mathbf{X}$ is a column-vector of the total change in output (for all sectors and countries), $\mathbf{I}$ is an identity matrix, $\mathbf{A}$ is the MRIO technical coefficient matrix, and ´$\mathbf{Y}$ is the direct impact, which is given by the exports to EU by country and sector.

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Impact on employment and wages

By multiplying element-by-element the change in total output by the column-vector of wages per output ($\mathbf{w}$) and employment by output ($\mathbf{n}$), we have the impact on wages and employments:

$$\Delta \mathbf{W} = \mathbf{w} \odot \Delta \mathbf{X} \tag{4}$$

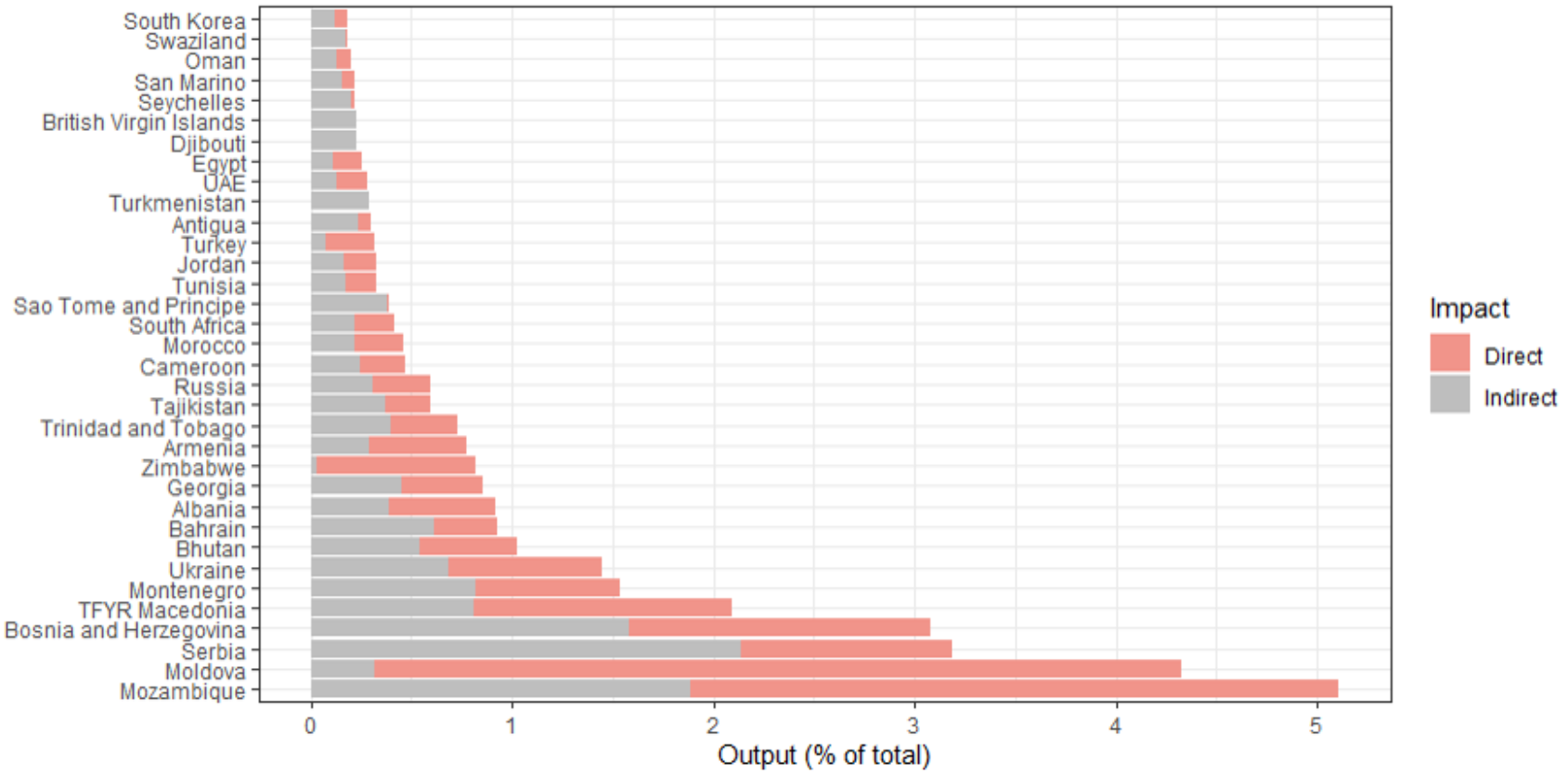
and

$$\Delta \mathbf{N} = \mathbf{n} \odot \Delta \mathbf{X} \tag{5}$$

where $\odot$ denotes the element-wise multiplication, and $\Delta \mathbf{W}$ and $\Delta \mathbf{N}$ are the column-vectors of the total potential impact on wages and employment, respectively.

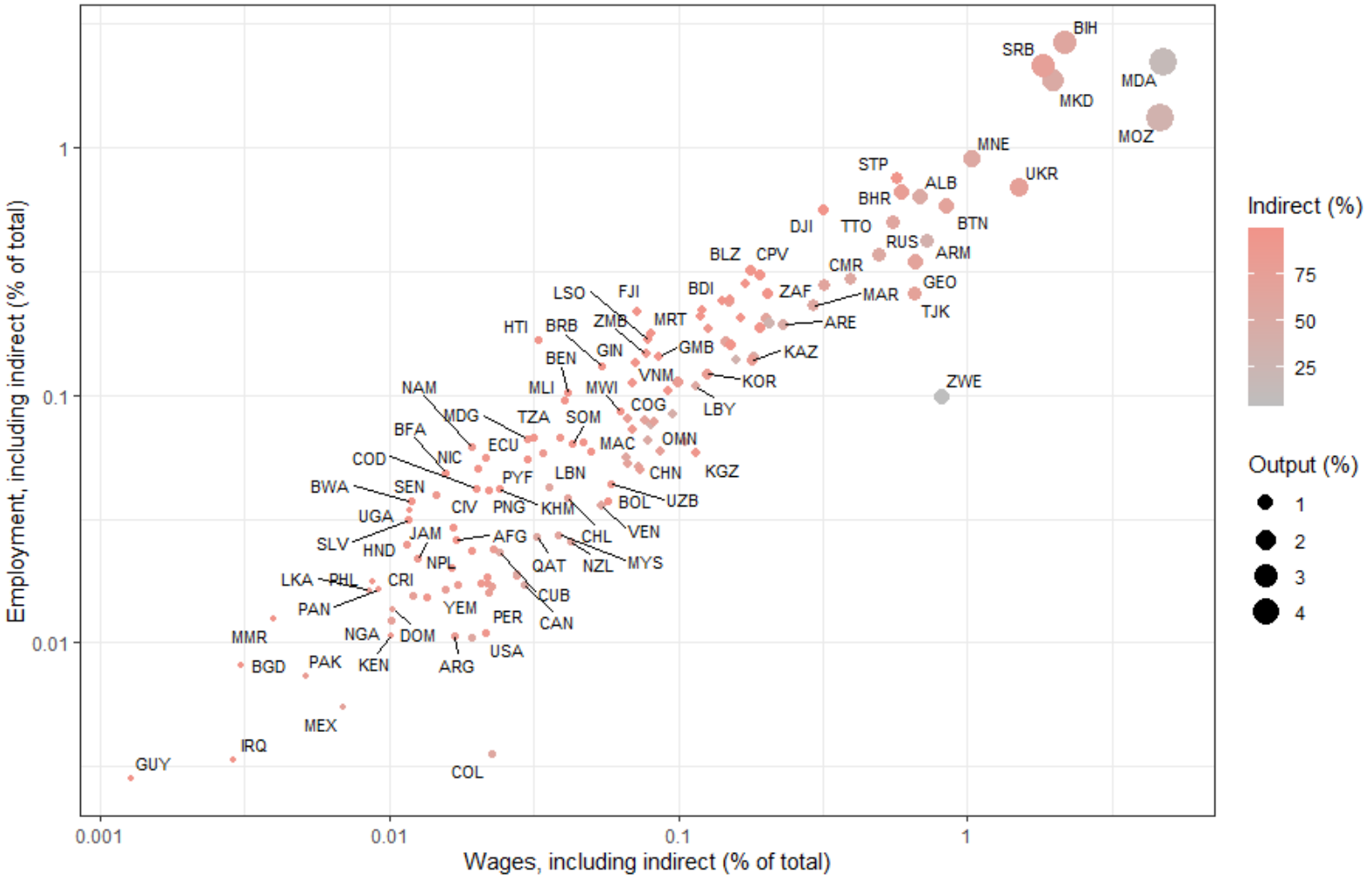
Impact on output

Figure: Potential impact on output, by country (2015)



Source: authors' elaboration based on COMTRADE and EORA data

Socioeconomic impacts



Source: authors' elaboration based on COMTRADE and EORA data
Scales are in logarithm

Conclusion and discussion

Key empirical findings

- Few specific countries are very exposed to CBAM, with impacts on their capacity to raise foreign currency, generate good jobs and pay wages (e.g. Mozambique)
- CBAM may not lead to adaptation in these countries (far from the 10% and very dependent), and hence it might be not effective

Recycling of CBAM's proceeds

- Building a development-friendly CBAM is key to the success of this emblematic part of the Fit for 55 package. It should come with a broader set of development policies to accompany the most exposed countries towards their own carbon neutrality strategy unc [2021]
- Least developed countries (LDCs) could be exempted from the CBAM, while the EU could target support to the developing countries most affected by the mechanism Brandi [2021].

Thank you!

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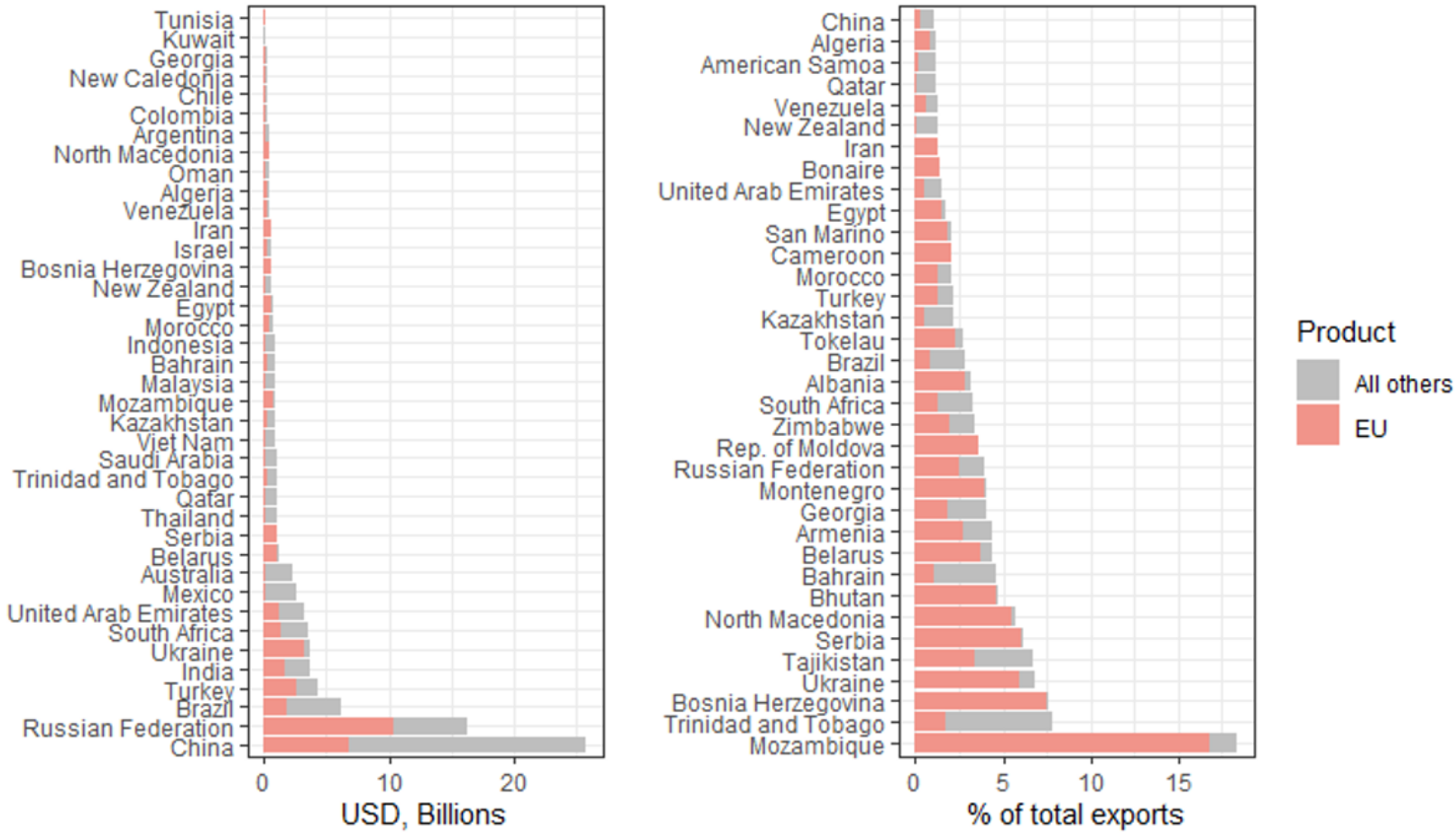
Extension of CBAM

Figure: Exports of CBAM products to EU+Others*, by country (2015)



Source: authors' elaboration based on COMTRADE and EORA data
Others: Switzerland, UK, Canada, USA, Japan and South Korea

Key messages and future research

The transition is more than a marginal change in production, need to perceive its systemic effects in a systematic way. This require identifying:

- The entire set of sectors that will be impacted (both directly and indirectly), and here the cascades concept is very useful,
- The various impacts of the transition onto economies: production, employment, financial, fiscal, trade, etc., and
- The nature of the transition composed of both demand and supply dynamics

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