

**ANNEX B-2 to E/C.18/2023/CRP.35**

**Paper for information and feedback by the UN Tax Committee from the  
Subcommittee on Environmental Taxation**

**Border Carbon Adjustments: Impact and Relevance for  
Developing Countries**

**Part C: Potential responses to border carbon adjustments**

This paper, which is Part C of Workstream 4 titled "Border Carbon Adjustments: Impact and Relevance for Developing Countries", is still being developed by the Subcommittee. It is being presented to the Committee for their *information, feedback, and guidance* during the Twenty-seventh Session. For reference, Parts A and B can be found in Annex B-1 to document E/C.18/2023/CRP35.

# Table of Contents

Introduction.....	3
1. Impact of a BCA on developing countries.....	3
1.1 Preliminary comments .....	3
1.2 Analysis of relevant literature .....	4
1.2.1 Limitations inherent in the studies .....	4
1.2.2 Volume of exports of CBAM goods to the EU .....	5
1.2.3 Share of exports made up of CBAM goods .....	6
1.2.4 Implied tariffs arising from CBAM .....	7
1.2.5 Impact on exports .....	9
1.2.6 Impact on GDP .....	9
1.2.7 Collateral effects .....	10
1.2.8 Impact on welfare, terms of trade, volume of trade and real wage effects.....	11
1.2.9 Conclusions .....	13
2. Potential policy measures to address the impact of BCAs.....	14
2.1 Introduction.....	14
2.2 Introduction of carbon pricing .....	15
2.3 Convert existing implicit pricing into explicit pricing .....	16
2.4 Apply a tax only on carbon intensive exports .....	17
2.5 Redirect exports to countries without a BCA .....	18
2.6 Leverage cleaner production technologies, potentially using the TRIPS Agreement.....	18
3. Administrative considerations.....	18
Appendix 1.....	19
Appendix 2.....	21

## Introduction

This paper is presented under Workstream 4 “Border Carbon Adjustments: Impact and Relevance for Developing Countries”. That workstream is divided into three parts. Part A deals with the “What” – what is carbon leakage and what are possible responses and their aims. Part B covers the “How” – how existing border carbon adjustment (BCA) proposals are intended to work, and focuses on the EU Carbon Border Adjustment Mechanism as an example of how a BCA might work in practice and because it is, at the time of writing, the only well-developed and in force initiative. These two parts were presented to the Committee for discussion and first consideration at the Twenty-sixth Session. They will be presented for final approval at the Twenty-seventh Session (see Annex B-1 to document E/C.18/2023/CRP35).

Part C addresses the potential “Response” by first considering the potential impact of BCAs on developing countries. Then it looks at policy measures developing countries could take to address such impact. Finally, it discusses relevant administrative considerations [section still to be drafted].

It should be noted at the outset that the impact a BCA has on a developing country may depend upon the actions that country is already taking to address climate change. On the one hand, to the extent explicit carbon pricing (such as a carbon tax) is being used, a credit should be given against any BCA – so reducing, or even potentially eliminating, the impact. This is examined in more detail in [parts 2.2 and 2.3] below. On the other hand, however, while the number of explicit carbon pricing regimes is increasing globally, many countries use other measures – such regulations, product standards or fuel duties (either with or without carbon pricing). There is, therefore, criticism of BCA measures in some quarters on the basis that they infringe the Paris Agreement principle of common but differentiated responsibilities because they potentially impact a country’s sovereign right to decide what climate measures it takes by implicitly encouraging the use of explicit carbon pricing over other measures.

*As with Parts A and B, this Paper is not intended to either support or contradict the theory of carbon leakage, the need for BCAs to address concerns or their potential efficacy in doing so. It is intended to share information by highlighting the potential impact of BCAs on developing countries by reference to existing studies and to indicate some potential steps developing countries could take where they are impacted by BCAs.*

## 1. Impact of a BCA on developing countries

### 1.1 Preliminary comments

In order for a country, or an individual enterprise, to understand how to respond to the introduction of a BCA by another country it is first necessary to analyse the potential effect such a mechanism may have. Setting out a methodology to achieve this is outside the scope of this paper. However, in general terms it would be necessary to look at a number of factors, potentially including some of the following:

- What is the level of exports of impacted goods to the BCA area?
- What percentage do those BCA goods make up of total exports and what is the contribution which such exports make to total GDP?
- What is the carbon intensity of the goods?
- What is the carbon price in the BCA area?
- From the carbon price and the carbon intensity it should be possible to calculate the potential BCA charge on the particular goods.
- Does the exporting country have carbon pricing which will be offset against the BCA charge?

- From the potential BCA charge less any credit for the local carbon price, it should be possible to calculate the implied tariff (the ad valorem charge on the goods) represented by the BCA.
- What is the price elasticity of the goods?
- Given the above factors, what is likely impact on exports of the BCA goods and what will the impact be on the local gross domestic product (GDP)?
- Other factors which will be relevant in determining the impact could include:
  - The level of employment within the impacted sector.
  - The availability of affordable decarbonisation technology.
  - The precise rules and complexity of the BCA and the number of BCA regimes to which a country is exporting.
  - Whether affected enterprises have the capacity to calculate embedded emissions in line with the BCA or whether they will be forced to use default calculations.
  - The possibility and ease of finding alternative viable export markets.

There are a number of studies by academics and institutions on the potential impact of BCAs, particularly on developing countries. These focus on the EU CBAM. Section 1.2. analyses some of these findings. The studies examine and set out some of the factors referred to above such the level of exports of impacted goods to the EU, the percentage of such goods in comparison with total exports, the implied tariffs and the potential impact on exports and welfare.

It will also be important for individual countries to carry out their own assessment where they can factor in their particular circumstances and any defensive measures they can take.

In order to help developing countries assess the impact the World Bank has developed a CBAM Exposure Index<sup>1</sup>. This includes an Absolute Exposure Index which estimates the total potential cost of CBAM certificates the exporters in a particular country are likely to have to purchase as a percentage of the value of total exports of the relevant goods. It also contains a Relative CBAM Exposure Index which considers the excess cost of CBAM certificates paid by exporters over the cost paid by an average EU producer of the same output. This latter index therefore recognizes the cost changes in the EU market, given that EU producers will also have to pay fully for their emissions in future.

## **1.2 Analysis of relevant literature**

### **1.2.1 Limitations inherent in the studies**

It should be noted that the studies quoted below were written before the CBAM Regulation was finalised. Therefore, they look at the impact on exports of the goods covered by earlier proposals - iron and steel, aluminium, fertiliser, cement and electricity - and do not specifically look at the goods which were added in the later stages such as hydrogen or certain downstream products like nuts and bolts. The studies also use different estimates about, for example, the cost of carbon, the impact of abolishing free allowances under the EU ETS and how CBAM may be extended. The conclusions each study draws are not, therefore, always directly comparable.

As will be apparent from the various tables set out below, some of the figures presented are based on historical data – which should be reasonably accurate. However, even here, there are some discrepancies in the different studies - for example in the data on export to the EU. Other figures presented rely on modelling and the outcomes can therefore only be indicative as they depend upon the assumptions made. The various papers use different models to predict outcomes, and each has advantages and drawbacks.

---

<sup>1</sup> [How developing countries can measure exposure to the EU's carbon border adjustment mechanism \(worldbank.org\)](https://www.worldbank.org/en/news/press-release/2023/07/12/how-developing-countries-can-measure-exposure-to-the-eu-s-carbon-border-adjustment-mechanism)

A 2022 Study by the French Development Agency entitled “Impact of CBAM on EU trade partners: consequences for developing countries”<sup>2</sup> (the FDA Paper) uses the EORA-26 MRIO database (Lenzen et al., 2012; Lenzen et al., 2013) to estimate the direct and indirect impacts of CBAM on production, wages and employment. The paper notes the advantage of using MRIO is that the indirect impact is not only due to the supply of inputs for domestic producers, but also internationally.

The United Nations Conference on Trade and Development (UNCTAD) produced a paper in July 2021 called “A European Carbon Border Adjustment Mechanism: Implications for Developing Countries (the “UNCTAD Paper”)<sup>3</sup>. That research used a Computable General Equilibrium (CGE) model which is the latest version of the GTAP Model, a multi-country and multi-sectoral model fully documented in Hertel and Tsigas (1997) and Corong et al. (2017). GTAP covers the entire world economy with detailed data for 147 regions and 65 sectors.

The African Climate Foundation and London School of Economics, Firoz Lalji Institute for Africa, published a study called “Implications for African Countries of a Carbon Border Adjustment Mechanism in the EU”<sup>4</sup>(the ACF/LSE Paper). This study uses two modelling approaches. The first uses a CGE model – more specifically, the PEP-w-1 model developed by Lemelin and colleagues. The CGE model can assess the economy-wide effects of the CBAM. However, it is a static model and a major limitation is its inability to assess the impacts of the CBAM over a long-term period. The baseline scenario in the model also assumes that other countries do not take policy action (yet) in response to the CBAM. The second angle of assessment in the ACF/LSE Paper relies on the New Trade Quantitative Model (NTQM) as developed by Caliendo and Parro. The Paper notes this model is better able to assess disaggregated individual African countries to identify those that may have vulnerabilities and sensitivities to the EU CBAM but this is at the cost of dynamic effects, such as changes to long-run aggregate factor productivities.

A third study which is referred to is a March 2022 the Task Force on Climate Development and the IMF released a paper “The Global Impact of a Carbon Border Adjustment Mechanism, A Quantative Assessment”<sup>5</sup> (the “TFCD/IMF Paper”) It notes that the model which is used builds on the dynamic CGE models by Van der Mensbrugghe (2019) and Zhai (2018), and is calibrated to Global Trade Analysis Project (GTAP) database 10.0.

It should be noted that GCE models are complex and time consuming to design and their results are highly dependent on key economic parameters, data quality and assumptions made.

CGE models frequently seek to capture the structure of the economy and behavioural response of agents (firms, households, government) to simulated policy changes and trace the impact on key economic variables, including income and expenditure flows. Thus, CGE models are created to analyse the main interdependencies between the sectors contained in the underlying data sets and the behaviour of different economic actors in order to evaluate alternative policy scenarios or economic shocks. GCE models often underestimate the value of goods and services that are not traded on markets and often also inadequately capture externalities such as pollution. They are often based on growth assumptions and are therefore not designed as forecasting tools. Models that inadequately capture dynamic effects in economies or trade flows may produce wrong results.

### 1.2.2 Volume of exports of CBAM goods to the EU

A key starting point for determining the impact of a BCA is the volume of exports to the BCA area. Various studies have looked at exports of CBAM products to the EU. For example the FDA Paper

---

<sup>2</sup>[2022 study by the French Development Agency](#)

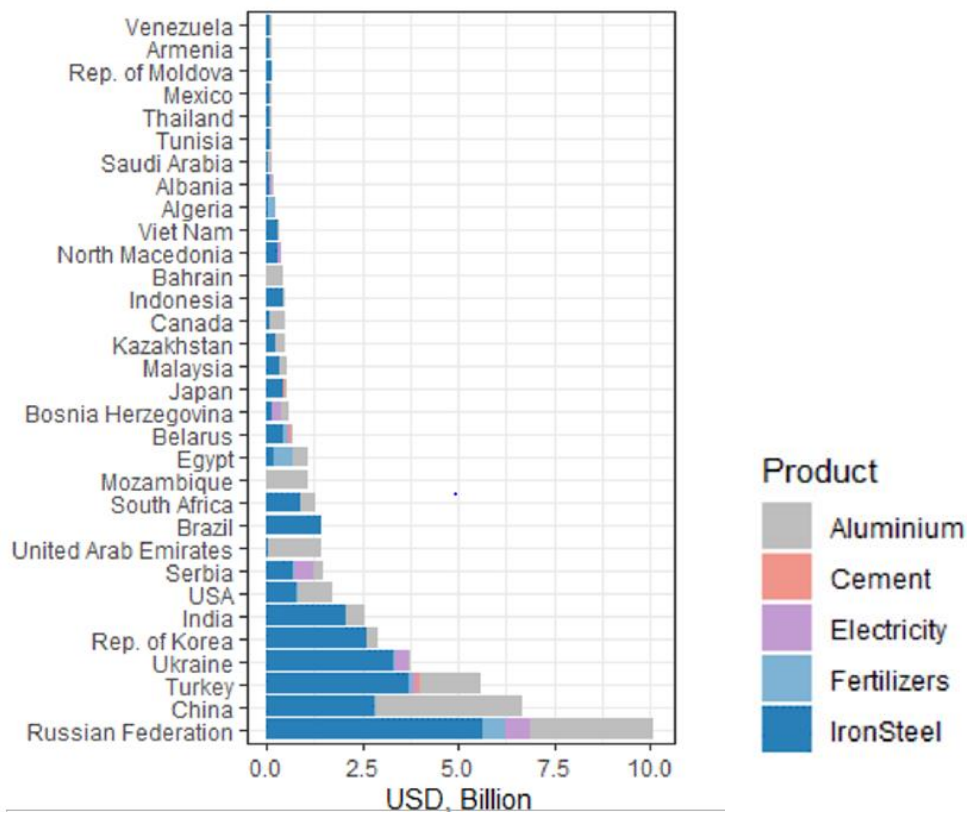
<sup>3</sup> TBA

<sup>4</sup> TBA

<sup>5</sup> TBA

shows that, using 2019 figures, the countries with the greatest volume of exports are China, India, Republic of Korea, Russia, Turkey, Ukraine, and the US<sup>6</sup>.

*Exports of CBAM products to EU countries in USD bn, by country (2019 historical data)*



Source: French Development Agency “Impact of CBAM on EU trade partners: consequences for developing countries” page 12

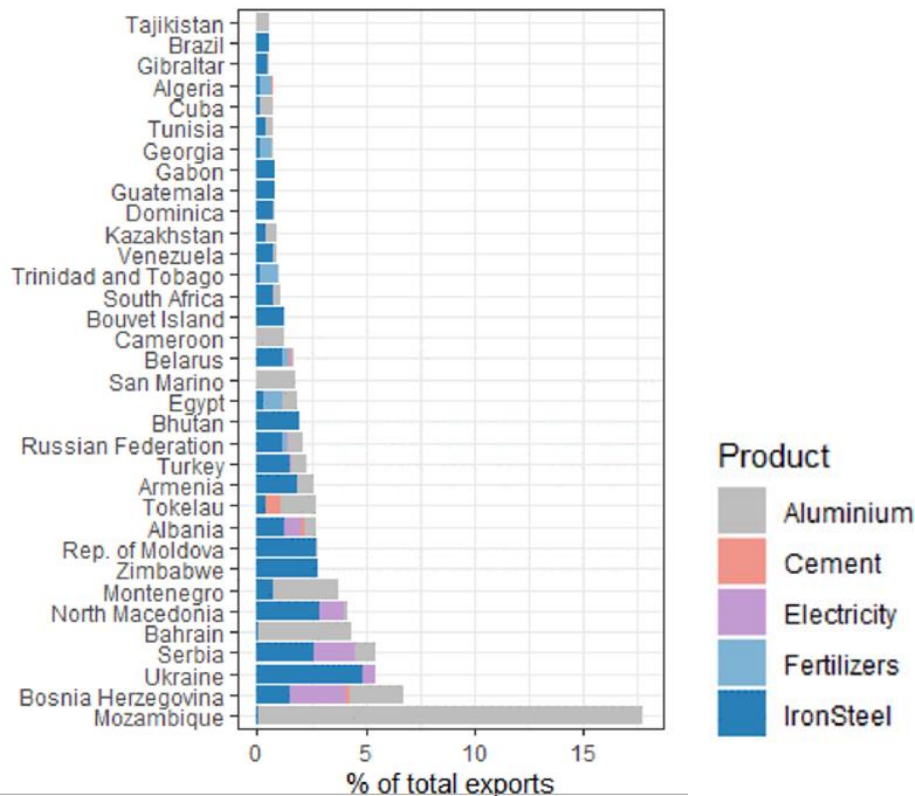
It is interesting to note that the UNCTAD paper (page 10) has a similar graph based on 2019 data as in the FDA one, but the figures for the total exports while very similar are not exactly the same.

### 1.2.3 Share of exports made up of CBAM goods

The FDA Paper also looks at the share of CBAM covered goods as a percentage of total export as the impact will depend upon the relevant significance of such export– and not just the absolute volume. If a country is more reliant on the export of covered goods as a total share of exports, it may be impacted to a greater extent than a country with a larger volume of such exports but which represent a smaller proportion of over all exports.

<sup>6</sup> Russia’s invasion of Ukraine and ensuing sanctions will have altered these figures

*Exports of CBAM products to EU countries as a percentage of total exports (2019 historical data)*



Source: French Development Agency “Impact of CBAM on EU trade partners: consequences for developing countries” page 12

The Paper concludes: “...except for Ukraine and Russia, the most impacted countries in terms of volume are not the same in terms of the share of exports. Mozambique is the most impacted economy as almost 20% of its exports are Aluminium to EU countries. Serbia, Bosnia-Herzegovina, Montenegro, North Macedonia and Bahrain are also very impacted countries (more than 5% of Serbian and Bosnian exports are CBAM products to the EU, and more than 3% in Montenegro, North Macedonia and Bahrain), but differently from Mozambique, in some of these countries, the impact is not due to a specific product export. In the case of the first two, it is due to the export of Iron and Steel, Electricity and Aluminium, and, in the case of North Macedonia, it is due to the exports of Iron and Steel and Electricity. Other countries that are very impacted relatively to total exports are Armenia, Tokelau, Albania, Moldova and Zimbabwe. In all these economies, CBAM products’ exports to EU represent more than 2.5%, and the product mix varies significantly from one country to another. In the case of Zimbabwe and Moldova, it is due mainly to exports of Iron and Steel, while in the case of Armenia and Albania, the product mix is more heterogeneous.”

#### 1.2.4 Implied tariffs arising from CBAM

To calculate the impact of CBAM on a country’s exports it is also necessary to look at the carbon intensity of the goods and the prevailing ETS price in the EU to estimate the CBAM charge. This will determine the BCA charge which will be applied on imports and so the impact on the price of the goods. The ACF/LSE Paper looking at various scenarios depending upon the carbon price, range of goods

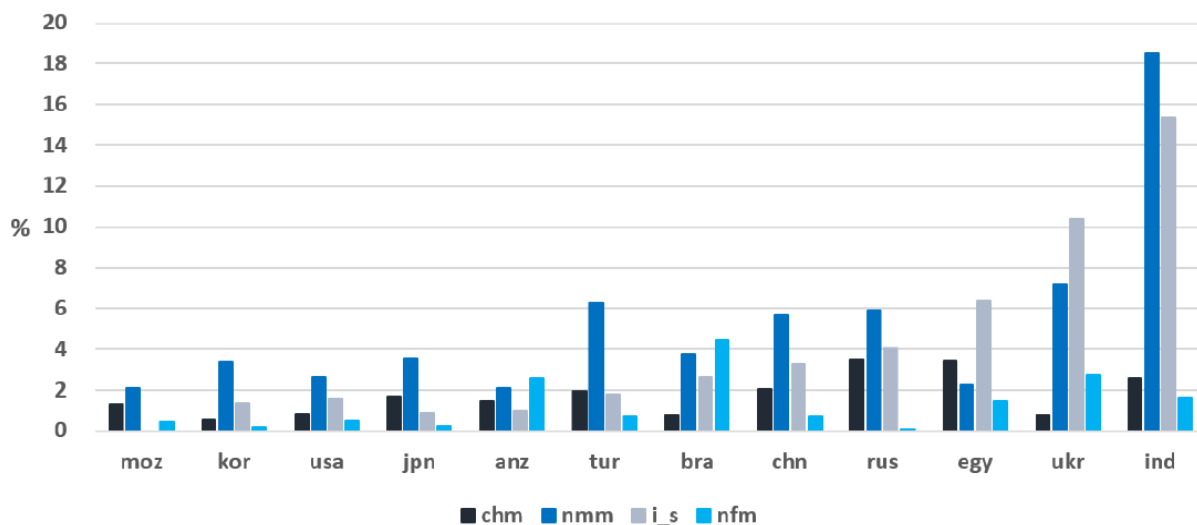
covered, and whether or not free allowances under the ETS had been withdrawn. One table in that paper shows the implied tariffs on certain goods which would be imposed by CBAM – that is the ad valorem charge on goods which results from a charge on the embedded carbon content. It demonstrates that for iron, steel, aluminium, fertiliser and cement, the implied tariff on imports from Africa will be higher than for other parts of the world. The paper also analyses the impact if CBAM was extended to other areas such as agriculture, energy and manufacturing. (Note this scenario does not take account of the phasing out of free allowances under the ETS.)

	Africa	China	India	USA	RoW
Agriculture	0.9	2.8	4.1	1.5	
Fertiliser	6.3	4.6	3	1.1	5.4
Electricity					
Iron and Steel	11.3	6.3	7.6	1.7	7.8
Aluminium	8.5	3.7	8	1.3	3
Cement	13.5	7.2	10.7	5.2	10.2
Energy	4.8	7.2	3.9	2.4	1.5
Manufacturing	1.7	4.6	3	1.3	0.7

Source: African Climate Foundation and London School of Economics, Firoz Lalji Institute for Africa, Implications for African Countries of a Carbon Border Adjustment Mechanism in the EU, page 13

The “TFCD/IMF Paper contains a more detailed breakdown of implied tariffs by certain country and product range using a CBAM price of \$75. It has two scenarios. The first looks at the application of CBAM to the initial restricted categories of goods (iron, steel, aluminium etc) and only on scope 1 emissions. The second is an extreme case where CBAM applies to all goods and all emissions. It can be seen that while the range of tariffs in the ACF/LSE and TFCD/IMF Papers are broadly in line there are differences. Even in the realistic scenario the TFCD/IMF Paper shows some much higher implied tariffs – for example 18.5% on cement from India respectively, 15.4% and 17.3% on iron and steel from India and Kazakhstan – while some are lower – for example 3.3% on Chinese iron and steel as opposed to 6.3% in the ACF/LSE Paper.

**Implied Tariffs of CBAM at \$75/tonne**



Note: Figures in the chart indicate the percentage point increases in tariff equivalent in 2030 due to the CBAM for exporting regions/sectors. Chm, nmm, i\_ and nfm refer to chemicals(fertilizers), non-metallic metals(cement), iron and steel, and non-ferrous metals (aluminium), respectively.



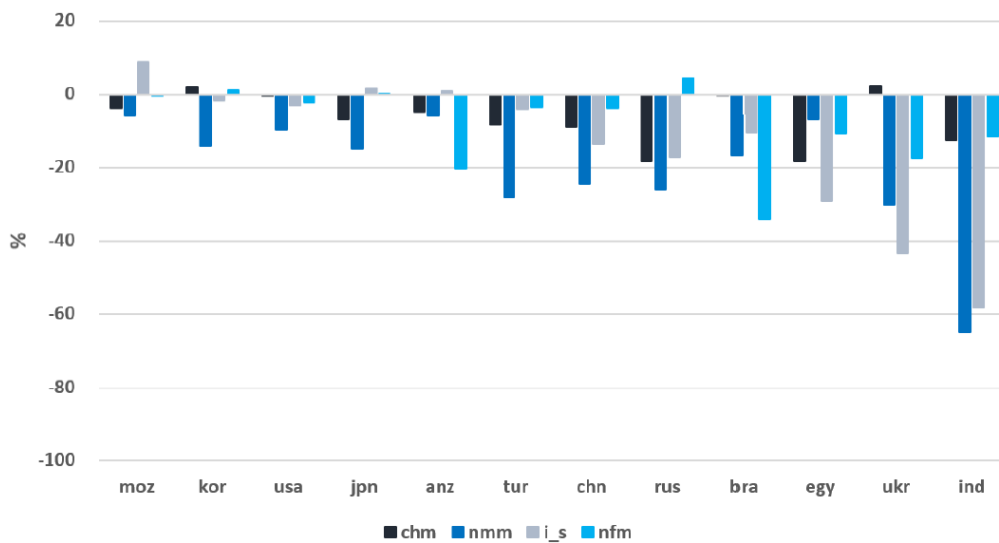
Source: Task Force on Climate Development and IMF, The Global Impact of a Carbon Border Adjustment Mechanism, A Quantative Assessment, page 8

### 1.2.5 Impact on exports

Once the implied tariff imposed by a BCA is known it is possible to model the impact on exports. The TFCO/IMF Paper shows there could be a significant impact in certain sectors for some countries – for example cement exports to the EU could drop by 65.2% and 44.3% from India and South Africa, iron and steel exports from Kazakhstan by 63.9%.

#### *Impact on Exports of CBAM Products to the EU with CBAM at \$75/tonne*

FIGURE 4 Impact on Exports of CBAM Products to the EU: Scenario 1 (% change from baseline)

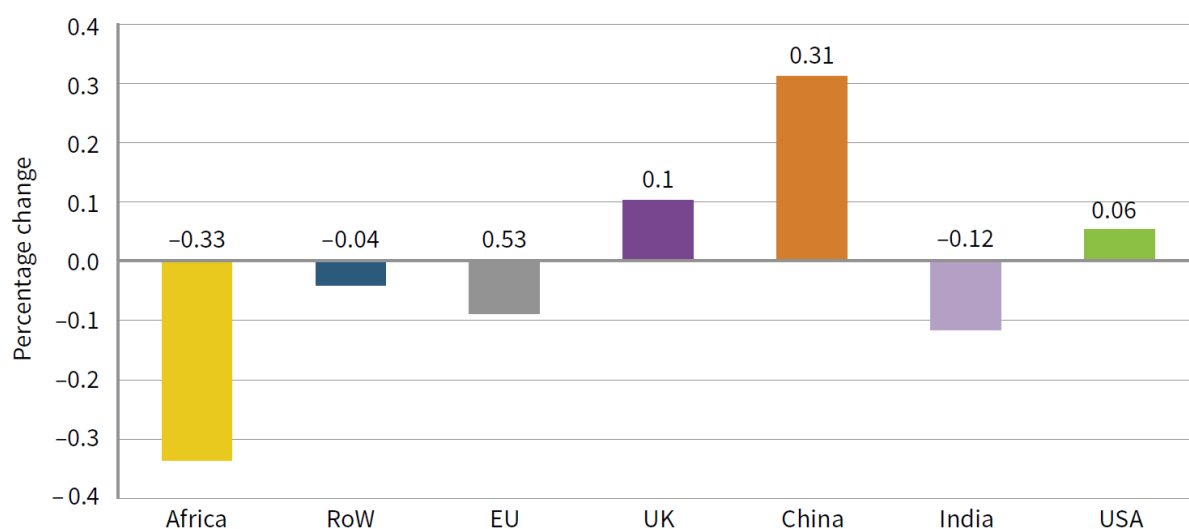


Source: Task Force on Climate Development and IMF, The Global Impact of a Carbon Border Adjustment Mechanism, A Quantative Assessment, page 9

### 1.2.6 Impact on GDP

The impact on a country’s GDP depends on a number of factors including the reduction in exports to the EU caused by the implied tariff and the relative importance of those exports to a country’s GDP. The ACF/LSE Paper also shows that the impact on GDP will be larger in Africa than other regions even though African countries are not the largest exporters to the EU. The following table shows the effect of CBAM at €40 once account is taken of the phasing out of free allowances under the ETS.

### *Impact of the CBAM at €40 on GDP with removal of free allowances (% change)*



Source: African Climate Foundation and London School of Economics, Firoz Lalji Institute for Africa, Implications for African Countries of a Carbon Border Adjustment Mechanism in the EU, page 21

This modelling predicts that there would be an increase in GDP in China – as well as the UK and US – as consumers switch to less carbon intensive products. Also, there would be a slight fall in GDP in the EU due price increases driven by CBAM.

The ACF/LSE Paper notes that the disproportionately large impact on Africa as opposed to other regions of CBAM is due to two factors (see page ix). First, African exports of certain commodities have a higher carbon intensity than other countries which means the implied tariffs on impacted African goods will be higher than on those from competitor countries. This will lead European consumers to switch supplies to countries such as US, UK or China.

Secondly, the EU is a major export market for Africa. The EU accounts for 26% of Africa’s exports of fertiliser, 16% of iron and steel, 12% of aluminium, 12% of cement and 33% of manufacturing. The Paper concludes: “As Africa’s economy exports substantially more to the EU, it is expected that the CBAM will have a larger impact relative to other economies that are less dependent on the EU market.”

#### 1.2.7 Collateral effects

In considering the impact of CBAM it is important to consider not just the immediate effect on covered goods exported to the BCA region but potential spillover effects on other industries and also whether or not exports can be relocated to other markets. The ACF/LSE Paper notes: “The exports of other commodities from Africa to the EU that are not covered by the CBAM are additionally forecast to decline...Africa’s exports of manufacturing, transportation and other services to the EU fall by 4.23%, 5.78% and 6.87% [under the scenario of CBAM at only €40 and with no phasing out of free ETS allowances]. These commodities, and especially transport and other services, can be seen as complements, and so decline on the back of reduced exports in other sectors.

However, it also states that “The negative impact on Africa’s exports is somewhat (but only partially) mitigated by a trade diversion effect. While Africa’s exports to the EU will decline for many commodities, Africa’s exports of these products will increase to China and India. For instance, Africa’s

exports of fertiliser to China and India are expected to increase by 0.30% and 5.14%, and exports of iron and steel to these countries by 9.34% and 12.82% [under the scenario of CBAM at only €40 and with no phasing out of free ETS allowances]. That in turn implies a benefit for those economies, as they are able to benefit from the more competitive supply of major inputs (like iron and steel) to their economies. In the case of China, this helps to explain why the CBAM has a positive net impact on its economy.”

### 1.2.8 Impact on welfare, terms of trade, volume of trade and real wage effects

Probably the most important question is how do all the various factors – volume and relative proportion of trade in CBAM goods, carbon intensity and implied tariffs, impact on GDP, employment in the sector etc – combine to impact welfare. The TFCD/IMF Paper contains a table with changes in welfare in terms of increase or decrease in household income measured in \$billions in both the realistic (scenario 1) and extreme (scenario 2) scenarios.

*Change in Welfare from Baseline (in USD bn, 2030)<sup>7</sup>*

Countries/Regions	Scenario 1	Scenario 2
<b>Selected Advanced Economies</b>		
Australia and New Zealand (anz)	-0.3	-2.0
Japan (jpn)	0.2	0.0
Canada (can)	-0.2	-2.0
United States of America (usa)	-0.2	-10.0
South Korea (kor)	0.3	-1.0
EU (eur)	10.7	146
UK, Switzerland and Norway (usn)	0.7	10
<b>BRICs</b>		
China (chn)	-1.1	-46.0
India (ind)	-1.8	-15.0
Brazil (bra)	-0.2	-2.0
Russia (rus)	-4.7	-19.0
South Africa (zaf)	-0.2	-2.0
<b>Selected Developing Economies</b>		
Kazakhstan (kaz)	-0.2	-9.0
Ukraine (ukr)	-0.7	-3.0
Turkey (tur)	-0.3	-5.0
Mexico (mex)	-0.3	-2.0
Egypt (egy)	-0.2	-2.0
Mozambique (moz)	0.0	-1.0
<b>Selected Regions</b>		
Association of South East Asian Nations (ASEAN)	-0.5	-12.0
Latin American Countries (lac)	-0.7	-4.0
Sub-saharan Africa (SSA)	-0.5	-2.0
Middle East & North Africa (MENA)	-2.7	-14.0
Least developed country (LDC)	0.0	0.0
Rest of the world (row)	-0.4	-2.0

The Paper concludes: “Under both scenarios [i.e., the realistic and extreme scenarios], depressed external demand and worsening terms of trade hurt many developing economies. However, under Scenario 1, the macroeconomic impact on most of these countries is modest...Under Scenario 2, the macroeconomic impacts of CBAM on all jurisdictions are stronger compared with Scenario 1. For example, reduced external demand causes the GDP of Mozambique to shrink by 2.5 percent, the GDP of Russia to shrink by 0.6 percent, and the GDP of India, Egypt and Turkey to shrink by almost 0.3 percent, compared with the baseline.” It should be noted though that Scenario 2 is not what is proposed by the EU and would involve the application of CBAM to all products and all emissions.

<sup>7</sup> Source: Task Force on Climate Development and IMF, The Global Impact of a Carbon Border Adjustment Mechanism, A Quantitative Assessment, page 20

The ACF/LSE Paper models the effect on welfare, terms of trade, volume of trade and real wages in African countries (see Appendix 1 to this paper). In the model, welfare is conceptually equivalent to GDP. As the workings, parameters and calculations used for this set of models is different to those used for the regional assessments referred to above, there are some differences in the results – which highlights that any impact assessment on CBAM is sensitive to modelling decisions. The Paper notes: “With the limited coverage, the impact of the carbon adjustment on African exports is negligible, even with a relatively high carbon price of €87/tonne. This is in part because these goods make up a small portion of total exports from African countries and then have no effect at the macro level.”

The FDA Paper also analyses the socio-economic impact looking at the share of employment and wages bill affected by CBAM. It should be noted that the analysts have taken what they call an extreme view assuming all CBAM exports and associated inputs are impacted<sup>8</sup>. It concludes: “The most exposed countries in socio-economic terms are Moldova (MDA), Mozambique (MOZ), Bosnia-Herzegovina (BIH), Serbia (SRB), Macedonia (MKD), Ukraine (UKR), Montenegro (MNE), Bahrain (BHR), Albania (ALB). In these countries, the potential reduction in production puts at risk more than 0.5% of the wage bill and of the employment. In the case of Moldova and Mozambique, about 2% of employment is exposed.” It continues: “Other countries, such as São Tome and Príncipe (STP), Armenia (ARM), Russia (RUQ), Georgia (GEO), Turkey (TUR) and Zimbabwe (ZWE), also present an important degree of socioeconomic exposure since more than 0.5% of the wage bill will be impacted. However, in these economies (with special regards to Zimbabwe), the share of employment at risk is not as high as the share of wages, indicating that few but well-paid [sic] jobs are those that may be impacted by the introduction of CBAM in the European Union.”

The ACF/LSE Paper also shows the impact of a CBAM at €87 on all sectors in Africa (see Appendix 2). The Paper notes that CBAM is to be applied to a restricted number of goods at present and there is not currently a stated object to apply it to all sectors, but nevertheless it could be expanded overtime. The full scope scenario shows the potential impact which is significantly more adverse.

It should also be noted that even if there is not a significant reduction in over all employment in a country, there could be a much greater impact in an effected sector which might create political sensitivities.

### 1.2.9 Conclusions

The outcomes are based on modelling which has inherent limitations and requires assumptions to be made. The conclusions are therefore not precise and can only be taken as indicative. The various papers examined use different assumptions (such as the prevailing CBAM cost) making direct comparison difficult. The results also vary significantly depending upon the scenarios which are modelled – for example the breadth of products and scope of emissions which are covered. Nevertheless, the results are broadly in line with each other and a number of tentative conclusions can be made:

- The impacts of CBAM are not evenly distributed with developed countries not as affected as developing countries and in some cases benefiting from CBAM.
- The countries most negatively affected are those which are more dependent on exports of CBAM goods to the EU, especially where their exports are comparatively carbon intensive in comparison with other countries.
- Generally, the most vulnerable countries are Least Developed Countries and Low Income Countries in Africa or developing countries neighbouring the EU.

---

<sup>8</sup> “Differently from other studies that use general equilibrium models, and hence rely on strong assumptions about price-elasticities of substitution among countries and technological substitutions, we focus on two extreme scenarios. First, we identify the maximum carbon revenue generated for the EU by the introduction of CBAM if countries’ exports’ volumes to the EU are not impacted (which relies on the idea that these exports are inelastic in relation to price). Second, we assume on the contrary that all exports are impacted, as well as all suppliers of inputs for the industries that produce these export goods.”

- Several studies single out Mozambique, Zimbabwe, Ukraine, Bosnia and Herzegovina, and Serbia as the most impacted. Other countries mentioned include Moldova, Macedonia, Montenegro, Bahrain, Albania, São Tome and Principe, Armenia Georgia and Turkey.
- Nevertheless, if the CBAM charge is around €87 and applied only to the initial category of goods - iron and steel, aluminium, cement, fertiliser, electricity - the impact is moderate (e.g., “according to the ACF/LSE Paper CBAM is found to have just a moderate impact on the economies of African countries even when carbon is priced at €87/tonne. In one model, the CBAM is forecast to reduce the GDP of no single African country by more than 0.18%.”).
- However, if CBAM was to be extended to significantly more carbon intensive products the impact on developing countries could be substantial (e.g., the ACF/LSE Paper notes “when the CBAM is applied to all products imported by the EU, it has very detrimental effects on the growth of African countries. Small, agricultural countries are particularly affected by this policy.”)

## 2. Potential policy measures to address the impact of BCAs

### 2.1 Introduction

Although the overall assessment of the impact on third countries of the EU CBAM with a limited scope) is marginal note should be taken of two issues of general consideration (i) the political dimension of being subjected to a BCA measure; and (ii) the potential expansion of such a measure either in its scope or by other countries or regions introducing a BCA.

There are various voices calling for multilateral approaches whether in terms of Carbon Clubs or creating a carbon floor price. Therefore, even if the CBAM example seems new and unique, countries should be prepared for similar action from like-minded countries such as Canada,<sup>9</sup> the United States,<sup>10</sup> and South Korea,<sup>11</sup> to name a few, where either a national carbon pricing approach is already in place, or there is a political will to implement a border measure.

In general terms, BCAs may be administered against three different types of policy instruments, namely: (i) a fiscal instrument, such as a carbon tax, (ii) a market-based instrument, such as an Emissions Trading Scheme and (iii) a regulatory instrument, such as a command-and-control measure to increase efficiency, for example.<sup>12</sup> The first two instruments (carbon taxes and ETS) are more traditional and more widely accepted as policies for which a BCA may be employed. A BCA in respect of a carbon tax has been proposed in Taiwan and a BCA in respect of an ETS has been introduced in the EU with CBAM. The last option, a BCA in respect of a regulatory measure, seems to be more novel and untested, being proposed by countries which do not possess a corresponding national explicit carbon pricing approach.

The political dimension denotes that the application of a BCA measure by any one state can be considered as a corresponding loss in potential tax revenues for the country of origin (the country exporting those goods to the country where the BCA measure is imposed). That is the case because, in the absence of a carbon tax or an ETS in the country of origin, it is the country of destination that both imposes the levy and keeps the revenue associated with the cross-border transaction. As a result, the application of a BCA measure by one or more countries could imply in a loss or surrender of important revenue resources that could be used particularly by middle- and low-income countries to foster the green transition, even if they are not a significant proportion of GDP.

---

<sup>9</sup> TBA

<sup>10</sup> TBA

<sup>11</sup> TBA

<sup>12</sup> T. Falcão, Border Carbon Adjustment Measures explained, Tax Notes International, 2023 (forthcoming)

## 2.2 Introduction of carbon pricing

The question that follows therefore is how could third countries impacted by a BCA measure react to it? In the specific case of the CBAM, it is noted in the Fit for 55 package that one of the objectives of the EU when introducing the CBAM is not just to tackle carbon leakage, but also to foster the proliferation of carbon pricing instruments in third countries.<sup>13</sup> Meaning the EU would be using the CBAM to in fact stimulate other countries to price carbon via the adoption of explicit pricing measures, the only two instruments accepted as eligible for compensation in the third state.

However, allowing third state compensation (or acknowledging the existence of a similar measure in the country of origin and abating the price from the BCA employed at the border), is also a legal requirement for the BCA measure to be compatible with WTO rules, and to live up to the standards of the public policy exception in Article XX (g) of the GATT.<sup>14</sup> Therefore, the likelihood is that any one country aiming to employ a BCA measure to the liking of the CBAM will also be required to admit such assimilation of nationally derived policies in the absence of a carbon club.<sup>15</sup>

It therefore follows from the above that one of the ways in which countries can react to the application of a BCA is through the application of a domestic carbon price which means that they keep the revenues from their exports which otherwise would be collected by the BCA region. There is as of yet no formal international consensus on what a carbon price means, although there is an implied consensus in the international literature emanating from the OECD,<sup>16</sup> IMF<sup>17</sup> and WBG<sup>18</sup> that it covers at least explicit carbon prices, implicit carbon prices and negative carbon prices.<sup>19</sup> In spite of that, under the CBAM legislation, effectively only explicit pricing – for example carbon taxes and ETSS – gives rise to abatement of the CBAM price employed at the border.<sup>20</sup> This means that the presence or introduction of implicit carbon prices (for example excise taxes levied on an ad valorem basis or in weight or volume units not relating to carbon content, like energy taxes and fossil fuel taxes) by the country of origin will not be enough to allow for a corresponding reduction of the price employed at the border by the country of destination. This is likely to continue to be the case in the short-term even if other countries introduce similarly minded BCAs, because there is as of yet no formal understanding on how to compute an implicit carbon price.

As a result, in practice countries wishing to exercise their sovereign right to tax without waiving taxing rights towards a trading partner imposing a BCA need to introduce an explicit carbon price such as a domestic carbon tax, or an emissions trading scheme, both schemes where the monetary amount paid under the system is calculated on GHG covered by such a scheme and released during the production of goods. This is the case even if such a country already imposes an implicit price on carbon such as through a fuel tax.

Both a carbon tax and an emissions trading scheme can be designed to be equally effective at pricing carbon and allowing recognition of the domestic price in a foreign market employing a BCA measure. However, ETS markets take, on average, five to ten years to be on a full working status and requires

---

<sup>13</sup> TBA

<sup>14</sup> TBA

<sup>15</sup> TBA

<sup>16</sup> OECD, Pricing Greenhouse Gas Emissions: Turning Climate Targes into Climate Action, November 2021, available at: <https://www.oecd-ilibrary.org/sites/e9778969-en/1/3/1/index.html?itemId=/content/publication/e9778969-en&csp=52c8137b50988e25208d117dee9bbae3&itemIGO=oecd&itemContentType=book> (last accessed 3/1/2023)

<sup>17</sup> IMF Working Papers, A Framework for Comparing Climate Mitigation Policies Across Countries, (S. Black ; D. Minnett ; I. Parry ; J. Roaf ; K. Zhunussova), pg. 4, December 2022, available at: <https://www.imf.org/en/Publications/WP/Issues/2022/12/16/A-Framework-for-Comparing-Climate-Mitigation-Policies-Across-Countries-527049>, last accessed 5 Jan 2023.

<sup>18</sup> WBG,

<sup>19</sup> T. Falcão, Paying the Piper: On the Legal Qualification of Carbon Prices, January 2023, available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4336765](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4336765).

<sup>20</sup> The definition of “carbon price” in Article 3(29) of the CBAM Reg is ‘carbon price’ means the monetary amount paid in a third country, under a carbon emissions reduction scheme, in the form of a tax, levy or fee or in the form of emission allowances under a greenhouse gas emissions trading system, calculated on greenhouse gases covered by such a measure, and released during the production of goods’

extensive monitoring, review, and verification processes (MRV)<sup>21</sup> to assess the level of pollution being emitted by the selected industries and set the cap under that threshold. Through the operational life of the ETS, MRV functions are also key to make sure the covered industries are compliant. Therefore, this instrument requires time and human resources from governments and tax administrations.

Carbon taxes on the other hand, can be introduced from one fiscal year to the next, and are capable of pricing the whole of the economy, particularly if employed at "choke points" at the upstream level.<sup>22</sup> This, as is further outlined in the UN handbook on Carbon Taxation for developing Countries, would be especially true of a carbon design is introduced as a Fuel Approach, expressing carbon tax rates in the legislation in weight or volume units using commonly acknowledged average carbon content values when determining the tax rates. An upstream carbon tax is simple to administer and is capable of impacting both the formal and the informal economies, a point that is particularly relevant for middle- and low-income countries.<sup>23</sup> It therefore is the most efficient and readily available instrument to price carbon in the short-term, for countries wishing to address the introduction of the EU CBAM.<sup>24</sup> It is also the instrument most likely to find correspondence in other countries for countries wishing to establish cooperative approaches in the future.<sup>25</sup>

It is to be noted that the introduction of a carbon tax does not prevent countries from employing other environmental tax instruments that might ultimately add to the policy mix required for any one country to meet its Nationally Determined Contributions (NDCs). Likewise, a carbon tax may coexist within the same normative setting with an ETS for countries wishing to apply a top up price on targeted carbon intensive sectors at the downstream level. As a general policy approach though, focusing only on sectors that are covered by other countries' BCA regimes might ultimately add complexity to the tax system, as different countries might choose to involve different sectors in their BCA measures. The preferable option is therefore for any one country to have a principled policy targeting the pricing of carbon as a result of general tax and environmental considerations, rather than purely as a response to the actions of third countries who might be significant trading partners.

### **2.3 Convert existing implicit pricing into explicit pricing**

Many countries already have implicit carbon pricing such as fuel duty. As noted above, the EU CBAM does not allow this as a credit against the CBAM charge and this may also be the case with any other form of BCA which is introduced in future. An option for a country with implicit pricing could therefore be to slightly modify the nature of that tax to create an explicit carbon price. For example, a fuel duty could be modified so that it was directly linked to the carbon content of the fuel. To the extent this creates an explicit carbon price it should then be creditable against a BCA. At the time of writing, several countries are examining or have effected such changes.

Uruguay is an example of a country which from 1 January 2022 has converted its implicit pricing to explicit pricing by introducing a carbon tax.

Vietnam levies several taxes on fossil fuels (custom duty on imported fuels; special consumption tax, VAT and environmental protection tax on both domestic and imported fuels). At a consultant workshop

---

<sup>21</sup> Based on the practical experience from Chile, China, and the EU.

<sup>22</sup> There is extensive literature on the mechanics of a carbon tax. See, for example: United Nations, UN Handbook on Carbon Taxation for Developing Countries, United Nations, 2017; Metcalf, G.E. 2019. *On the Economics of a Carbon Tax for the United States*, Brookings Papers on Economic Activity,.; IMF, *Fiscal Policies for Paris Climate Strategies – from Principle to Practice*, IMF Policy Papers, (May 2019); IMF, Fiscal Monitor, (Chapter 1), *How to Mitigate Climate change?* (2019), Pg. 3; Ramseur, J. and Parker, L. 2009. *Carbon tax and greenhouse gas control: Options and considerations for Congress*, CRS Report for Congress (2009), p. 2.

<sup>23</sup> T. Falcão, Paying the Piper: On the Legal Qualification of Carbon Prices, January 2023, available at: [https://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=4336765](https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4336765)

<sup>24</sup> (While CBAM took effect from October 2023, there is only a reporting requirement until 2026 which does give some lead time for countries considering this option).

<sup>25</sup> IMF, Carbon Price Floor, 2022; T. Falcão, A Climate Treaty for the Global Taxation of Carbon, ICTD Policy brief, 2023 (forthcoming)



on 30 August 2023 in Ha Noi, the integration of a carbon tax into the existing environmental fee or the environmental protection tax was discussed as a potential response to CBAM.

India currently employs both taxation (the ‘Goods and Services Tax (GST) Compensation Cess’) and trading systems focussing on energy savings (‘Perform, Achieve and Trade’ (PAT)). It is in the process of creating an Indian Carbon Market (ICM) which serves as a carbon financing platform to mobilize finance and technology towards decarbonisation of the economy, helping to achieve India’s 2030 NDC target and net-zero by 2070. The ICM focuses on greenhouse gas intensity rather than energy intensity; targets will not be set in terms of tons of oil equivalent anymore but in terms of tons of carbon dioxide equivalent. It is understood that this transition is intended make recognition under the CBAM easier.

Establishing an Emission Trading System (ETS) in Türkiye is one of the targets defined in the Medium Term Programme (2023-2025) and Türkiye's Green Deal Action Plan, presented in April 2023<sup>26</sup>. The system is planned to include emission-intensive sectors, and the implementation principle is designed as cap-and-trade system.

## **2.4 Apply a tax only on carbon intensive exports**

The [2021 UN Handbook on Carbon Taxation for Developing Countries](#) gives detailed practical guidance on the implementation of a carbon tax including how to address issues of public acceptance and any undesired impacts on households and firms. Nevertheless, for many reasons a country may be reluctant to introduce a carbon tax at present. A potential solution would be to introduce a carbon tax only on exports. This would clearly not be consistent with driving decarbonisation and net zero commitments, as the price burden would not impact the country’s own economy and would only produce effects towards the country of destination to which the product was exported. A carbon tax on exports would ensure that the tax revenues flowed to the country in question rather than the country or region imposing a BCA. It could therefore be a good instrument for domestic resource mobilization purposes, although it would not count towards the country’s mitigation targets under the Paris Agreement (as established by the Nationally Determined Contributions), as it would not in fact impact production for the domestic market.

However, it is not clear whether or not such a carbon tax solely levied on carbon emissions occurring during the production of CBAM goods imported to the EU would be creditable under the CBAM regulations.

It would also be necessary to consider the WTO implications of an export-only carbon tax. That is the case because an export carbon tax would be clearly geared towards foreign trade partners and therefore might be considered to be contrary to the purpose and objective of the GATT, as established in the Preamble to that agreement. As a general rule, a border measure (in this case, an export carbon tax would be assimilable to a border measure) has to provide parity in treatment between the national price and the foreign applied price. On the other hand, it could be considered as admissible if the public policy exception in Article XX (g) of the GATT were to be considered applicable (on the basis of it being an environmental measure).

Overall it is unlikely that many countries will resort to a carbon tax applicable on exports only, as the application of the carbon tax in itself could: (i) increase the price of commercialization of the product in the international market and therefore could have a negative competitive impact; (ii) lead to carbon leakage without the country being able to resort to a remedying action such as a BCA; and (iii) generate a right for third countries to sanction the country under trade rules.

---

<sup>26</sup> Republic of Türkiye Updated First Nationally Determined Contribution [Republic of Türkiye \(unfccc.int\)](https://unfccc.int)

## **2.5 Redirect exports to countries without a BCA**

Where a country is unable or does not wish to introduce any form of explicit carbon pricing a potential defensive measure would be to try to redirect exports which would be impacted by a BCA to countries which do not impose such a charge. Such a response would not be consistent with decarbonisation aims and whether or not it would be feasible would depend upon such factors as whether or not such markets exist for the export, the cost of switching markets and the likelihood of the new markets introducing a BCA at a later point in time.

An important point to consider is the fact that there are domestic debates on the introduction of a BCA type measure in several markets (Canada, the USA, Korea). As a result, the availability of alternative international markets may diminish over time.

## **2.6 Leverage cleaner production technologies, potentially using the TRIPS Agreement**

As well as (or instead of) imposing their own carbon price on the relevant goods to ensure they retain taxing rights – rather than ceding them to the BCA area – exporting countries could aim to reduce the embedded carbon content of exports and therefore the impact of any BCA. Such incentivisation could take many forms including both direct subsidies or tax incentives to invest in cleaner technologies. According to the ACF/LSE Paper it may also be possible for developing countries to avail themselves of the provision of the Trade Related Aspects of Intellectual Property Rights Agreement (TRIPS). TRIPS provides for compulsory licencing of intellectual property rights to developing countries in certain specified circumstances. Such provisions could potentially be applied to environmentally sound technologies such as energy storage, greenhouse gas reductions methods and industrial processes. One obstacle however is that compulsory licencing generally only applies to use in the domestic market. TRIPS also requires developed countries to incentivise enterprises in their territory to transfer technologies to developing countries in certain circumstances. While the application of TRIPS to the licencing and transfer of environmentally sound technologies is not clear or straightforward, there could well be opportunities for developing countries to work with developed countries to facilitate such transactions.

## **3. Administrative considerations**

This chapter is still being developed. It will contain practical guidance on administrative requirements for exports to countries with a BCA, including the following topics:

- 3.1 Measurement, Reporting and Verification in Carbon Pricing (MRV)
- 3.2 Challenges in implementing MRV in developing countries
- 3.3 Internationally recognised verification processes
- 3.4 Possibilities to include scope 3 emissions (i.e., indirect emissions other than imported energy)
- 3.5 Possibilities to include carbon credit

## Appendix 1

*Impact on welfare: Limited CBAM coverage with a carbon price of €87 per tonne*

Country	Welfare	Terms of Trade	Volume of Trade	Real Wage
Algeria	0.032	0.032	0.00063	0.21
Angola	-0.03	-0.023	-0.0067	-0.049
Benin	-0.031	-0.028	-0.0026	-0.08
Botswana	0.021	0.121	0.00068	0.089
Burkina Faso	-0.017	-0.014	-0.0032	0.061
Burundi	0.022	0.022	0.00079	0.19
Cabo Verde	0.057	0.027	0.03	2.2
Cameroon	0.028	0.026	0.0022	0.2
Central African Republic	-0.011	-0.0046	-0.0065	0.083
Cote d'Ivoire	0.064	0.063	0.0015	0.28
Democratic Republic of Congo	-0.044	-0.036	-0.008	0.079
Djibouti	0.32	0.24	0.078	0.81
Egypt	0.018	0.011	0.0065	0.12
Ethiopia	0.0068	0.0054	0.0014	0.0059
Gabon	-0.075	-0.062	-0.013	-0.18
Gambia	-0.12	-0.11	-0.013	-0.18
Ghana	0.013	0.011	0.0022	0.063
Guinea	0.0081	0.008	0.00016	0.07
Kenya	0.03	0.025	0.0048	0.08
Lesotho	-0.0039	-0.008	0.0041	0.0039
Liberia	0.33	0.3	0.027	0.4
Libya	-0.17	-0.17	0	0.17
Madagascar	0.073	0.063	0.011	0.4
Malawi	0.02	0.016	0.0035	0.032
Mali	-0.036	-0.028	-0.0078	0.095
Mauritania	-0.054	-0.05	-0.0042	0.11
Mauritius	0.039	0.037	0.0019	0.26
Morocco	0.035	0.022	0.013	0.52
Mozambique	-0.056	-0.058	0.0024	-0.12
Namibia	-0.029	-0.03	0.00085	-0.041
Niger	0.021	0.02	0.0039	0.16
Nigeria	-0.0011	-0.00092	-0.00016	-0.00075
Rep. of Congo	-0.0071	-0.0062	-0.0092	0.0006
Rwanda	-0.012	-0.012	-0.00003	0.035
Sao Tome & Principe	0.14	0.15	-0.0043	0.68
Senegal	-0.01	-0.0068	-0.0034	0.072
Seychelles	0.0052	-0.035	0.04	1.2
Sierra Leone	-0.0056	-0.032	0.026	0.5
South Africa	-0.011	-0.015	0.0041	0.042
Sudan	0.0012	0.00053	0.00065	0.014
Swaziland	-0.013	-0.016	0.0022	-0.012
Tanzania	0.0057	0.0038	0.0019	0.0075
Tchad	-0.017	-0.013	-0.0038	-0.027
Togo	0.052	0.044	0.008	0.13
Tunisia	0.094	0.056	0.038	1.2
Uganda	0.038	0.034	0.0041	0.18

Zambia	-0.009	-0.0096	0.00063	-0.063
Zimbabwe	0.0055	0.0045	0.00098	0.0039

Source: African Climate Foundation and London School of Economics, Firoz Lalji Institute for Africa, Implications for African Countries of a Carbon Border Adjustment Mechanism in the EU, page 29

## Appendix 2

### *Impact on welfare: WiderCBAM coverage with a carbon price of €87/tonne*

Country	Welfare	Terms of Trade	Volume of Trade	Real Wage
Algeria	-1.5	-0.34	-1.2	-0.085
Angola	-0.92	-0.12	-0.8	-0.63
Benin	-3	-0.35	-3	0.043
Botswana	-0.003	0.16	-0.16	1.3
Burkina Faso	-1.1	-0.22	-0.87	-1.1
Burundi	-0.59	-0.037	-0.56	-0.24
Cabo Verde	-2.4	0.51	-2.9	11
Cameroon	-1.4	-0.086	-1.3	-0.18
Central African Republic	-1.6	-0.017	-1.6	0.079
Cote d'Ivoire	-1.5	-0.21	-1.3	-0.7
Democratic Republic of Congo	-1	0.11	-1.1	0.86
Djibouti	-8.4	3.1	-11	14
Egypt	-0.88	-0.16	-0.72	-0.72
Ethiopia	-0.92	-0.64	-0.28	-0.8
Gabon	-1.4	0.29	-1.7	3.7
Gambia	-3.4	-0.38	-3	-0.62
Ghana	-1.5	-0.28	-1.3	-0.93
Guinea	-2.6	0.23	-2.9	1
Kenya	-0.9	-0.31	-0.6	-1.1
Lesotho	-0.37	0.64	-1	5.2
Liberia	-5.8	-1.1	-4.7	-1.4
Libya	5.1	5.1	0	23
Madagascar	-1.2	-0.018	-1.1	0.16
Malawi	-1.2	0.47	-1.6	1.5
Mali	-1.3	0.036	-1.3	0.5
Mauritania	-4.1	1.1	-5.2	6.9
Mauritius	-0.2	-0.064	-0.14	0.19
Morocco	-0.68	0.012	-0.69	0.45
Mozambique	-0.89	0.83	-1.7	2.5
Namibia	-0.28	0.15	-0.43	1.8
Niger	-0.7	-0.16	-0.54	-0.77
Nigeria	-0.36	-0.16	-0.2	-0.72
Rep. of Congo	1.3	8	-6.7	34
Rwanda	-0.94	-0.13	-0.81	-0.53
Sao Tome & Principe	-2	-0.12	-1.9	0.023
Senegal	-1.6	0.002	-1.6	0.065
Seychelles	-1.7	3.6	-5.3	57
Sierra Leone	-3.2	0.091	-3.3	14
South Africa	-0.37	0.43	-0.79	18
Sudan	-0.08	-0.086	-0.71	-0.81
Swaziland	-0.4	0.082	-0.48	1
Tanzania	-0.92	-0.15	-0.77	-0.62
Tchad	-0.46	0.013	-0.47	0.28
Togo	-3.8	1.7	-5.5	4.8
Tunisia	-0.82	0.31	-1.1	2.6
Uganda	-0.72	-0.14	-0.58	-0.81

Zambia	-0.97	0.25	-1.2	9.1
Zimbabwe	-0.77	-0.06	-0.17	-0.006

Source: African Climate Foundation and London School of Economics, Firoz Lalji Institute for Africa, Implications for African Countries of a Carbon Border Adjustment Mechanism in the EU, page 33