Border Carbon Adjustment: A brief survey from the Chinese perspective

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1. Introduction

Border carbon adjustment (BCA) has quickly gone from a controversial hypothetical to one of the most debated topics at the trade–environment interface. This brief paper explains what BCA is and explores the implications for China of its use by major trading partners.

The paper begins by asking what BCA is and how it relates to the United Nations Framework Convention on Climate Change's (UNFCCC) Paris Agreement and its principles (Section 2). It then surveys current developments, noting where BCA has become part of the national and regional processes and exploring the roots of its sudden spike in policy relevance (Section 3). Section 4 examines the potential impacts of BCA for China and the variables that dictate the strength of those impacts. Section 5 then explores China's strategic options in responding to the employment of BCA in partner countries. Section 6 concludes.

2. Background

This section gives a brief overview of BCA. It first explains the concept in its various permutations and then briefly assesses BCA in light of the principle of common but differentiated responsibilities and respective capabilities (CBDR-RC), asking whether BCA is in conflict with the spirit of the UNFCCC's Paris Agreement.

2.1 What is BCA?

BCA, also called the Carbon Border Adjustment Mechanism (CBAM) in the European Union (EU), is a mechanism that accompanies some form of domestic carbon pricing. That domestic policy could be a carbon tax, a cap-and-trade scheme, or output-based pricing. BCAs ensure that imported goods are assessed at the same carbon price as domestic producers. One variation of BCA also relieves domestic producers of that carbon price at the point of export.

There are two basic forms of BCA. The first accompanies a carbon tax and functions as a border tax adjustment. Most countries use value-added tax adjustments to charge foreign producers the domestic rate of value-added tax and to refund that tax to their own exporters. There are some legal differences between BCA and border tax adjustment, explored below, but the mechanics of the regime would be the same.

The other form of BCA accompanies a non-tax carbon price—that is, a regulation, like a cap-and-trade scheme or an output-based pricing scheme. This type of BCA technically does not make an adjustment at the border, so BCA is a misnomer. Rather, it simply enforces the domestic regulatory requirements on imports, mirroring the domestic regulatory requirements at the border. An analogy, in this case, is a product efficiency standard that is imposed on domestic goods and mandatory for imported goods. In the case of a cap-and-trade scheme, for example, an accompanying BCA might oblige importers to purchase emissions allowances in the same amount as they would have to do if their imports had been domestically produced.

2.2 Conflicts with CBDR-RC and the Paris Agreement?

CBDR-RC is a core principle of the UNFCCC and its Paris Agreement. Built into those agreements is the understanding that developed and least-developed countries have done the least to contribute historically to climate change and have relatively limited means by which to address it. The implication is that leadership and greater responsibilities should lie with developed countries to both mitigate climate change and help developing and least-developed countries both mitigate and adapt to it.

Modelling shows that the major impacts of BCA applied by developed countries would fall on developing countries, whose exports would suffer disproportionately (Böhringer et al., 2011). This has led to the argument that BCA contravenes the principle of CBDR-RC; it constitutes climate action by developed countries for which developing countries are forced to pay.

It is worth unpacking that argument. At its core, it argues that if the responsibility for leading on mitigation rests with developed countries like those in the EU, developing country exporters should not be the ones bearing the costs. That basic truth should be modified by four considerations:

1. It is not clear what the actual numbers look like; the final impacts on developing countries will depend critically on policy design. An analysis by Böhringer et al. (2011) assumes a BCA covers all traded goods, for example, whereas we know the BCAs now being considered will cover only a handful of basic and semi-finished heavy industrial goods such as iron and steel, aluminum, nitrate fertilizers, cement, plastics, and organic chemicals. The inclusion of agriculture alone—an unrealistic assumption—would make a major difference to developing country vulnerability, given the importance of agricultural exports to many developing countries. In the same vein, under the scenarios in that modelling that had revenues being returned to exporting countries, the impacts were significantly weaker.
2. Static analyses do not tell the whole story. A BCA in a major market would create incentives for producers to reduce emissions, for example, by contracting directly with renewable energy providers for electricity. While some such investments or arrangements would be costly, others would have relatively short payback, even without considering the benefits of market access, meaning longer-term costs would be reduced accordingly.
3. Producers protected by a BCA will never have complete protection; no BCA can be 100% effective at preventing leakage (see Box 1) and loss of market share. On the export side, firms that are protected by a regulation-based BCA may lose market share in global markets since their exports probably cannot be legally rebated for carbon costs. On the domestic side, they will be competing against foreign producers who will be subject to BCA only for the portion of their total production that is exported to the implementing country. These foreign producers would be able to spread the costs of BCA across that total production (cost absorption). Finally, in some cases, there is potential for resource shuffling—the reorientation of existing clean production as exports to the countries with BCA without changing production processes or incurring additional costs.[1] To the extent BCA protection is necessarily incomplete, the impacts on foreign producers will be reduced.
4. CBDR-RC requires that developed countries show leadership in addressing climate change. It could be argued that strong carbon pricing policies constitute such leadership—in fact, that they are a *necessary* part of that leadership. But such policies are ineffective without protection from leakage. High carbon prices without such protection may indeed benefit developing country exporters, but they would be poor climate policy in terms of lowering global emissions—and thus poor leadership. As such, the relationship between BCA and CBDR-RC is nuanced, not straightforward.

[1] The extent to which this potential exists will differ by firm, country and commodity. It will be limited by the extent to which there are existing clean producers and by any rules in the BCA regime meant to prevent resource shuffling.

Another crucially important argument relates to the UNFCCC's Paris Agreement. That agreement—unlike its predecessor, the Kyoto Protocol—allows countries to set their own nationally determined contributions (NDCs) to address climate change. It is a fundamentally bottom-up approach; none of the agreement's processes judge the adequacy of individual country contributions.

It has been argued that BCA contravenes the spirit and principles of the Paris Agreement. Most fundamentally, Quick (2020) argues that the underlying assumption of any BCA is that the climate actions taken by other countries are in some sense insufficient, which violates the bottom-up nature of the Paris Agreement. On the other hand, it could also be argued that because the Paris Agreement does not judge the adequacy of parties' NDCs, ratification of the agreement does not imply agreement that other parties' NDCs are adequate. Quick (2020) also argues that if parties judge that other parties' commitments are inadequate, the appropriate place to address that is the Paris Agreement. But there is deliberately no avenue within the agreement for judgment of that sort or for influencing other parties' level of effort, which is supposed to be nationally determined.

In conclusion, there may be elements of BCA that conflict with CBDR-RC and the spirit of the Paris Agreement, but the relationship in both cases is ultimately more nuanced than straightforward.

Box 1: What is leakage?

Leakage is defined as an increase in foreign emissions as a result of climate policies in an implementing country. It can happen through several channels:

- Relocation of firms from the implementing country to other countries to avoid carbon costs.
- Loss of market share, both in domestic and global markets, for firms in the implementing country that are made less competitive by carbon costs.
- Diversion of investment in productive capacity that would have gone to the implementing country but instead goes to countries with lower carbon costs.
- Increased foreign use of fossil fuels triggered by price decreases that are in turn a result of decreased demand in the implementing country (this channel is not relevant to the BCAs discussions).

The formula for leakage is:

$$Leakage = \frac{increase\ in\ foreign\ emissions\ (tonnes)}{decrease\ in\ domestic\ emissions\ (tonnes)}\ x\ 100$$

This gives us a percentage figure. Typically, when policy-makers say they want to avoid leakage, it is shorthand for reducing leakage to below 100%–the point at which there is a net global increase. Other things being equal, leakage below 100% is actually *good* for the global environment.

Most studies looking for leakage *ex post* have found little evidence of it, but they tend to agree that this is likely because up until now, carbon prices have been low or have been muted by protective measures such as free allocation.

3. Current Developments

As noted above, BCA was, until recently, a niche and hypothetical policy prospect. It now seems likely that we will see some version of it implemented in at least one major regional grouping, and perhaps other economies, in the coming few years.

The EU is leading this charge with a European Commission proposal for BCA (or in the EU, the CBAM) and is in the process of a trialogue with the European Commission, member states (represented by the European Council), and the European Parliament (European Commission, 2021). The result of that negotiation is expected to be a regime that would come into force in 2023, covering electricity and basic and semi-processed goods in four classes: iron and steel, aluminum, cement, and fertilizers. The proposed regime would force importers to purchase EU emission allowances akin to those that domestic manufacturers must purchase under the EU's emissions trading system, based on direct greenhouse gas (GHG) emissions in the manufacturing process. The regime would be implemented slowly, with an initial 3-year period during which no charges are levied (but reporting would be mandatory) and a CBAM charge that increases over 10 years (from 2026 to 2035) as the free allocation of emissions allowances is phased out.

Other countries are also exploring the possibility of implementing BCA. Canada is currently consulting with affected stakeholders on what a BCA might look like for that country (Department of Finance, 2021). The United Kingdom is likely to implement some sort of BCA if the EU does in a bid to keep the flow of goods between the two jurisdictions as smooth as possible (UK Environmental Audit Committee, 2021). The United States has repeatedly affirmed its intention to implement some sort of BCA, the most recent legislative proposal for which came only days after the European Commission proposal was released (Fair, Affordable, Innovative, and Resilient Transition and Competition Act, 2021). It is, however, not yet clear what the United States has in mind for a BCA since it has no domestic carbon price for which to adjust at the border.

While only the EU has a process in place to adopt BCA at this time, it is likely that others will follow. To understand why, it is important to start with the fact that BCA is not a stand-alone instrument but is a complement to domestic carbon pricing. It is designed to allow that pricing to be costly for domestic producers and consumers without being undermined by foreign products that have not been subject to carbon prices. There is thus an inexorable dynamic that leads to BCA, starting with climate change impacts and science and working through policy responses, including carbon pricing:

- The **pressure for political action on climate change is increasing.** It will accelerate as more climate-related disasters affect people globally and the science of climate change becomes ever more indisputable and compelling. This is why the last few years have seen a rush of national commitments to achieve net-zero GHG emissions. As of January 2022, 74 parties representing 81 countries and covering almost 80% of global GHG emissions have communicated net-zero targets to the UNFCCC (Climate Watch, n.d.)

- Many types of policies can respond to that pressure, but it is difficult to imagine the final mix of policies in any ambitious country not including **carbon pricing** that affects emissions-intensive, trade-exposed industries. Those industries are responsible for roughly a third of emissions in most industrialized economies.
- While there is progress globally toward carbon pricing in many jurisdictions, including China, that progress is incomplete and uneven, meaning that any **unilaterally ambitious carbon pricing regime will be subject to the risk of leakage**: that it will simply result in increased emissions in other jurisdictions as domestic firms lose market share.
- Politically, no jurisdiction would favour a policy that, instead of decarbonizing its economy, simply deindustrialized it, especially if the result were not advantageous globally from an environmental perspective—that is to say, if global emissions were unchanged.
- Therefore, **we will see increasing moves toward the adoption of BCA**, at least until there is a global agreement on carbon pricing or carbon intensity. **We will not see such global agreement in time to avoid the need for BCA** in jurisdictions like the EU or Canada, which have legislated timetables for increasing ambition out to net-zero by 2050.

The dynamic described above also explains why there has been a surge of interest in global carbon pricing in the last year:

- The Secretary-General of the Organisation for Economic Co-operation and Development (OECD) has promoted the idea of that organization coordinating global efforts for carbon pricing (Fleming & Giles, 2021).
- The International Monetary Fund has proposed an international minimum carbon price floor (Parry et al., 2021).
- The World Trade Organization (WTO) Director-General has called for global cooperation on carbon pricing, calling it “essential” (Okonjo-Iweala, 2021).

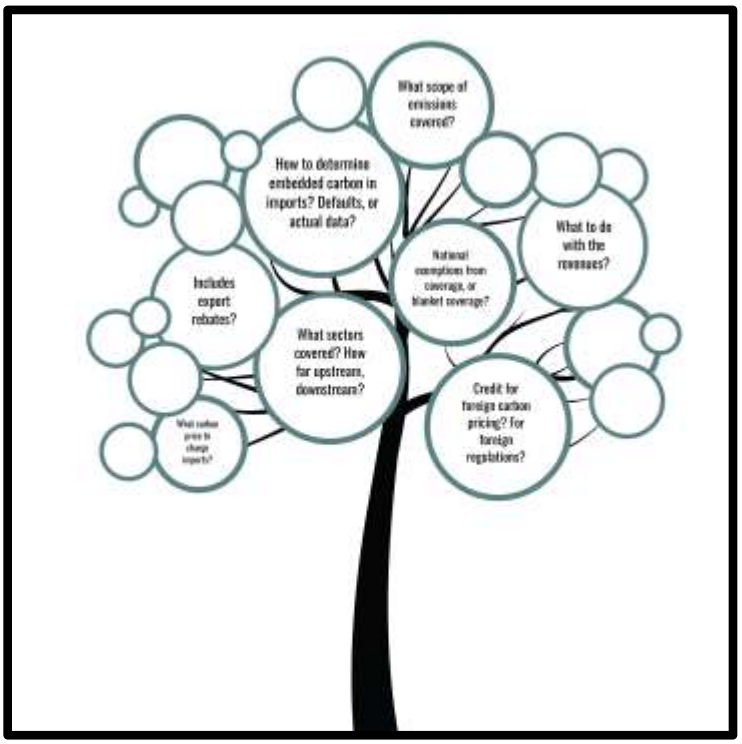
There have also been initiatives to combat leakage in energy-intensive trade-exposed sectors. The EU and the United States announced a Global Steel and Aluminum Agreement that seeks to “restrict access to their markets for dirty steel” (U.S. White House, 2021); and the G7 leaders agreed to launch an industrial decarbonization agenda and to collaborate on addressing leakage at the international level (G7 Leaders, 2021).

4. Potential Impacts for China

What impact would we expect to see if the EU's CBAM is implemented and if other countries follow suit as predicted above? The answer is difficult because BCA is not a definite instrument; it is more like a decision tree of potential instruments (see Figure 1). At various points in the elaboration of a BCA regime, there are decisions about design elements that will dictate the final shape of the regime, such that there are a large number of possible BCAs and a commensurately large number of possible patterns of impacts.

To illustrate the types of differences possible, consider the EU's proposed CBAM and the United States' proposed FAIR Act. The CBAM would charge imports based on their actual carbon content and would credit for foreign carbon pricing, such as China's emissions trading system. The FAIR Act would charge imports the estimated financial burden borne by U.S. manufacturers under U.S. climate regulations and would not credit for foreign carbon pricing (or foreign climate policies), but would exempt countries found (by the United States) to be adequately ambitious. The impacts of these two different regimes would be vastly different. Other determinative decision points in the elaboration of BCA include the scope of emissions coverage, whether exports are rebated, how the revenues are used, and what products are covered (Marcu et al., 2020).

Figure 1. The BCA decision tree



Source: Cosbey, 2021b.

All that said, the European Commission's CBAM proposal is a useful, concrete formulation of BCA by which we can glean some basic insight into the impacts such instruments might have for China. The proposal covers four types of goods—iron and steel, cement, aluminum, and nitrate fertilizers—and electricity. Within each of those four goods sectors, the coverage would start with basic materials and extend only slightly down the value chain, ultimately covering 29 classes of goods. Annex 1 shows the full scope of coverage.

The CBAM charge for a given shipment from a given installation would be:

$$CBAM\ charge = EUAp\ x\ SEE_g\ x\ Tonnes_g$$

Where EUAp is the EUA price (average closing price per calendar week), expressed in euros/tonne of CO_2e; SEE_g are the specific embedded emissions for good g, expressed in CO_2e/tonne of product; and $Tonnes_g$ is the number of tonnes of good g in the shipment.

Specific embedded emissions are determined in the first instance by request for actual data to fulfill the formula:

$$SEE_g = \frac{(AttrEm_g + EE_{ImpMatt})}{AL_g}$$

Where $AttrEm_g$ is total direct emissions attributed to the production of good g by the installation in the reporting period; $EE_{ImpMatt}$ is the specific embedded emissions of any input goods also covered under the CBAM; and AL_g is the total tonnage of good g produced in the installation in the reporting period.

If that data is not available or not furnished, the CBAM charge would be based on a **first default**: assuming the Chinese national average emissions intensity of the sector for which the good is produced. The EU will be responsible for compiling and maintaining a database of such sectoral emissions intensity for each trading partner. Where "reliable" data for the country and sector of export cannot be applied for a type of good, the **second default** will be applied. This is a punitive assumption that the goods were produced at an emissions intensity equal to the bottom 10% of performers in the EU.

To assess the impacts of the CBAM on Chinese exports, the first question is: What level of exports to the EU does China have in those covered goods, and how significant are they? Figure 2 shows the extent of those exports in 2020. Iron and steel are by far the most significant category, with roughly 40% of that in the form of basic iron and steel and 30% in structural steel. The total value of covered exports is just over EUR 4.5 billion (full data by product category for China's covered exports is contained in Annex 1).

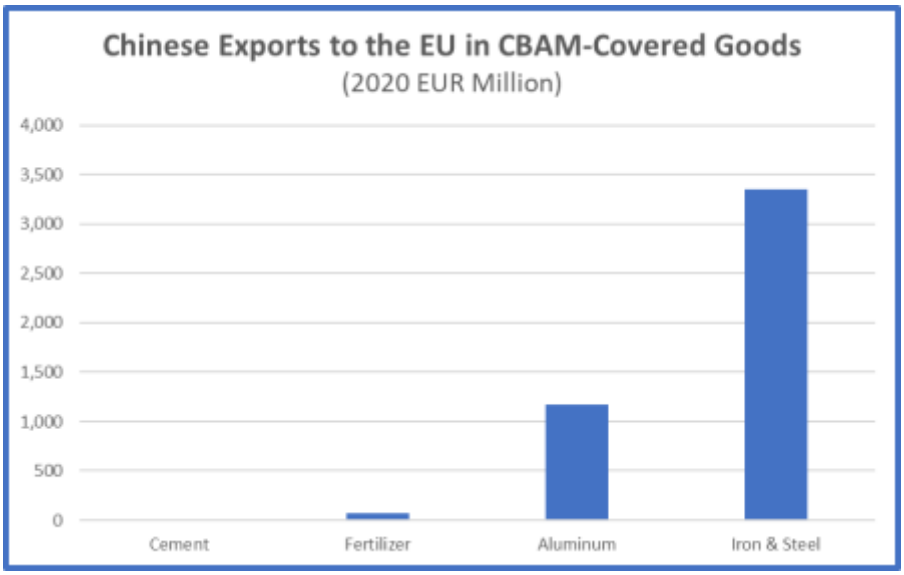
Relative to the exposure of other countries, those are significant numbers. China has the second-highest exposure to the CBAM of any country, as shown in Table 1. However, the same figure shows that, in terms of the size of exposed exports as a percentage of GDP, China ranks quite low—similar to the United States—due to its diversified economy and export profile and its

strong domestic demand. While the CBAM might be a significant threat for specific exporters, it does not look like a particularly significant threat to overall Chinese economic well-being.

That conclusion needs to be qualified, however, by three considerations:

- We do not know the final sectoral scope of the EU's CBAM. The European Parliament's Committee on the Environment, Public Health and Food Safety (ENVI Committee) rapporteur on the CBAM has proposed extending coverage to include basic chemicals, plastics, and hydrogen, and in any case, there is likely to be a review early in the process that will recommend expanded coverage. The rapporteur's proposal would increase the total value of covered Chinese exports by roughly 500%. Even if these sectors are not included in the initial iteration of the CBAM, they are likely to be included eventually.
- As noted above, the EU is probably not the only jurisdiction that will put such a regime in place, and the total impact would be the sum of all schemes.
- These numbers only tell us the volume of exported goods covered under the CBAM; they do not tell us how affected those exports will be. While Chinese exports covered under the European Commission proposal amount to EUR 4.5 billion, the actual costs or loss of market share would be a fraction of that total.

Figure 2. Chinese exports covered under the proposed CBAM (2020)



Source: EU ProdCom database (Access2Markets, n.d.)

Table 1. Top 10 countries with exports to the EU in CBAM-covered sectors (proposed)

		Exports covered (EUR) (2020)	% OF GDP
1	Russian Federation	**6,987,476,015**	**0.41%**
2	China, People's Republic of	**4,590,865,538**	**0.03%**
3	Turkey	**4,401,587,714**	**0.54%**
4	United Kingdom	**4,396,401,718**	**0.14%**
5	Ukraine	**2,593,576,518**	**1.46%**
6	Korea, Republic of	**2,388,705,942**	**0.13%**
7	India	**2,265,620,941**	**0.08%**
8	Serbia	**1,160,358,686**	**1.92%**
9	United States	**1,134,790,962**	**0.00%**
10	Egypt	**934,746,239**	**0.23%**

Source: Export figures from EU ProdCom database (Access2Markets, n.d.); GDP data: World Bank, n.d.

To determine how affected the vulnerable export flows would be, at least in the context of the proposed CBAM, we need to know what level of charge would be assessed on Chinese goods as they enter the EU. That would, in turn, be a function of:

- The GHG intensity of production for those goods
- The EU emissions trading scheme (ETS) allowance price
- Any credit due to China for domestic carbon pricing.

These three factors are briefly considered below. Given its outsized significance in the context of the current CBAM proposal, China's steel sector is used as an illustrative example.

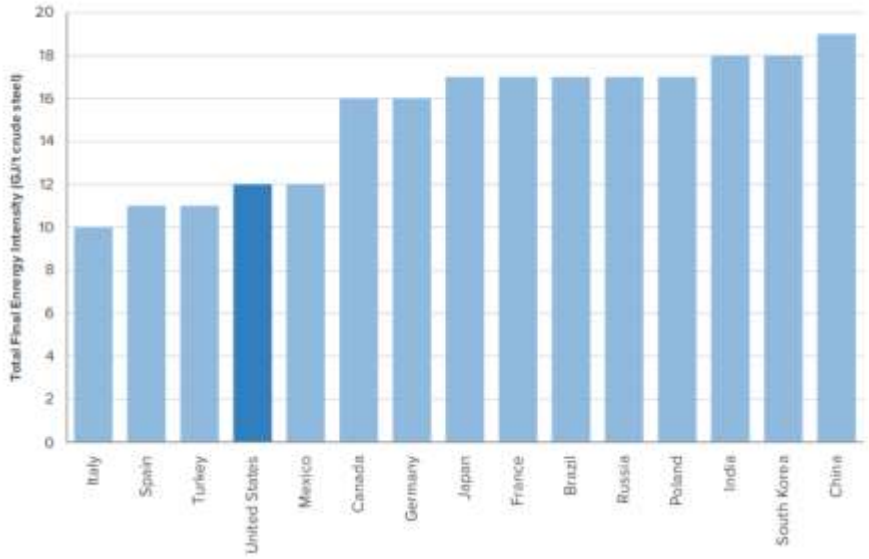
4.1 GHG Intensity of Production

Chinese steelmaking is relatively energy- and emissions-intensive compared to trade partners such as the United States and the EU (see Figure 3). This is mostly a function of two industry characteristics:

> ***Production technology:*** 90% of China's steel is produced via blast furnace-basic oxygen furnace (BF-BOF) (Ren et al., 2021), which consumes 60% more energy and produces 80% more emissions on average than the scrap-based electric arc furnace (EAF) route (He et al., 2020). That compares to a global breakdown where roughly 75% of steel is produced via BF-BOF, with a U.S. share of just 33% (Hasanbeigi & Springer, 2019). In the EU, 59% of steel is from BF-BOF, with the rest from scrap-based EAF (Marcu et al., 2021).
>
> One of the reasons for China's low use of EAF is that it is primarily a production method that involves scrap steel as an input, and China's infrastructure is still young enough that it does not provide an adequate supply, though this is changing significantly and will change further in the coming years (He et al., 2020)

Energy sources: Steelmaking is energy intensive. In China, 90% of the sector's used energy comes from coal and coke—the most emissions-intensive sources (Ren et al., 2021). By comparison, U.S. steelmaking relies on natural gas for 47% of its energy and coal for only 24% (He et al., 2020).

Figure 3. Global comparison: Final energy intensity of steel sector



Source: Hasanbeigi & Springer, 2019.

At the end of the day, the EU Commission's CBAM proposal asks for actual data on direct emissions—a provision that would benefit China's cleanest producers. It is likely that the regime would eventually also cover indirect emissions (i.e., from electricity), and if it did, the GHG intensity calculation for those emissions might not be based on actual data but rather on the national average or averages of the relevant electricity markets. This would not offer as much opportunity for specific producers to obtain preferential treatment. Ultimately, in the most likely configurations of CBAM, much of China's exported steel would be considered to have significantly more embedded carbon relative to the EU and other global producers.

4.2 ETS Allowance Price

The price of allowances in the EU's ETS (EUAs) has been on a steady rise since the passage into law of its strengthened climate targets. Over the course of 2021, prices almost tripled, rising from just over EUR 30 in January to almost EUR 90 in December. The higher these market-driven prices go, the higher the CBAM charge will be.

4.3 CBAM Credit Due to China for Carbon Pricing

The European Commission's proposed CBAM offers credit to foreign producers for a carbon price paid in the country of origin:

> An authorised declarant may claim in its CBAM declaration a reduction in the number of CBAM certificates to be surrendered in order for the carbon price paid in the country of origin for the declared embedded emissions to be taken into account. (European Commission, 2021, Article 9.1)

In principle, this is straightforward, but exactly how the prices in any individual country would be taken into account will only be worked out in the final implementing acts. Nevertheless, there are some near certainties that we can identify that are relevant to the Chinese case:

- "Carbon price" refers not only to a carbon tax but also to the costs incurred under an ETS, such as the national and regional schemes China has implemented. No credit will be granted for non-price-based regulatory climate policies in the country of origin.
- The methodology for crediting China's current ETS, which is an intensity-based system, would be complex, and we have no way of knowing at this point whether any credit would be granted at all or whether it would have to wait for the eventual transition to a system based on absolute caps. Methodologies will be worked out in the EU's implementing legislation.
- Subnational carbon prices paid, for example, under China's regional ETSs, will very likely be credited.
- The CBAM as proposed would only cover direct emissions. Since the CBAM would not charge for indirect emissions from electricity, there also, of course, would be no credit for the carbon price paid under China's national ETS, which currently only covers electricity-producing installations.
- This will change over time. The EU CBAM is widely expected to eventually cover indirect emissions, perhaps in response to a review of the regime's function, due in 2026. As well, China's ETS is widely expected to expand beyond the electricity sector, though the timing on that is uncertain.
- As noted above, regional ETS carbon prices—which go beyond covering electricity generation to covering other sectors—would be eligible for credit, and some of China's regional pilots cover the same sectors covered by the CBAM.
- In the event that China's exporters were granted a credit, the carbon price the CBAM recognized would likely be reduced to account for free allocation in the Chinese ETS. That, combined with the low allowance prices that currently prevail (the 2022 electricity sector price is expected to reach USD 10/tonne), would result in a small amount of credit. But there is potential for that credit to increase in the future as the Chinese ETS moves toward auctioning and a more stringent cap. It is very unlikely that credit would be granted for the purchase of offsets.

4.4 Impact Estimates

Given the many uncertainties and variables, it is difficult to say with any precision how great the impacts of the CBAM and other such schemes would be for China's exports of covered products. Several analyses have produced helpful estimates based on hypothetical scenarios. A United Nations Conference on Trade and Development (2021) analysis, carried out before the European Commission proposal was tabled, estimated significant impacts for China, including an ad valorem charge of 3.7% for steel and 2.4% for aluminum. It also saw an overall fall in exports of 3.5% under CBAM, compared to an increase of 0.8% in the base case of climate ambition with no CBAM. These estimates are too high, though, and the reasons underline the difficulty in predicting final costs. In the first place, they assumed that indirect emissions would be covered under the CBAM, when (at least in the initial phase) they will not be, meaning lower impacts. In the second place, they assumed the CBAM would charge the full amount of the EU carbon price (scenarios of EUR 44 and EUR 88), whereas the final proposal will not see full charges being imposed until free allowances are fully phased out in 2035.

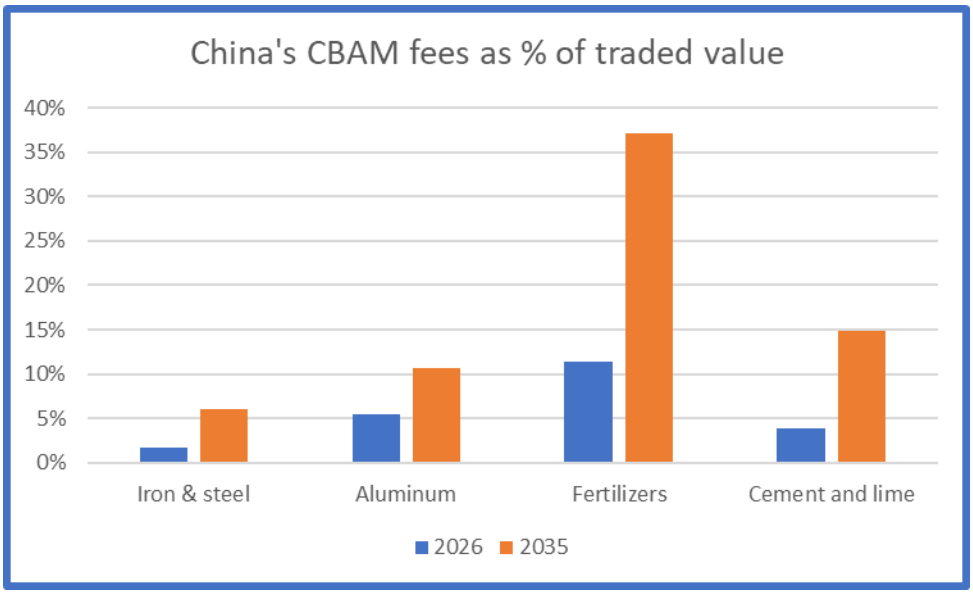
A Sandbag/E3G analysis also estimates the impacts of the CBAM for China. None of its three scenarios exactly corresponds to the European Commission proposal, and the total trade volumes are higher than those listed in Annex 1 of this paper, but the results are nonetheless indicative. The closest scenario to the European Commission proposal uses Chinese sectoral average emissions intensity as the assumed values for all firms, assumes only direct emissions are covered, and assumes a 10-year timeline for the phase-in of CBAM, concurrent with the phase-out of free allocation. Figure 4 shows the results in terms of CBAM charges as a percentage of trade values. In trade policy terms, these could also be thought of as equivalent to ad valorem tariffs. The values in 2035 are, of course, higher because it is assumed the full charge will be applied with the full phase-out of free allocation. While it is noted above that steel has the most significant exposure in terms of trade flows, Figure 4 shows that fertilizers and cement have more serious exposure in terms of the impacts on trade flows, presumably because of their relatively high levels of direct emissions.

In reality, these numbers may necessarily overstate impacts. Because the proposed CBAM relies on actual direct emissions data for covered installations, the cleanest producers would export to the EU, meaning the average intensity figures assumed in the Sandbag/E3G analysis would be on the high side.

4.5 Conclusions on Impacts

In the final event, while individual producers will be vulnerable to loss of market share under the proposed EU CBAM, the impacts for China are not particularly significant. That could quickly change if the scope of covered products or the scope of emissions coverage is expanded, and it likely will be in future. As noted above, the inclusion of basic plastics and organic chemicals (per the draft proposal of the ENVI Committee of the European Parliament) would increase the value of China's covered exports by roughly 500%.

Figure 4. CBAM charges in the Sandbag/E3G analysis (EUA price EUR 60)



Source: Assous et al., 2021.

It could also change if a number of countries follow the EU's lead and implement similar BCA regimes. As noted above, Canada and the United States might soon follow suit, though it is unclear what the U.S. regime might look like.

The picture might also change as China's climate policy evolves. The vulnerability is in part based on China's heavy reliance on coal-fired electricity, and this is in the process of shrinking. As well, the evolution of China's ETS might mean credits from other countries' BCAs, which will nullify the impacts at the border.

5. Strategic Options

Section 3 describes the ways in which the global community seems headed toward outcomes at the national and international levels that will account for carbon in the prices of traded goods. It also makes the link between those trends and national-level climate ambition, which is inexorably becoming more ambitious.

For countries such as China, which will be on the receiving end of those trade-restrictive policies, there are a few possible ways to react, including:

- Seeking policy reversal: political pressure and sanctions
- Seeking policy reversal: WTO challenge
- Seeking policy reversal: national trade remedy
- Seeking policy optimization: tame the beast
- Supporting affected exporters.

5.1 Political Pressure and Sanctions

In a prototype effort at BCA, the European Union tried in 2012 to include aviation within the scope of its ETS, including demanding allowances for miles flown outside the EU. The reaction from key partners was swift and severe. Dozens of countries filed legal challenges with the European Court of Justice and the English High Court, none of which succeeded. The real pressure came from diplomatic channels and from sanctions. China, for example, threatened to cancel orders for 10 European-manufactured Airbus A380s to Hong Kong airlines, and China's State Council approved a resolution prohibiting Chinese airlines from participating. The United States House of Representatives also passed legislation forbidding U.S. airlines from complying with the regime. India threatened that the European action would "derail" climate talks at the UNFCCC. International Civil Aviation Organization members (with the EU reserving) passed a resolution that no country can include another country's airlines in their ETS without a mutual agreement between the two. Eventually, the EU backed down.

Could a similar firestorm of protest and reaction make the EU pause or reverse its plans for a CBAM? There are several reasons to believe the story might end differently this time. First, the EU has already passed into law the climate ambition that the CBAM is meant to enable. Without the CBAM, the Fit for 55 climate package as a whole cannot function. There is much more political capital invested in this initiative than was ever at stake for the inclusion of aviation in the ETS. Second, the urgent need for climate action is much more widely accepted today than it was in 2012, and that acceptance both inside and outside the EU gives political cover for more radical and disruptive policies. Third, the global consensus of respect for international law has been considerably eroded in recent years, perhaps most noticeably in trade law, and is less of a constraint than it was in 2012.

5.2 WTO Challenge

If the CBAM passes into law, it will almost certainly be brought to the WTO dispute settlement mechanism. Annex 2 briefly explores some of the key legal questions to be resolved. From a strategic perspective, though, it may not matter whether the measure is found to be a breach of the EU's WTO obligations.

At the outset, it's worth noting that the WTO's dispute settlement regime is not functional. Since December 2019, the United States has been blocking appointments to the Appellate Body, with the result that it now lacks a quorum. A dozen cases have since been sent into the void of appeal. It is, however, hard to imagine the EU taking that route should it lose a panel ruling; it has championed an alternate dispute settlement procedure and would be expected to use it.

More likely, in the case of a loss, the EU would look for ways to avoid compliance, given the political pressure described above. That might include making revisions to the measure that do not fully satisfy the complainants, triggering further legal proceedings. The EU's defence against the U.S. Airbus subsidies complaints ran more than 15 years from the initial complaint to a final resolution.[2] It might also include refusing to amend the legislation and instead suffering compensatory retaliation (such as increased tariffs) from the complainants, as the EU did when its ban on hormone-treated beef was found to contravene WTO rules.[3]

It is not clear, however, that the measure would lose in dispute settlement, at least not in its major features. The European Commission proposal is carefully drafted with a WTO legal challenge in mind. Moreover, the body of WTO case law has, over the years, become more sympathetic to measures it perceives as legitimate attempts to address issues of global concern, such as climate change (though much of that movement has taken place in the currently broken Appellate Body).

It is worth noting that such a dispute would be a lose–lose proposition for the multilateral trading system at a time when it is already seriously weakened. A win for the EU would be seen as judicial overreach and turning a blind eye to the concerns of developing countries. A win for the complainants would be seen as the WTO undercutting environmental objectives.

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[2] See WTO Dispute Settlement case DS316: *European Communities and Certain member States — Measures Affecting Trade in Large Civil Aircraft*.
https://www.wto.org/english/tratop_e/dispu_e/cases_e/ds316_e.htm

[3] See WTO Dispute Settlement cases DS26 and DS48, *European Communities — Measures Concerning Meat and Meat Products (Hormones)*, brought by the United States and Canada, respectively. In both cases, the complainants were given authorization to retaliate.
https://www.wto.org/english//tratop_e/dispu_e/hormab.pdf

5.3 Trade Remedy

The CBAM as currently proposed does not include any sort of export rebate to relieve exporters of the cost of compliance with the ETS. This is because the European Commission believes that the ETS is a regulatory regime, not a tax, with costs not legally able to be rebated at the border.

There is, however, immense pressure from the EU's many export-oriented industries (steel, aluminum, fertilizers) to incorporate some sort of compensation that would allow EU exports to go into world markets unburdened by the costs of the ETS. If that does come to pass, the EU's trading partners might go to the WTO with a complaint that the measure is a prohibited export subsidy. But, noting the problems cited above, they might also deal with the matter under national trade remedy law, finding the goods to be subsidized and imposing countervailing duties.

Most national trade remedy law requires a finding of injury, however. This might be difficult since the subsidized EU exports would presumably be shipped at market prices. The subsidy in question would simply be relief from a costly domestic regulatory burden.

5.4 Optimizing BCA/CBAM

It was argued above that BCA is like a decision tree with many different possible final shapes depending on the choice of design elements. The final regime would sit somewhere on a spectrum that runs from blatantly protectionist to purely environmental in its objectives and effects.

One policy response to BCA is to push implementing countries for design choices that will ensure that any BCA is more environmental and less protectionist. This could be pursued either instead of, or in parallel to, efforts to seek policy reversal. An illustrative list of principles and best practices in the elaboration and implementation of BCA is featured in Annex 3.

China could push the EU and other countries bilaterally to adopt "fair" design elements in any BCA regimes. It might, for example, argue that its intensity-based ETS deserves crediting as a carbon price under the CBAM or that CBAM revenues should help underwrite the compliance costs of affected firms. China could also be part of international efforts to identify best practices. Similar efforts were helpful, for example, in the WTO during the negotiations on telecommunications services. Members produced a non-binding reference paper of agreed best practices in the domestic regulation of telecoms, which, as well as shaping the final negotiated text, had a significant positive influence on national-level efforts in regulating and deregulating the sector. Such an agreement might have a positive influence on countries that are moved to implement BCA in future.

As well, China might press its case for best practices as part of one or more of the "club" efforts described in Section 3. The German push for an international climate club, for example, involves an open-door policy for membership, and one of the roles of club members will probably be to set standards and agree to best practices for preventing carbon leakage. Such forums should not

only be the domain of those interested in implementing BCA; they should also hear the voices of those countries that will be affected by BCA.

5.5 Support Affected Exporters

Even if BCA were optimally designed, it would have impacts on covered exporters. It would be costly for them to set up internal systems of accounting for emissions if they are not already doing so for other reasons, as well as to account for carbon up the value chain for CBAM-covered input goods, to certify their data as accurate, and to certify any carbon costs paid. High-carbon exporters to the EU in covered sectors may have to either undertake investments in low-carbon technologies or process improvements or find new markets for their products.

China could assist those exporters in cushioning the impacts of CBAM (and any other such regimes), for example, by:

- Compiling statistics on national sectoral emissions and transmitting them to the EU to avoid Chinese producers being subject to the punitive second-default assumptions.
- Negotiating a bilateral agreement with the EU on a fair crediting methodology for China's carbon pricing regime and a protocol of recognition that supersedes the need for individual certification of the carbon price paid.
- Lobbying the EU to underwrite exporters' costs of certifying their data.
- Building exporters' capacity for internal carbon accounting that meets the regulatory requirements of the CBAM.
- Being a conduit of information for exporters on the requirements and likely developments in the CBAM and other similar instruments.
- Strengthening the national ETS in line with existing priorities and timelines, to avoid transmitting funds to the EU that could be retained domestically to support industrial transformation.
- Ramping up existing support for industrial transformation in energy-intensive, trade-exposed sectors to make them less vulnerable to BCAs and other such requirements, aiming to achieve or exceed the sectoral energy efficiency targets set in the 14th Five-Year Comprehensive Work Plan for Energy Saving and Emission Reduction.
- Continuing efforts to increase the efficiency of coal utilization and reduce overall reliance on coal as a generator of electricity, in line with the goals of the 14th Five-Year Comprehensive Work Plan for Energy Saving and Emission Reduction.

6. Conclusions

The proposed CBAM would have limited effects on China's EU exports at the outset, and the ramp-up of the regime to full effect will probably be gradual. In the longer term, however, the CBAM will very likely expand to cover more goods (including organic chemicals and basic plastics) and more emissions (including emissions from electricity generation) that would make it a greater concern for Chinese exporters. Moreover, the EU likely will not be the last jurisdiction to implement BCA. The future of international trade in industrial goods looks certain to involve a significant amount of carbon accounting.

China will no doubt bring considerable political and economic pressure to bear on the EU either to amend the CBAM or to scrap it altogether. Other trading partners will do the same. China and others will likely also avail themselves of their rights under WTO law and national trade remedy law to object to the CBAM, but ultimately that may have a limited effect, as argued above. Given the political capital invested in the CBAM, none of those efforts is likely to force the EU to change course as it did when it backed off the proposed aviation levy in 2012. At best, they might force a slow-down of the schedule for implementation.

In any case, China's reaction to BCAs, such as CBAM, should probably also be pragmatic and strategic, pursuing parallel efforts to both influence the final shape of BCAs and cushion the impacts on Chinese exporters. Many of those efforts are in line with existing priorities and plans and would produce spin-off benefits in terms of increased competitiveness and pollution reduction. China's capacity to pursue both of those lines of effort is globally unparalleled.

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Annex 1. Covered Chinese Exports to the EU by Sector (2020)

	Value (EUR 2020)	
Cement		
Cement clinkers - 2523 10	1,399,641	
White Portland cement - 2523 21	11,748	
Other Portland cement - 2523 29	29,382	
Other hydraulic cements - 2523 90	134,366	
TOTAL		**1,575,137**
Fertilizer		
Nitric acid; sulphonitric acids - 2808 00	3,762	
Ammonia, anhydrous or in aqueous solution - 2814	94,416	
Nitrates of potassium - 2834 21	6,010,903	
Mineral or chemical fertilisers, nitrogenous - 3102	25,679,304	
Mineral or chemical fertilisers containing two or three of the fertilising elements nitrogen, phosphorus and potassium; other fertilisers; goods of this chapter in tablets or similar forms or in packages of a gross weight not exceeding 10 kg - except 3105 60	33,912,386	
TOTAL		**65,700,771**
Iron & Steel		
Iron and steel - 72 (except 7202, 7204)	1,363,530,819	
Sheet piling of iron or steel - 7301	11,296,498	
Railway or tramway track construction material of iron or steel - 7302	10,680,750	
Tubes, pipes and hollow profiles, of cast iron - 7303	9,600,917	
Tubes, pipes and hollow profiles, seamless, of iron or steel - 7304	91,363,430	
Other tubes and pipes (for example, welded, riveted or similarly closed), having circular cross-sections, the external diameter of which exceeds 406,4 mm, of iron or steel - 7305	17,312,653	
Other tubes, pipes and hollow profiles, of iron & steel - 7306	103,498,926	
Tube or pipe fittings of iron or steel - 7307	569,279,868	
Structures and parts of structures of iron or steel; plates, rods, angles, shapes, sections, tubes and the like, prepared for use in structures, of iron or steel - 7308	965,426,854	
Reservoirs, tanks, vats and similar containers for any material (other than compressed or liquefied gas), of iron or steel, of a capacity exceeding 300 l, whether or not lined or heat-insulated, but not fitted with mechanical or thermal equipment - 7309	22,437,159	
Tanks, casks, drums, cans, boxes and similar containers, for any material (other than compressed or liquefied gas), of iron or steel, of a capacity not exceeding 300 l, whether or not lined or heat-insulated, but not fitted with mechanical or thermal equipment - 7310	123,513,877	
Containers for compressed or liquefied gas, of iron or steel - 7311	68,366,319	
TOTAL		**3,356,308,070**
Aluminum		
Unwrought aluminium - 7601	8,442,492	
Aluminium powders and flakes - 7603	3,478,404	
Aluminium bars, rods and profiles - 7604	299,627,416	
Aluminium wire - 7605	12,376,458	
Aluminium plates, sheets and strip, of a thickness exceeding 0,2 mm - 7606	380,554,887	
Aluminium foil of a thickness not exceeding 0,2 mm - 7607	358,636,165	
Aluminium tubes and pipes - 7608	51,907,448	
Aluminium tube or pipe fittings - 7609	52,258,290	
TOTAL		**1,167,281,560**
OVERALL TOTAL		**4,590,865,538**

Source: EU ProdCom database (Access2Markets, n.d.)

Annex 2. Border Carbon Adjustments and World Trade Organization Law

Border carbon adjustment (BCA) is not a single tool that can be assessed in terms of legality or, for that matter, effectiveness. It is more like a decision tree (see Figure 1). There are many design options—points at which a decision must be made that will shape the final mechanism—meaning there are many possible BCAs. Each of those decisions has implications for legality. So, to assess the legality of BCAs, we must first specify the nature of the BCA in question.

One basic difference is described above: is it a tax-based BCA or a regulation-based BCA? For a tax-based BCA to be legal according to the World Trade Organization (WTO) on both the import and export sides, the underlying carbon tax would have to be ruled an indirect tax—a tax levied not on the producer but on the product. There is no consensus on this question, but the majority of legal scholars believe it would be an indirect tax (Holzer, 2014). For a regulatory-based BCA to be WTO-legal, the regulations facing the imported goods would have to mirror the domestic requirements as closely as possible, not treating imports any less favourably. The details of that obligation would vary from scheme to scheme, depending on the regulation. Note that there is no legal scope for the costs of an internal regulation to be rebated at the border in the way a tax can be rebated, so export rebates would not be WTO-legal for a regulation-based BCA—they would be considered prohibited export subsidies.

Various design elements are considered below, but a common thread for many of them starts from another basic difference at the outset: the objective of the BCA. There are many possible objectives for a BCA, including protecting the competitiveness of domestic producers, incentivizing climate ambition in trading partners, and preventing leakage—the phenomenon whereby climate policies lead to increased emissions in other jurisdictions.[4] The objective matters to the shape of the tool. Export rebates, for example, are a good thing in terms of protecting competitiveness but may be a bad thing from the perspective of preventing leakage, since they send goods into the global markets without any attached carbon price and may thereby lead to leakage in other countries.

It also matters from a legal perspective. Many design features of BCA will probably violate non-discrimination obligations in the General Agreement on Tariffs and Trade (GATT) Articles I and III. That means they will probably end up being defended under GATT's General Exceptions – Article XX. One of the key requirements for a BCA using that defence would be showing that the measure is created and implemented to only achieve environmental goals. A measure designed

[4] Leakage can result from two basic channels (Organisation for Economic Co-operation and Development, 2020). The *trade channel* sees domestic production and its associated emissions shifting to other countries in response to the high costs of climate policy. The *international energy price channel* sees increases in foreign fossil fuel consumption, as domestic demand reduction causes lower global prices. BCAs are only aimed at addressing the trade channel.

to prevent leakage would have a chance to do so, but measures aimed at protecting competitiveness or influencing foreign policies would not.

Some of the key design elements and their legal implications include:[5]

- **Product scope:** What products should be covered? As a general rule, only products at risk of leakage should be covered: those that are energy intensive and trade exposed. Products typically proposed for coverage are commodities high on the value chain: steel, basic chemicals, aluminum, cement, fertilizers, pulp, and paper. Products not covered by the underlying carbon pricing regime could not legally be covered by a BCA.
- **Emissions scope:** What emissions should be covered? Only those emissions covered by the domestic climate policy should be covered by a BCA; adjusting for more than that might be discriminatory. That will always include direct (scope 1) emissions but may not include scope 2 (primarily electricity-related) or scope 3 emissions (all other emissions, including those embodied in input goods).
- **Geographic scope:** What countries should be covered? Exempting any country from coverage is on its face discrimination, a violation of GATT's most-favoured-nation obligations. It might be that exempting some developing countries would be allowed under the WTO's Enabling Clause, but other exemptions—for example, based on level of climate ambition—would have to be saved under Article XX. The details of the exemption would matter; if the BCA was being justified as a leakage protection measure, it would have to be shown that the exemption was based on an assessment that there was minimal risk of leakage. This might be the case for trading partners with linked emissions trading schemes or harmonized carbon taxes. Legal conflicts with the Paris Agreement might also arise here; they are examined in more depth below.
- **Calculating embodied emissions:** In determining the emission intensity of imports, would the measure ask for actual data or actual data with resort to a default, or would it simply use a default? Asking for actual data would be safest from a WTO legal perspective since it mirrors what is expected of domestic producers. A default—in particular a punitive one that assumes high greenhouse gas intensity—would seem to be discriminatory and protectionist, though it could be argued that it also offers the most protection from leakage. A non-punitive default that offered producers the opportunity to challenge it with actual data would likely fare well in an Article XX challenge.
- **Determining the charge:** When levying the charge on imports, would the measure account for the carbon price paid in the country of export? And would it charge the actual domestic carbon price or the effective price paid after accounting for such things as free allowances? It seems straightforward from a legal perspective that the charge assessed on imports would have to account for both carbon prices already paid and for only the effective price paid by domestic producers—that is, minus any free allocation.

[5] This is an extremely abbreviated treatment of the legal issues. For more in-depth consideration, see Holzer, 2014; Organisation for Economic Co-operation and Development, 2020; Pauwelyn & Kleinmann, 2020; Pirlot, 2017.

- **Use of revenues:** How would the revenues from the BCA be used? In an Article XX defence, it would be helpful to show that the revenues from a BCA were used to help developing country exporters meet the standards set or contributed to a multilateral fund such as the Green Climate Fund or the Adaptation Fund. This would show that the measure was truly environmentally motivated, as opposed to being protectionist. At the other end of the spectrum, if the revenues were used to help decarbonize domestic firms, the implication might be that the measure is intended to protect those firms from foreign competition.

Ultimately, it is not possible to definitively say in advance of a ruling by a WTO dispute settlement body what is or is not WTO-legal, but case law gives us some guidance. As noted above, it will ultimately be a function of the specific design elements adopted and the regime's implementation. Popular opinion is that, in theory, a legal BCA is possible, though there is less agreement about what form it might have to take.

Annex 3. Principles and Best Practices in BCA: An illustrative list[6]

What follows is an illustrative list of principles and best practices for the elaboration and implementation of BCAs, aimed to make any BCA regime a tool of purely environmental protection.

- **Primacy of leakage protection:** BCA should be aimed at preventing leakage—an environmental objective that involves enabling domestic climate ambition. It should not be aimed at preserving or increasing the competitiveness of domestic firms; there is multilateral agreement to refrain from using trade measures to that end. BCA should also not be used to coerce other countries to enact more ambitious climate policies; judging the adequacy of other countries' climate ambition is not the prerogative of any one country.
- **No double protection:** BCA charges on foreign goods should be adjusted downward to account for any domestic measures that shield covered sectors from a full carbon price. Only the *effective* carbon price should be levied on imports. Failing to do so involves unfair double protection for domestic producers.
- **Credit for equivalence:** BCA should grant credit for effective carbon prices already borne by foreign goods in the country of export since such carbon pricing reduces the risk of leakage. It should not grant credit for non-price foreign policies, assuming the border "adjustment" is to compensate for domestic *price*-based policies; the two types of policies are not equivalent.
- **Openness:** There should be meaningful and timely consultation on draft regulations with affected trading partners and full transparency in the regime's implementation and operation.

Best practice

- **Coverage:** BCA should only cover goods that are subject to domestic carbon pricing.
- **Challengeable assumptions:** If a default is used to determine the greenhouse gas (GHG) intensity of foreign goods, foreign producers should be able to challenge that default by submitting actual data.
- **Downstream sectors:** BCA coverage should be extended to downstream sectors only if they face a risk of leakage equivalent to the thresholds used to qualify upstream sectors for coverage.
- **Exemptions:** There should be no national exemptions from BCA coverage based on national policies (e.g., based on the level of ambition in climate policies). As noted above,

[6] Based on Cosbey, 2021a.

no country has the prerogative to unilaterally judge the adequacy of other countries' climate ambition.

- **Revenue sharing**: A portion of the revenue from a BCA should be used to help foreign producers, for example, by lowering their costs of compliance with the BCA regime.
- **International standards for data**: GHG intensity data should be required in terms of an internationally recognized accounting regime, such as the GHG Protocol or ISO 14064. Ideally, all countries with BCAs that required such data would agree to the use of a single standard.
- **Mechanisms for appeal**: There should be independent mechanisms for the appeal of any decisions or judgments taken under the BCA regime with respect to foreign producers or goods.