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MIKE YOUNG

Improving border adjustment mechanisms

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Executive Summary

The EU's CBAM

As the Paris Agreement allows each party to determine how and how fast they will seek to reduce greenhouse-gas emissions, the EU is proposing to introduce a “carbon border adjustment mechanism”, or CBAM as it is commonly called.

The proposed mechanism seeks to prevent the leakage of jobs and investment to nations pursuing a less ambitious emission reduction pathway. The EU is committed to a 55% reduction in emissions when measured against a 1990 benchmark and net-zero emissions by 2050. In addition, it wishes to transition from the making of so-called “free allocations” to industry participants in its emissions trading system to one that requires producers to purchase 100% of emissions certificates. The phase-out of free allocations will commence in 2026 and be completed by 2036.

The EU's proposed CBAM seeks to keep the greenhouse gas emission price signal for imported and locally produced goods in lockstep with one another. This will be achieved by requiring the importers of

greenhouse gas-intensive products to pay a charge equivalent to the cost of the proportion of emission certificates that would have had to be purchased if the product had been produced within the EU. Credit, however, will be given for the cost of purchasing emission certificates and the impact of any greenhouse gas tax in the country of origin.

Rather than applying the proposed mechanism to all 62 sectors involved in its emissions trading system, initially, it is proposed to limit the application of the proposed mechanism to imports of 6 products – cement, iron, steel, aluminium, fertiliser and electricity.

Leakage

Typically, leakage is defined as the flow of jobs and investment out of an economy. In the EU's case, the main concern is that leakage may be caused by their decisions to

- a) pursue a more ambitious greenhouse gas emissions reduction pathway than some other nations; and
- b) phase out the provision of free allocations.

Shifts in jobs, investment and trade flows as a result of access to low-greenhouse gas emission technologies and abundant sources of wind and/or solar energy have not been mentioned as a concern.

A set of principles

Despite several attempts and significant progress, broad agreement on the most appropriate way to manage conflicts between international trade and environmental issues has yet to emerge. Consequently, **this paper begins with a search for a set of principles to guide the use of border adjustment mechanisms** to ameliorate global environmental problems or, as economists call them, global externalities. Global environmental problems are defined as problems that affect the function of the world's oceans and/or atmosphere.

One might think of these principles as propositions that might find their way into a zero draft of an agreement prepared by a club of WTO members in an attempt to expedite progress in the resolution of one or more global environmental problems.



The club's agreement would be drafted to guide the development and use of **Global Environmental Border Adjustment Mechanisms – (GEBAMs)**.

The first suggested principle is a global recognition principle.

1. The use of GEBAMs should be limited to atmospheric and oceanic problems that a majority of members of the United Nations and sources or causes of the problem have agreed can be resolved only through collective action.

The paper then observes that progress towards the elimination of a global environmental problem will be faster if countries are free to choose, and encouraged to compete in the search for, the most efficient way to contribute to the reduction of a global environmental problem.

If a country has made, and is making, as great or a greater contribution than the importing country and has been doing so in a manner consistent with all other international trading rules, then it should be encouraged without restriction to continue to do so – **an equivalent contribution principle**.

2. At the mechanism level, all imports from any country that has been making an equivalent contribution to progress in reducing a global environmental problem should be exempt from the fiscal component of a GEBAM.

Reporting on progress would need to be objective and subject to audit. When developing the legislation necessary to introduce a GEBAM, there is a temptation to choose a benchmark date that favours the implementing party. Consequently, there is a case for a **process-determined benchmark principle** that aligns with the date when international agreement on the need to address the global environmental problem was reached.

3. Assessment of the cumulative contribution to progress in reducing the global environmental problem should commence from the time when international agreement on the need to address the problem was reached.

Moreover, as any GEBAM runs the risk of producing a perverse outcome, care must be taken to ensure that the application of the mechanism to one but not all sources of the environmental problem does not have the perverse effect of worsening the problem. Application to one greenhouse

gas-causing input, such as electricity, but not to a close substitute such as gas is an example. That is, one might expect a zero-draft of the agreement to contain a principle that requires the **inclusion of all close substitutes in the mechanism**.

4. To prevent the emergence of arrangements that could have the perverse effect of worsening the extent of the global environmental problem, the chosen fiscal mechanism must be applied to all inputs which are or could be used in the production of the imported good.

With regard to the delicate question as to whether or not a region or province within the affected country could gain fiscal-mechanism exemption, it is suggested that progress will be faster if negotiations for access to a general fiscal exemption are structured so that the greatest pressure possible is put on the party responsible for managing trade issues by **limiting access to a general fiscal exemption to a single party**.

5. The provision of a general GEBAM exemption should be provided only to nations and/or customs unions and not available to sub-jurisdictions.

In order to encourage broad coverage of causes of a global environmental problem, the agreement could include an arrangement that discourages selective GEBAM implementation by, for example, including some but not all sectors. With this outcome in mind, a **cascading accounting mechanism is proposed**.

6. A GEBAM exemption should be available to any party that has been making an equivalent contribution to either the entire environmental problem or any larger category of causes and sources of the problem covered by the mechanism.

Fiscal considerations

The EU's proposed CBAM has been developed to enable the EU to shift from the provision of free allocations to an arrangement that requires cement, iron, steel, aluminium, fertiliser and electricity producers to purchase emission certificates in a manner that does not expose the producers of these products to increased competition. This chosen approach, however, only recognises one policy approach and does not recognise the fact that, in some circumstances, regulations

can have a similar effect. The result is an arrangement that discourages countries from searching for the most efficient and equitable way to reduce the extent of a global environmental problem.

Learning from experience in the search for ways to reduce agricultural subsidies, however, the EU could use a carbon price equivalent estimation procedure similar to the producer subsidy equivalent estimation procedure used in agricultural trade negotiations. Estimation of the extent of **equivalent-price signals** embedded in regulatory and other approaches can be used to encourage governments and businesses to compete in the search for the most cost-effective and equitable ways to reduce the magnitude of a global environmental problem.

7. The fiscal mechanism chosen to reveal the cost of reducing a global problem to producers should take full account of direct and indirect price signals including the impact of regulations on the costs of producing or consuming a good or service.

When and where ever a fiscal mechanism is applied, significant amounts of revenue will become available. One option is to return this money to consolidated revenue. After administrative costs have been covered, the other option is to use this money to expedite progress by requiring that it be invested in an action that reduces the extent of the environmental problem.

As the purpose of any GEBAM should be to enable a party to expedite progress towards the elimination of an environmental problem, it is suggested that there is a case for an **environmental-improvement requirement**.

8. All the net revenue resulting from applying a mechanism should be used to offset the environmental damage caused by the production and/or consumption of the imported good or service.

Offset could be achieved either by requiring the purchase of emission certificates within the country and/or arranging for the reduction of emissions elsewhere. If this requirement was respected, significant advances in the international trade of emission certificates could be expected.

Special assistance and treatment

In many international trade negotiations, a case is made for the provision of special assistance to countries that are less developed. Rather than leaving this issue open to case-by-case negotiation, it is suggested that club members would argue that the provision of any **special assistance be objective** but be provided in a manner that leaves open the opportunity for members to provide additional complementary forms of assistance that are not associated with the cause of the environmental problem.

9. The extent of any form of special and differentiated assistance offered to a nation should be limited to the use of objective formulae or compliance with a defined threshold condition.

The last issue raised is the question of whether or not any country should be allowed to negotiate a special bi-lateral or multi-lateral arrangement that provides for fiscal exemption, for example, in return for an agreement to collaborate, in the collaborative development of emission-reducing technologies or establishment of a free trade agreement. It is suggested that those involved in preparing a zero-draft agreement would conclude that there is a need for **a one-club principle**.

10. No sponsor of a GEBAM should be allowed to enter into a bilateral or multi-lateral trade agreement with another country or customs union that establishes a lesser price signal and or allows for less progress than that required of all other parties.

Application to the EU

These principles are then used to identify opportunities to improve the EU's proposed CBAM. As the EU's case for introducing its proposed CBAM rests heavily on its desire to phase out the provision of free allocations, attention is also drawn to opportunities to modify its emission trading system. There are two ways to address the EU's problem, and both are worthy of consideration. The first opportunity is to improve its proposed CBAM. The second opportunity is to strengthen the EU's ETS.

Improving the EU's proposed CBAM

The EU has signalled that it is interested in receiving comments on opportunities to improve its draft CBAM legislation. If the thrust of the above principles is acceptable then it can be concluded that the EU's proposed CBAM could be enhanced by:

- 1) Significantly reducing administrative costs by including an equivalent-contribution-exemption provision in the legislation so that imports of goods and services from any nation that has been making equivalent cumulative progress are exempt from the mechanism's fiscal requirement.
- 2) Providing automatic fiscal mechanism exemption for imports from any country that has been reducing emissions as fast as the EU in any of the following greenhouse gas emission categories
 - a. All greenhouse gas emissions;
 - b. All CO₂ emissions;
 - c. Emissions from all the 66 sectors included in the EU's ETS; or
 - d. All emissions associated with the production of goods and services covered by the CBAM mechanism.
- 3) Setting the date when the EU formally ratified the Paris Agreement as the benchmark date for assessment of a country's cumulative contribution to the reduction of global greenhouse gas emissions for mechanism purposes.
- 4) Expanding mechanism coverage to include gas, coal and close substitutes for the electricity used in the production of CBAM products.
- 5) Recognising the impact of indirect regulatory mechanisms as well as direct pricing mechanisms.
- 6) Requiring the fiscal payment to reflect the impact of all (Scope 2) sources of greenhouse gas emissions including those associated with the use of electricity, steam, heating and cooling processes during the production of the imported good.
- 7) Allowing for the certified offset of greenhouse gas emissions instead of making a mechanism payment.
- 8) Directing that all the net revenue collected be used to offset global greenhouse gas emissions in a cost-effective and equitable manner.

9) Requiring that the magnitude of any financial concession provided be calculated using either an objective formula or pre-defined threshold condition.

10) Prohibiting the negotiation of a bi-lateral or multi-lateral agreement that allows for the provision of a lesser price signal or recognition of a lesser cumulative contribution to the reduction of global greenhouse gas emissions.

A more demanding agenda would signal an intention to transition quickly to expand the EU's proposed CBAM to include all 66 sectors and processes included in the EU ETS.

Improving the EU's ETS

In practice, the EU's proposed CBAM can be described as a decision to impose an uncapped extension to the price-signalling dimensions of the EU's Emission Trading System to imported products without any modification to emission limiting features of the scheme. In recognition of the importance of this feature of the EU's proposed CBAM, the paper closes with a brief consideration of opportunities to improve the functioning of the underpinning ETS mechanism.

An opportunity for the EU to transition from the use of one to two emission trading mechanisms is identified. This could be achieved by converting current entitlements to free allocations into tradeable shares and replacing the proposal to increase the proportion of emission certificates that have to be purchased with an annual requirement for the surrender and auction of between 1% and 2% of shares. The resultant revenue could then be recycled to households and regions in the form of an annual climate adjustment assistance payment. International experience in the use of similar share systems to improve investment in and use of fishery and water resources suggests that the resultant increase in investment security and incentive to innovate would make it easier for the EU to introduce the equivalent contribution and equivalent price signalling arrangements as proposed in this paper.

“Effective carbon pricing is crucial to decarbonisation, but cannot be achieved without effective anti-carbon leakage policies in place.

The (UK) Government’s current approach to addressing the risks of carbon leakage, including free allocation of Emissions Trading Scheme (ETS) allowances, is insufficient on its own to incentivise industrial decarbonisation effectively.

A clear policy response is needed to address this; we consider that a UK carbon border approach is the most appropriate response.”

**Report of the UK House of Commons
Environmental Audit Committee
23 March 2022**

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Improving border adjustment mechanisms

Background

The European Union (EU) and a number of other countries including the USA, the UK, Canada, Malaysia, and Japan are in the process of considering how best to prevent the flow of jobs and investment to countries and regions where there is a lesser incentive to reduce greenhouse gas emissions.

Rather than spending pages and pages reviewing the details of these emerging schemes,¹ the paper begins by making the following observations.

1. Interest in the use of border adjustment mechanisms has emerged as individual countries grapple with changes in the flow of internationally traded goods owing to differences in the incentives to reduce greenhouse gas emissions and many objectives associated with incentive mechanism choice.
2. International trade in goods and services allows all countries, including developing countries, to prosper by taking advantage of variations in competitive advantage.²
3. Climate change policies and consumer preferences for lower emissions are altering the competitive advantage of nations in a manner that appears to be favouring countries with access to zero-emission (renewable) sources of energy and emission-reducing technologies.³
4. Efficient resource use requires that the cost of environmental externalities be internalised.
5. With the exception of processes that affect the functioning of the world's oceans and atmosphere, it is most efficient to use local and regional mechanisms rather than international trade rules to reveal the nature of these costs.
6. The effects of climate change on the environment and production costs is a global environmental externality whose reduction requires the development and use of policies that encourage emission reduction.
7. The EU has been using an Emission Trading System – the EU ETS – to encourage producers within its borders to reduce emissions, and now wishes to transition from an arrangement that requires some producers to purchase emission certificates but others are provided with free allocations, to one that will phase out the provision of free allocations.



¹ For a detailed review of Carbon Border Adjustment Measures see the OECD review by Condon and Ignaciuk (2013).

² See Lash and Wellington (2007) and Bartley, J.; Marcus, B.; Cali, P.; Hoppe, M.; and Piermartini, R. (2015.)

³ See Kortum, S. and Weisbach (2021).

⁴ https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/free-allocation/carbon-leakage_en

8. Unless efficient border adjustment mechanisms are put in place, the EU perceives that the dual effects of its ambitious emission reduction pathway and the phase-out of free allocations may result in the leakage of jobs and investment to other countries.⁴
9. In a manner that has secured a significant first-mover advantage, the EU is proposing to introduce a Carbon Border Adjustment Mechanism (CBAM)⁵ as a means to encourage other countries to reduce greenhouse gas emissions as quickly as the EU and transition towards the increased use of direct greenhouse gas emission pricing mechanisms.⁶
10. There is a significant risk that poorly designed border adjustment measures could have the perverse effect of increasing rather than decreasing greenhouse gas emissions.
11. In an ideal world, the EU's proposed CBAM would be consistent with an international agreement for the management of the trade-related aspects of global environmental externalities but such an agreement does not exist.

Stepping off from these observations, the paper searches for a set of global principles or guidelines for the use of border adjustment mechanisms as a means to reduce the extent of global environmental problems.

A “global environmental problem” is defined as one that can be resolved if, and only if, a majority of nations have agreed its resolution requires collective action in recognition of the fact that failure to resolve it could have extremely adverse consequences for the global commons.

Leakage

Given the nature of the international debate, careful consideration needs to be given to the meaning of a leakage.

In international trade literature, the word “leakage” tends to be used loosely as an umbrella term that has several meanings.⁷ In essence, the concept begins with the idea that no economy is fully closed and circular in the way that it operates. The flow of goods, services, financial capital, people, knowledge, etc. is continuous. This leakage can be good or bad. Typically, leakage is used to describe undesirable changes in the flow of internationally traded goods.

Typically, the term is qualified. Official EU documents, for example, use the term “carbon” leakage.⁸

Carbon leakage refers to the situation that may occur if, for reasons of costs related to climate policies, businesses were to transfer production to other countries with laxer emission constraints. This could lead to an increase in their total emissions.⁹

⁵ A Border Adjustment Mechanism is a mechanism that seeks to establish a level playing field by exposing importers to the same costs and incentives as producers within a country. Typical mechanisms include an import levy or an export rebate (Campbell et al., 2021).

⁶ By moving first and ahead of a global discussion about the best way to manage interactions between trade and environmental issues, the EU may be establishing precedents that are neither in the best interests of other nations nor optimal for the amelioration of global environmental problems.

⁷ See Pirlot (2021) for a discussion of the different “leakage” narratives.

⁸ “Carbon” as a term is mis-leading as it implies that there is a need only to reduce CO₂ emissions. Throughout this paper, we refer to “greenhouse gas” emissions in an attempt to draw attention to the need to reduce all causes of global warming.

⁹ https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/free-allocation/carbon-leakage_en

Greening international trade rules

Adoption of the General Agreement on Tariffs and Trade (GATT) by 23 nations in 1947, enabled trade in goods to expand significantly and played a key role in improving the wealth of many nations. As the agreement evolved, more and more countries have agreed to be subject to the GATT's rules and processes.

As a result of progress made, in 1995 a General Agreement of Trade in Services was adopted and both these agreements were brought together under the oversight of the newly established World Trade Organisation (WTO). Today, there are 164 members of the WTO.¹⁰

Seeking to explain the nature of these agreements to laypeople, in a formal summary the WTO has stated that the principles underpinning any trading system should be characterised by arrangements that are:

- **without discrimination** — a party to the agreement should not discriminate at the border between its trading partners (giving them all “most-favoured-nation” status); and once they are across the border on the internal market, it should not discriminate between its own and foreign products, services or services providers (giving them “national treatment”);
- **freer** — barriers coming down through negotiation;
- **predictable** — foreign companies, investors and governments should be confident that trade barriers (including tariffs and non-tariff barriers) should not be raised arbitrarily; tariff rates and market-opening commitments are “bound” in the WTO;
- **more competitive** — discouraging “unfair” practices such as export subsidies and dumping products at below cost to gain market share;
- **more beneficial for less developed countries** — giving them more time to adjust, greater flexibility, and special privileges.¹¹

These principles and the structure of the GATT that led to their development were developed well before there was widespread global awareness of the extent of global environmental problems. More recently, the WTO's membership has been progressing the search for a set of rules that would bring greater international discipline to relationships between trade and environmental issues. As a result, a significant number of WTO members have been holding a series of “Structured Discussions on Trade and the Environment”¹² which seek to enable one more dot point to be added to the above high-level summary.

- **clean and green** – encouraging forms of international trade that protect and, where necessary, improve the environment.

Indicators of progress include the 1992 United Nations Conference on Environment and Development which recognised countries have a common but differentiated responsibility to protect and manage the global commons in a manner that recognises the respective capabilities of different countries; the 1987 Montreal Protocol which has played a key role in restoring health to the ozone layer; and, most recently, the 2015 Paris “Climate Change” Agreement and the Glasgow Climate Pact. In 2020, the WTO launched an Informal Dialogue on Plastics Pollution and Environmentally Sustainable Plastics Trade that seeks to complement discussions in the Committee on Trade and Environment (CTE) and other fora.¹³

¹⁰ As of 12 April 2022. See https://www.wto.org/english/thewto_e/whatis_e/tif_e/org6_e.htm for an update.

¹¹ Adapted from WTO (2015) “Understanding the WTO” 2015 edition.

¹² In 2020, 50 members announced their intention to intensify work on trade and environmental sustainability to complement the work of other WTO bodies and to support the objectives of the Marrakesh Agreement Establishing the WTO, which envisages a global trading system that protects and preserves the environment in accordance with sustainable development. The Ministerial Statement adopted in 2021 sets out future work for the initiative. See https://www.wto.org/english/tratop_e/tessd_e/tessd_e.htm

¹³ See https://www.wto.org/english/tratop_e/ppesp_e/ppesp_e.htm

Box 1: An overview of the EU's proposed carbon border adjustment mechanism

On 14 July 2021, the EU released a draft regulation to enable implementation of a proposed Carbon Border Adjustment Mechanism and is now inviting interested parties to suggest ways to improve it. As part of this process, the EU has been stressing that its proposed mechanism is consistent with the WTO rules, procedures, and protocols.

The EU has a problem. It wishes to remove one of the core features of its ETS – the provision of free allocation of rights to make greenhouse-gas emissions. That is, rather than setting a cap and enabling producers to lock in access to a share of all future certificates, the EU has decided that it would be more equitable if all producers were required to purchase certificates. Either mechanism would send an efficient price signal, but the EU has indicated that it prefers the latter.

As a result, industry leaders are of the view that the EU's intention to transition from an arrangement where a significant proportion of emission certificates are issued for free to one where all certificates are auctioned will undermine their ability to compete with importers. In response, the EU has decided to use its proposed CBAM to keep the direct price signals given to importers and local producers in lockstep.

Rather than applying their proposed CBAM to all the 62 sectors covered by the EU ETS, the EU has decided to limit application to 6 sources of emissions – the production of iron, steel, aluminium, fertilisers, cement and electricity. Importers of these products will be required to purchase as many emission certificates as would have been required if the factory making these products was located within the EU. Credit, however, is to be given for the cost of paying a carbon tax and/or the requirement to purchase emission certificates.

To keep administrative costs low, importers will be 'given' a choice between a) making a payment based on an estimate of actual emissions per unit of product exported to the EU; or b) purchasing the same number of certificates that the worst 10% of European producers of the product would have to purchase.

Importers will be required to report emissions from 2023 and purchase certificates from 2026. The proportion of certificates that each EU producer of the above products will have to purchase is scheduled to increase from 10% in 2026 to 100% in 2035.

During the initial period, it is proposed to limit application to direct (Scope 1) emissions and not include indirect (Scope 2) emissions associated with the sourcing of the energy necessary to make the product in question. In the case of steel production, for example, Scope 1 emissions result from the mixing of iron ore with coal. Emissions associated with the production of electricity used to heat a furnace, etc. are known as Scope 2 emissions.

On 17 May 2022, the European Parliament's Committee on Environment, Public Health and Food Safety recommended a broadening of CBAM to

- Include aluminium, hydrogen, polymers and organic chemicals in addition to the products proposed by the Commission (iron and steel, refineries, cement, organic basic chemicals and fertilisers);
- Include indirect emissions, i.e. emissions deriving from the electricity used by manufacturers;
- Require payments from 2025 rather than 2026;
- Establish a centralised EU CBAM Authority;
- Include all sectors of the EU Emissions Trading System (ETS) by 2030 - 5 years earlier than proposed by the Commission;
- Fully phase out all free allocations by 2030; and
- Require EU support to least developed countries be as great or greater than CBAM revenue.

The Committee stated that "coherence between the CBAM and the EU ETS is essential to respect the principles of the World Trade Organisation and that CBAM must not be misused as a tool to enhance protectionism."

Sources: <https://www.europarl.europa.eu/news/en/press-room/20220516IPR29647/cbam-meps-push-for-higher-ambition-in-new-carbon-leakage-instrument>

The draft CBAM legislation is available at https://ec.europa.eu/info/sites/default/files/carbon_border_adjustment_mechanism_0.pdf

An earlier report prepared by the European Parliament's lead CBAM rapporteur, Mohammed Chahim which is available at <https://www.euractiv.com/wp-content/uploads/sites/2/2022/01/CBAM-Infomal-draft.pdf>



Towards a set of principles

As yet, there has been no attempt to develop a general agreement on the use of so-called “border adjustment” mechanisms to prevent international trade from contributing adversely to a global environmental problem.

Nevertheless, in the hope that one may emerge eventually, it is assumed that there is value in thinking through the concepts and principles that an agreement on the use of trade measures to expedite progress towards the elimination or mitigation of a global environmental problem might contain.

Such an agreement could be developed by a club of nations, as suggested by Nordhaus,¹⁴ or by an international organisation such as the WTO, or the OECD.

In this paper, it is assumed that the prime objective of any border adjustment measure is to enable a government to act to reduce the extent of a global environmental problem at a faster rate than other nations without fear that this action might have the perverse effect of shifting production, jobs and investment to regions where a lesser contribution to the resolution of the environmental problems is being made.

Ten suggested principles follow.¹⁵ The first five relate to a suite of trade-policy measures that typically are managed by national governments and/or a customs union such as the EU. The next three relate to pricing issues. How much should be charged and how should the resultant revenue be used? The last two principles relate to issues associated with the special treatment of imports from nations with a lesser capacity or capability to address the problem and, also, agreements that seek to promote freer forms of trade.

National considerations

One of the first issues to be resolved is the most appropriate way to differentiate between global environmental problems and those that are local or regional in character. In order to limit the use of such mechanisms to global problems, a critical mass of countries would need to be involved in determining whether or not the environmental problem was of sufficient scale to be classified as a global environmental problem.

One option is to limit application to global environmental problems that are the subject of an international agreement that has been ratified by a majority of countries. Another would be to limit application to production processes that are truly global and have been shown to have an adverse effect on the way the atmosphere and/or all oceans function. Examples of such agreements include the Montreal Protocol which has been ratified 197 times¹⁶ and the Paris Agreement on Climate Change which has



been ratified 192 times.¹⁷ As suggested by Nordhaus¹⁸, a club of countries could then work on the detail of a specific agreement such as one that deals with climate change.

A third, much more stringent, option would be to require a double majority. Under such an arrangement, application would be limited to agreements that have been ratified by signatories that, in aggregate, are responsible for over 50% of the cause and extent of the problem and, also, by a majority of members of the United Nations. Individual countries or clubs of countries would then be able to proceed to develop the mechanisms necessary to deal with specific global environmental problems such as the need to reduce greenhouse gas emissions in a more efficient manner.

¹⁴ Nordhaus' address delivered on acceptance of a Nobel Prize in recognition of his contribution to the development of clubs with regard to climate change is available at <https://www.nobelprize.org/uploads/2018/10/nordhaus-lecture.pdf>

¹⁵ Consistent with this paper's principles this paper, Crosby (2021a) has proposed border carbon adjustment principles that 1) give primacy of leakage protection; 2) require the sharing of the revenue collected with the production source; 3) prevent double protection through failure to recognise the effects of non-price measures; 4) give credit for the use of equivalent pricing mechanisms; and 5) require openness in consultation.

¹⁶ See <https://www.awe.gov.au/environment/protection/ozone/montreal-protocol>

¹⁷ 192 Parties (191 countries plus the European Union). See <https://www.un.org/en/climatechange/paris-agreement>

¹⁸ Nordhaus' Nobel Prize Lecture on this topic is available at <https://www.nobelprize.org/uploads/2018/10/nordhaus-lecture.pdf>

1 A global recognition principle

The use of Global Environmental Border Adjustment Mechanisms (GEBAMs) should be limited to atmospheric and oceanic problems that a majority of members of the United Nations have agreed can be resolved only through collective action.

For the remainder of this paper, we refer to any border adjustment mechanism that seeks to reduce the extent or severity of a global environmental problem as a “Global Environmental Border Adjustment Mechanism” (GEBAM).¹⁹

More formally, a GEBAM is defined as

“any arrangement that makes it possible for an importing nation to apply a fee, charge or similarly defined fiscal mechanism to imports in a manner that is equivalent to or in proportion to an objective assessment of harm to the world’s atmosphere or oceans caused by the production and consumption of a good or service.”

Pragmatically, this definition is limited to processes that affect the world’s atmospheres or oceans. It does not envisage the use of an international trade measure to address regional environmental issues associated, for example, with the management of rivers and/or specific fisheries. That is, the environmental problem has to be truly global in the sense that, unless addressed objectively, it is likely to change the way these systems function. Examples include global warming, the structure of the ozone layer, and the accumulation of plastics in the ocean.

Is equivalence an appropriate concept?

From an environmental perspective, it does not matter how a country contributes to the elimination of a global environmental problem provided they make an equivalent contribution. Some countries may choose to make widespread use of regulations and the development of technology while others may decide to include an emissions trading system and/or a pollution tax in the

mix of policies used to encourage actions that seek to reduce the extent of the environmental problem.

The mix of greenhouse gases targeted by domestic measures is also relevant. As set out in the Kyoto Agreement, 1 kg of CO₂ is equivalent to 20 tonnes of CH₄, 298 kgs of N₂O, etc.²⁰ In essence, and with regard to climate change, the question to ask is: “What would be required to demonstrate that the import of goods and services from a nation, rather than production of a similar good within the EU, is unlikely to increase global greenhouse gas emissions?”

In practice and consistent with OECD and WTO principles, one would expect an international agreement on the use of trade-related mechanisms to reduce global environmental problems to include an equivalent contribution principle, that draws a clear distinction between measures that protect producers from competition and those that discourage the reduction of an environmental problem.

If jobs and investment flow towards a country with better access to non-polluting technologies and it is making an equivalent contribution to the elimination of the environmental problem, then such a shift should be encouraged. If, however, the shift in trade flows occurs because a country is making a lesser contribution to the elimination of a global environmental problem then there may²¹ be a case for the imposition of a border adjustment mechanism.

More formally, one would expect a GEBAM agreement to provide that all imports from any country that has been making an equivalent contribution to the elimination of the environmental problem should be exempted from the application of any payment mechanism. That is, countries should be encouraged to search for the most cost-effective ways to reduce a global environmental problem and, subject to WTO rules and regulations, be free to choose which products and which services to export.

In the case of the EU’s proposed CBAM, international commitment to such a principle would require that any country that has been reducing greenhouse gas emissions as fast as the EU be exempted

from the imposition of the fiscal component of its proposed CBAM. Pragmatically, the exemption would be based on an objective assessment of actual rather than promised contributions.

In the case of the EU’s proposed CBAM, measurement would be in CO₂-e and, consistent with the Paris Agreement, defined as a requirement to have achieved an equivalent percentage reduction in emissions measured from the date when the EU ratified this agreement. International competition in the search for which industries and regions to apply the most adjustment pressure would be encouraged. The result is a framework that would encourage all parties to search for the most cost-effective way to reduce greenhouse gas emissions and discourage the use of GEBAMs to pursue non-environmental objectives such as the protection of producers in a region from competition.

2 An equivalent-contribution principle

At the mechanism level, all imports from any country that has been making an equivalent contribution to progress in reducing a global environmental problem should be exempt from the fiscal component of a GEBAM.

How should the extent of a contribution be measured?

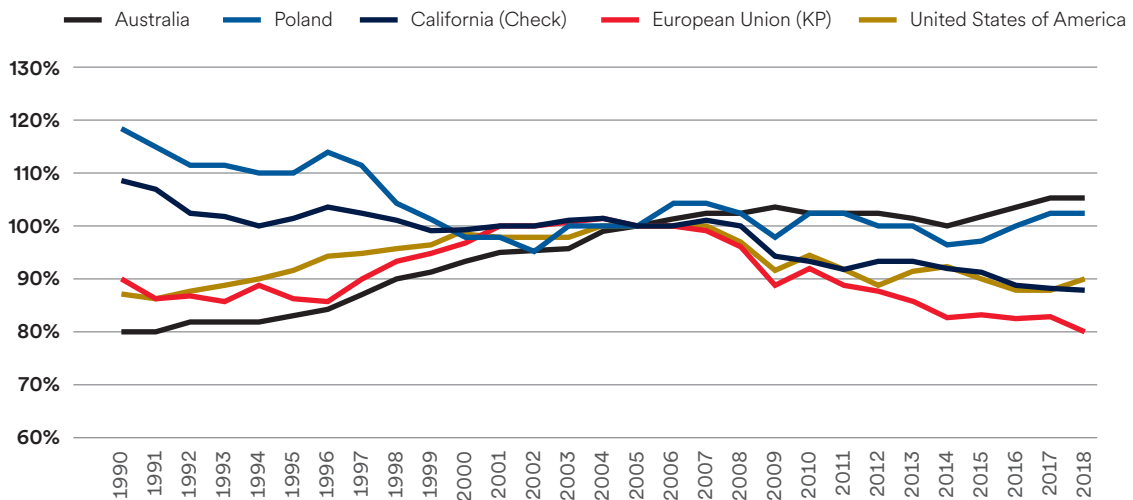
One would also expect the agreement to prevent countries from back-dating the start date for assessment so as to secure a strategic advantage. In this regard, it is informative to note that the EU’s “Fit for 55” package uses the Kyoto Protocol’s 1990 baseline, while the USA and Australia have chosen to use 2005 as their benchmark for setting greenhouse gas emission reduction targets. In contrast, UNFCCC documents tend to focus on what further action is required to keep global warming at less than 1.5oC or 2oC. As illustrated in Figure 1 below, sudden increases and decreases in emissions can occur and could easily be exploited by a country as it proceeds to implement a GEBAM.

¹⁹ Pirlot (2021) describes border adjustment measures as an umbrella concept that enables countries to pursue many, sometimes conflicting, objectives including the promotion of fair competition among trading partners; the promotion of compliance with an international agreement; a means to demonstrate international leadership; the discouragement of forms of consumption that worsen an environmental problem; and a means to raise revenue.

²⁰ See Conference of the Parties (25 March 1998). “Methodological issues related to the Kyoto Protocol”. Report of the Conference of the Parties on its third session, held at Kyoto from 1 to 11 December 1997 Addendum Part Two: Action taken by the Conference of the Parties at its third session. Available at <https://unfccc.int/resource/docs/cop3/07a01.pdf>

²¹ Provided this shift is not due to the provision of special and differentiated assistance to a developing country.

Figure 1 Changes in annual greenhouse gas emissions in CO₂-e for the EU, the USA, Australia and Poland (2005 = 100%)²⁴



Of all the options, one of the most straight forward approaches would be to require the assessment of the contribution made by each party be from the date when that party ratified the international environmental agreement that is being used to justify implementation of the GEBAM.

3 A process-determined benchmark principle

Assessment of the cumulative contribution to progress in reducing the global environmental problem should commence from the time when international agreement on the need to address the problem was reached.

How broad should “problem cause” and “problem source” coverage be?

A related issue is the question of whether or not a GEBAM must cover all causes and sources of the problem or if it is acceptable for a GEBAM to cover only some causes and some sources of the problem.

As a general rule and with regard to the causes of a problem, when one input is taxed and another close substitute is not

taxed, a market-driven bias is created in a manner that can have the perverse consequence of increasing the magnitude of the global environmental problem.²² By way of example, a GEBAM levy on the production of electricity used for domestic heating but not gas could result in an increase in the use of gas for domestic heating that could have the perverse effect of increasing, rather than decreasing, greenhouse gas emissions.

In practice, one would expect an international agreement on the management of the trade-related dimensions of a global environmental problem to contain a requirement for the inclusion of all close substitutes associated with the cause of the environmental problem.

Similarly, with regard to sources of a problem, one would expect consistent coverage on a sector and sub-sector basis to ensure that the GEBAM price signal is set in proportion to the cause of the problem and no significant cause is left unpriced. With regard to the manufacturing sector, for example, one would expect the system to account for direct and indirect sources in a consistent manner. In the EU’s case, and if leakage is a general problem, one could argue that from the outset its CBAM should cover all EU ETS products and

processes. Similarly, should Canada decide to implement a CBAM it could require the inclusion of all products and processes covered by its carbon tax.²³

4 A substitute-inclusion principle

To prevent the emergence of arrangements that could have the perverse effect of worsening the extent of the global environmental problem, the chosen fiscal mechanism must be applied to all inputs which are or could be used in the production of the imported good.

Which parties should be entitled to a general exemption?

A more difficult issue is the question of whether or not general GEBAM exemptions should be accessible to provinces or states when the party responsible for managing international trade issues is not entitled to a general exemption. Should, for example, all goods and services imported from a US state, like California, be allowed a general exemption clause – when the USA’s contribution to emission reduction is such that it would be ineligible to qualify for one?²⁵

²² See Martin (2022) for an important discussion on the merits of consumption versus production taxes and the risk that the interplay of GEBAM and ETS mechanisms can send mixed pricing signals.

²³ For more information, see <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work.html>

²⁴ Note the Californian data needs to be checked for consistency with other data. National data is as reported to the UNFCCC. Californian data is as reported by the Californian Government. Sources are the UNFCCC GHG Data Interface and <https://ww3.arb.ca.gov/cc/inventory/data/data.htm>

²⁵ Since 2013, California has used a GEBAM to discourage the leakage of electricity production to neighbouring states and Canada (Fowlie et al., 2021).

Figure 1 above also shows the rate of progress in reducing emissions in the entire EU, Poland, Australia and California. Scale matters. Poland's rate of emissions reduction is quite different from the EU as a whole. Arguably, if California is allowed a general exemption, then the EU should be required to implement its GEBAM at the country level and cap emissions in each country and not, as it has done, at the EU level in a manner that protects Poland.

Pragmatically, and because GATT Article XXIV makes provision for the recognition of customs territories or, as they are often called, customs unions, it is recommended that the general exemption provisions of any GEBAM be determined and applied at the level of the party responsible for international development and implementation of the mechanism.

The result is an arrangement that encourages regional, provincial and industry representatives to promote greater progress at the national and customs union level and thereby avoid the significant administrative costs involved in assessing the quantity of greenhouse gas emissions associated with each and every international transaction covered by the GEBAM.

5 A single-party general exemption limitation

The provision of a general GEBAM exemption should be provided only to nations and/or customs unions and not available to sub-jurisdictions.

Should exemptions for a broader spectrum of causes be allowed?

While the overall objective of any GEBAM should be to expedite progress in the elimination of an environmental problem, in practice, countries will seek to apply the mechanism to some rather than all causes of the problem.

In the case of greenhouse gases, for example, a country might decide to apply the mechanism to CO₂ and N₂O but neither to CH₄ nor to the range of fluorinated gases that contribute to global warming. Such an approach, however, is discriminatory – especially if the aim is to

expedite progress towards the elimination of a global environmental problem. If one country has found a way to reduce a cause of a global environmental problem that has eluded producers in the importing country, then they should be encouraged to adopt it. In practice, and in order to encourage competition in the search for cost-effective ways to reduce the problem, a cascading structure is needed. This cascading structure would start with an arrangement that would provide a general exemption to any party that has been making equivalent progress for all causes of the problem and then cascade down through a series of sub-categories.

In the case of greenhouse gases, for example, the result would be an arrangement that would enable mechanism exemption for any country that makes equivalent progress in the reduction of:

1. The full range of gases covered by the Kyoto Agreement (CO₂, N₂O, CH₄ and all fluorocarbons);
2. The full range of gases covered by the EU's CBAM (CO₂, N₂O and perfluorocarbons from aluminium production);
3. The full range of sectors covered by the EU's ETS and the EU's proposed CBAM (the EU ETS involves 62 sectors);
4. Aggregate emissions from all the sectors covered by the EU's proposed CBAM (electricity, iron and steel, aluminium, cement and fertilizers).

6 A cascading exemptions structure

A GEBAM exemption should be available to any party that has been making an equivalent contribution to either the entire environmental problem or any larger category of causes and sources of the problem covered by the mechanism.

Fiscal-mechanism considerations

How much should importers have to pay?

Having set out a framework for the provision of fiscal mechanism exemptions for products imported from a country that has been making equivalent progress, we can now consider the nature of the payment required in order to enable the import of a product from a non-exempt country.

In essence, the EU's proposed CBAM seeks to expose international competitors to the same "carbon price" signal as European producers of cement, iron, steel, aluminium, fertilisers and electricity face.

This is to be achieved by requiring importers to pay a levy equivalent to the amount that would have had to be spent on the purchase of emission certificates if the imported product had been produced in the EU and credit is given for the cost of purchasing emission certificates and carbon taxes in the country of origin. In each case, importers will need to document the quantity of each product imported, estimated emissions and the amount of money spent within the producing country on emission taxes and the purchase of emission certificates.

Note that the current CBAM proposal seeks only to apply a direct price signal and does not allow for the effect of indirect price

signals on production costs. This approach arises from a distributional issue. As the EU has said

"The continuation of free allocation allows the EU to pursue ambitious emissions reduction targets while shielding internationally competing industry from "carbon leakage."²⁶

The EU, however, now wishes to phase out free allocations and increase the proportion of emission certificates that must be purchased and ultimately transition to a situation where all emission certificates will have to be purchased.²⁷

There are two issues here. The first is the correct price to set so that producers within and outside the EU face the same price signal so that greenhouse-gas emission reduction incentives within and outside the EU are in lockstep with one another. The second is a much broader question of whether or not the EU should be able to force other nations to use the same type of mechanism it has chosen and, in effect, make the polluters pay.

With regard to the former question, the experience with the promotion of international trade in subsidized agricultural products led to the development of estimates of producer subsidy equivalents to assess the degree of direct and indirect forms of assistance to producers (Box 2). The search is for an objective way to measure the effects of all direct and indirect effects of greenhouse gas emission reduction policies and mechanisms on production costs. That is, there is a need for a framework that enables the assessment of shadow prices or, in lay terms, estimation of the charge that would have the same effect on emissions as a regulation.



If the establishment of a level playing field is the goal in the search for cost-effective ways to eliminate a global environmental problem, then the fiscal component of a GEBAM should seek to impose a price signal equivalent. Approaches that aim to give preference to one mechanism over another should be avoided.

In passing, and given experience with the estimation of producer subsidy equivalents associated with trade in agricultural products, this would suggest a need to treat Scope 1 and Scope 2 greenhouse gas emissions in a consistent manner. Scope 1 emissions are those resulting from the production of a good or service while Scope 2 emissions are those resulting from the production of the energy used in a production process. At this stage, however, the EU's proposed CBAM only requires that account be taken of Scope 1 emissions. The European Parliament's rapporteur for this proposal, however, has recently recommended a transition arrangement that would include Scope 2 emissions from 2030.²⁸

²⁶ https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets/free-allocation_en#ecl-inpage-1367

²⁷ In the steel industry, it is anticipated that the allocation of free emission certificates will be reduced by 10% per annum from 2026 with the result that free allocation will end in 2035. See <https://www.shearman.com/perspectives/2021/08/cbam-and-revised-eu-ets-implications-for-the-steel-industry>

²⁸ See Box 1.

With regard to the second question, and from an environmental perspective, WTO principles would suggest that it is equivalence in outcome, not mechanism choice, that matters. Each country should be free to choose how best to reduce the extent of a global environmental problem.

7 An equivalent price signal requirement

The fiscal mechanism chosen should take full account of direct and indirect price signals including the impact of regulations on the costs of producing or consuming a good or service.²⁹

How should GEBAM revenue be used?

As currently specified, the EU's proposed CBAM seeks to apply the direct but no

the indirect price-signalling dimensions of the EU ETS to imported products without any impact on the supply and demand for emission certificates within the EU.

If the aim of any GEBAM is to expedite progress in the reduction of a global environmental problem, then it can be argued that the net revenue collected from the application of its fiscal mechanism should be used to reduce the extent of the problem. Conceptually, this could be brought about by allowing an importer to purchase and surrender validated emission certificates from any part of the world. The alternative approach is to require the implementing authority to invest in actions that reduce the extent of the environmental problem in the most cost-effective manner possible.

In the case of greenhouse gas emissions, potential actions include recognition of greenhouse gas emission offset

arrangements that are part of government-certified schemes and/or voluntary emission-offset agreements such as the planting of trees and/or an increase in soil carbon.³⁰ Under such an arrangement, for example, an importer of an Australian product covered by the EU's proposed CBAM would be able to claim credit for the cost of purchasing carbon credits that have been approved by the Australian Government's Clean Energy Regulator.³¹

8 An environmental offset requirement

All the net revenue resulting from the application of a mechanism should be used to offset the environmental damage caused by the production and/or consumption of the imported good or service.

Box 2: From Producer Subsidy Equivalents to Greenhouse Gas Tax Equivalents

The idea that the estimation of producer subsidy equivalents and consumer subsidy equivalents could play an important role in encouraging freer international trade in agricultural products was first proposed by Tim Josling in the early 1970s and emerged from earlier theoretical work by Max Corden (Cahill and Legg, no date).

In essence, the Producer Subsidy Equivalent Estimation Procedure seeks to bring objectivity to debates about the effects of different agricultural production policies on opportunities to trade.

A reference price is used to enable objective comparison and the degree of support estimated and presented as a percentage of the reference price. Typically, estimates are prepared on a product by product basis for each country and then used to assess the magnitude of the direct or indirect price support or subsidy given to agricultural producers.

During the data collection phase, the estimates of the following five effects are assessed:

1. Measures that simultaneously affect producer and consumer prices (Price Support Mechanisms);
2. Measures that transfer money to or from producers without raising consumer prices (Direct Payments and Charges);

3. Measures that change short-run input costs (Input price effects);
4. Measures that indirectly change input costs as a result of General Government Services, etc; and
5. Other indirect costs primarily as a result of sub-national policies.

Applied to the array of emission trading and carbon taxation systems that are emerging around the world, a similar process could be used to develop objective estimates of the effect of alternative emission reduction strategies on the cost of producing "carbon-intensive" products and express this as a number that could be described as being equivalent to a percentage of an objectively-determined benchmark price.

The result would be a number that could be used, for example, to describe the equivalent carbon-pricing effect of Australia's renewable energy policy that requires a proportion of all electricity to be produced from a renewable source as being equivalent to x% of Canada's carbon tax or y% of the average cost of purchasing an EU emission certificate.

Source: OECD (2016).

²⁹ Domestic regulatory impact analysis could help in establishing the processes used to determine price equivalence.

³⁰ An alternative approach would require the purchase of EU emission certificates rather than the payment of the amount as if this occurred. In practice, however, this would require a massive shift in global and national greenhouse gas accounting rules. At present, each country is responsible for all the emissions that occur within its own jurisdiction. As part of a revised CBAM arrangement, however, the EU could allow importers to purchase and surrender emission certificates.

³¹ For more information on this opportunity, see <http://www.cleanenergyregulator.gov.au/csf/how-you-can-benefit/Pages/how-you-can-benefit.aspx#:~:text=By%20running%20a%20project%2C%20you,gas%20emissions%20stored%20or%20avoided.>

Special-interest considerations

As is the case with the GATT, during the development of an international agreement on the use of border adjustment measures to reduce the extent of global environmental purposes, there will be a need to consider the provision of special and differential treatment for developing countries.

Developing-country interest in the development of arrangements that make it easier for them to reduce emissions is already strong and is reflected in the fact that a significant number have opted to set zero-emission targets at a date later than 2050. China, for example, has set 2060. India has set 2070. Malaysia, however, has set 2050.

In recognition of the complexity of this issue, it is suggested that the club of nations involved in developing a zero-draft of an agreement would be interested in an arrangement that required the use of objective criteria to encourage fair competition among developing countries and prevent the development of arrangements which, for example, favour a country that is “closer” to the GEBAM implementing country.

Pragmatically, this would require an arrangement that would limit assistance to the use of objective formulae and defined threshold conditions. GEBAM implementing parties would then be free to choose which formula or threshold conditions to use. Options include a reduction in proportion to GDP per capita and/or a variation that includes an index of emission intensity. Complete exemption from the imposition of a financial mechanism for imports from all Least Developed Countries is another example.³² Under such an arrangement, it would be possible for countries to provide additional complementary forms of assistance that are not associated with the cause of the environmental problem.

9 An objective special assistance requirement

The extent of any form of special and differentiated assistance offered to a nation should be limited to the use of objective formulae or compliance with a defined threshold condition.

Should separate bi-lateral and multi-lateral arrangements be allowed?

As countries seek opportunities to expedite progress in the development and adoption of low-carbon technologies, a number have begun to explore opportunities for bi-lateral and multi-lateral cooperation. By way of example, the USA and the EU have committed to negotiate a sectoral arrangement that

“modifies tariffs on European Union steel and aluminium providers, addresses global overcapacity, and

toughens enforcement mechanisms to prevent leakage of Chinese steel and aluminium into the U.S. market. As a result of the arrangement, the European Union will remove its tariffs on a wide range of products, protecting American jobs, reducing costs for middle-class families, and maintaining U.S. export competitiveness.”³³

While, at this stage, the announced intention is to address existing trade policies, it is possible that discussions be extended to include an arrangement that excludes USA steel and aluminium producers from CBAM application. Such an arrangement, however, would violate the WTO’s most favoured nation principle which requires a country to provide any concessions, privileges, or immunities granted to one nation to all other member countries.³⁴ While acknowledging that the GATT contains exception clauses, one would expect an international agreement on the use of border adjustment measures to ameliorate the extent of global environmental problems to take a similar position. In essence, any bi-lateral or multi-lateral agreement, for example, one that seeks to encourage freer forms of trade between two or more parties, should not be used as a means to avoid the full application of a GEBAM.

10 A one club principle

No sponsor of a GEBAM should be allowed to enter into a bilateral or multi-lateral trade agreement with another country or customs union that establishes a lesser price signal and or allows for less progress than that required of all other parties.

³² Using a dynamic CGE trade model, Xiaobei et al (2022), for example, observe that CBAMs can “widen the gap between developed and developing countries in terms of GDP and welfare.”

³³ White House Fact Sheet: The United States and European Union To Negotiate World’s First Carbon-Based Sectoral Arrangement on Steel and Aluminium Trade. Available at <https://www.whitehouse.gov/briefing-room/statements-releases/2021/10/31/fact-sheet-the-united-states-and-european-union-to-negotiate-worlds-first-carbon-based-sectoral-arrangement-on-steel-and-aluminum-trade/>

³⁴ Adapted from [https://www.investopedia.com/terms/m/mostfavorednation.asp#:~:text=A%20most%2Dfavored%2Dnation%20,\(equal%20treatment%20of%20all%20countries.](https://www.investopedia.com/terms/m/mostfavorednation.asp#:~:text=A%20most%2Dfavored%2Dnation%20,(equal%20treatment%20of%20all%20countries.)

Application to the EU's CBAM

The EU has signalled that it is interested in receiving comments on opportunities to improve its draft CBAM legislation.

If the thrust of the above principles is acceptable then it can be concluded that the EU's proposed CBAM could be enhanced by:

- 1) Significantly reducing administrative costs³⁵ by including an equivalent-contribution-exemption provision in the legislation so that imports of goods and services from any nation that has been making equivalent cumulative progress are exempt from the mechanism's fiscal requirement.
- 2) Providing automatic fiscal mechanism exemption for imports from any country that has been reducing emissions as fast as the EU in any of the following greenhouse gas emission categories
 - a. All greenhouse gas emissions;
 - b. All CO₂ emissions;
 - c. Emissions from all the 66 sectors included in the EU's ETS; or
 - d. All emissions associated with the production of goods and services covered by the CBAM mechanism.
- 3) Setting the date when the EU formally ratified the Paris Agreement as the benchmark date for assessment of a country's cumulative contribution to the reduction of global greenhouse gas emissions for mechanism purposes.³⁶
- 4) Expanding mechanism coverage to include gas, coal and close substitutes for the electricity used in the production of CBAM products.
- 5) Recognising the impact of indirect regulatory mechanisms as well as direct pricing mechanisms.
- 6) Requiring the fiscal payment to reflect the impact of all (Scope 2) sources of greenhouse gas emissions including those associated with the use of electricity, steam, heating and cooling processes during the production of the imported good.
- 7) Allowing for the certified offset of greenhouse gas emissions instead of making a mechanism payment.
- 8) Directing that all the net revenue collected be used to offset global greenhouse gas emissions in a cost-effective and equitable manner.
- 9) Requiring that the magnitude of any financial concession provided be calculated using either an objective formula or pre-defined threshold condition.
- 10) Prohibiting the negotiation of a bi-lateral or multi-lateral agreement that allows for the provision of a lesser price signal or recognition of a lesser cumulative contribution to the reduction of global greenhouse gas emissions.

A more demanding agenda would signal an intention to transition quickly to expand the EU's proposed CBAM to include all 66 sectors and processes included in the EU ETS.

Finally, as the EU CBAM system operator began to search for cost-effective ways to offset emissions, it is possible that the EU could end up playing a leading role in the expansion of international opportunities for trade in emission certificates as the money raised is used to offset global emissions.

³⁵ For countries that have been reducing emissions as fast as or faster than the EU, the cost of making an annual assessment of emissions should be significantly less than the import by import reporting costs that will be imposed on importers and, when anything other than the default emission estimate used, incurred by the EU.

³⁶ The EU formally ratified the Paris Agreement on 5th October 2016.

Improving the EU's emissions trading system

As the EU has repeatedly stated, its CBAM proposal has been developed with a view to enable it to transition to an arrangement that requires greenhouse gas emitters to purchase emission certificates and the elimination of the provision of free allocations – as they are often called.

From a greenhouse gas emission reduction perspective, the main benefit of the EU's ETS arises from the important role that this mechanism plays in enabling the EU to place a binding cap on annual emissions and set a firm emission reduction trajectory. Under this arrangement, the EU sets an emissions cap and businesses determine the prices paid for emission certificates. In practice, the greenhouse-gas emissions tax needed to keep emissions within the cap is set by industry as they compete for access to emission certificates. No politician or bureaucrat is involved and each participant is encouraged to search for the most cost-effective way to reduce emissions.

As an influential review of US experience in allocating SO₂ emission permits to industry as a mechanism to reduce acid rain problems has found emission permit trading programs enable the rapid and cost-effective reduction of emissions. "Few other environmental programs of any sort have performed as well."³⁷

In recognition of these findings, it is useful to consider whether or not there is a set of changes to the ETS system that might make it easier or less costly to implement the EU's proposed CBAM.³⁸

Since its inception in 2005, the EU ETS has grown to include 66 sectors and now covers around 40% of EU greenhouse-gas

emissions.³⁹ Moreover, the "carbon-price signal" it sends has been found to have played a key role in helping the EU reduce emissions. While the logic of this proposed transition is clear, businesses have been making it apparent that if they are made to pay for permits, the resultant leakage in jobs and investment will cause them hardship, as they will not be able to compete with nations that have no such system in place.⁴⁰

One of the merits of an emissions trading system lies in the way that market-like processes rather than a political process is used to set the price of each certificate, permit or allocation. While there is devil in the detail, a carefully constructed review of the literature and international experience could be expected to experience in the management of fisheries, providing access to scarce water supplies, improving water quality, reducing the impact of acid rain, encouraging developers to offset adverse biodiversity impacts, etc.

If, in the lead up to a formal review, this considerable experience was coupled with an assessment of international experience in the use of market-based mechanisms to solve other environmental problems, it is likely that the review might draw attention to the following considerations:

1. **Investment security** can be enhanced by allowing businesses to secure

access to future emission rights either by allocating time-stamped packets of future permits to producers as proposed by McKibbin and Wilcoxon (2002), or by issuing climate shares as proposed by Young (2017).

- a. Adjustment pathway flexibility can be built in by empowering an Authority to place an annual cap on emissions and allocate permits in proportion to the number of shares held as is done in many fishery quota and water allocation systems; and
- b. making the Authority responsible for the adaptive management of the emission reduction pathway as investments are made, emission reduction costs are revealed and technology improves.

2. **Community and family support** for the use of market-based mechanisms secured by guaranteeing to recycle the revenue received from the provision of access to emission certificates to households in the form of a quarterly or an annual payment as suggested by Holden and Dixon (2019).
3. **Undue speculation can be curtailed and increased business confidence** achieved either by making additional permits available for purchase at a pre-determined "ceiling" price or

³⁷ Schmalensee, R. and Stavins, R.N. (2013) The SO₂ allowance trading system: The ironic history of a grand policy experiment. *Journal of Economic Perspectives* 27(1):103–122.

³⁸ The EU's next planned review of its emission trading system is in 2026.

³⁹ The scheme includes Iceland, Liechtenstein and Norway and limits emissions from around 10,000 sites in the electricity, manufacturing and aviation sectors. The greenhouse gas emissions covered in the scheme include CO₂ from electricity and heat generation, oil refineries, steelworks, and production of iron, aluminium, metals, cement, lime, glass, ceramics, pulp, paper, cardboard, acids and bulk organic chemicals and commercial aviation within the European Economic Area. Nitrous oxide (N₂O) from the production of nitric, adipic and glyoxylic acids and glyoxal and perfluorocarbons (PFCs) from the production of aluminium are included. Methane (CH₄) and CFC emissions are not yet included in the system.

⁴⁰ For more information see https://ec.europa.eu/clima/eu-action/eu-emissions-trading-system-eu-ets_en

making top-up permit allocations to shareholders whenever the price rises above a nominated price, as proposed by McKibbin and Wilcoxon (2002, 2008).

4. The **incentive to develop technology at scale and invest in new technology** can be enhanced by guaranteeing share register integrity and making it possible to mortgage shares, as is done in a significant number of fishery and water resource management systems.
5. **Distributional equity** can be achieved by requiring the annual surrender of between 1% and 2% of all shares on the understanding that the revenue generated from the auction of these shares and the money so received be used to support structural adjustment and compensate those who most have to change the way they use resources.

If some combination of the above mechanisms could be added to the EU ETS then implementation of the EU's proposed CBAM could be simplified. In particular, many of the challenges associated with the proposed transition to a system where all emission certificates are sold and none are provided for free could be avoided. In particular, rather than simply reducing the proportion of 'free allocations' by 10% per annum, the EU could decide to convert this component of the ETS into a climate sharing system. The key features of a system, which builds on international experience in the management of fishery and water resources, could include:

- 1) Legislation that would make an Independent Authority responsible for the development and implementation of the EU's climate sharing system.
- 2) An annual cap on total national (or jurisdictional) emissions by greenhouse-gas type and a requirement to distribute emission certificates to those involved in the climate sharing system in proportion to the number of shares held;
- 3) Development of a low-cost, bank-like accounting system that would allow the trading of shares and emission certificates in accordance with pre-specified rules.

- 4) A requirement for the annual surrender of, say, 1% of each shareholding into an auction process on the understanding that all the revenue received would be recycled to households and regions as a compensatory payment designed to make it easier for them to reduce greenhouse-gas emissions.
- 5) Establishment of the share register, certificate accounting, the use monitoring and the trading systems necessary to allow efficient, low-cost implementation.

The result would be a framework that enables separate management of the efficiency and distributional dimensions of the current EU ETS system. The main difference between this suggested approach and the EU's current approach is recognition of the fact that free allocations have value and can be turned into an asset in a manner that can be taxed, used to finance investments in low-carbon technology and enable businesses to manage lumpy investment risks efficiently. Rather than increasing the proportion of emission certificates that have to be purchased, a long-term asset is created and its value taxed at a rate of between 1% and 2%⁴¹ by requiring the annual surrender of a small proportion of each shareholding.

In effect, each shareholder is given a long-term lease or entitlement to their share of the stream of certificates that the EU plans to issue between now and 2050 in return for an annual payment of between 1% and 2% of the market value of these shares.

By adding climate sharing features to the European Union's emission trading system,

- Business certainty could be enhanced;
- Innovation and investment in the development of low-emission technologies could be expedited;
- European citizens could be compensated for the direct household and other costs of reducing greenhouse gas emissions;
- Regions could be guaranteed access to annual funding to enable them to invest in zero-emission infrastructure; and
- Reduce leakage tensions by creating a valuable asset and then charging for its use.

Attention is drawn to the role that climate shares could play in expediting innovation and green investment in the iron, steel, fertiliser and aluminium sectors.

In summary, there is an opportunity for the EU to modify its ETS so as to reduce industry concerns about leakage and, at the same time, enable them to compete more effectively in the search for competitive ways to reduce emissions at less cost than other nations.

⁴¹ The real rate of return of most government-guaranteed assets is typically in the vicinity of 1% and 2% per annum. The suggested surrender and auction system uses a competitive approach to reveal each investor's assessment of the cost of reducing greenhouse gas emissions.

Concluding comments

This paper draws attention to the reality that the European Union, by developing a comprehensive proposal for the implementation of a carbon border adjustment mechanism has gained a significant first-mover advantage in discussions about the most effective way to develop measures for the greening of international trade and that before this proposal is finalised, trading nations would benefit from a more general discussion about the principles that should guide the use of such mechanisms.

As a result, it is suggested that interested parties could consider the development of a framework for the management of the trade-related dimensions of any global environmental problem. Such a framework could be developed by a club of nations or, alternatively, by an existing organisation. A group of nations working through the OECD, for example, or within the WTO system could lead such an initiative. Alternatively, a group of Pacific nations or Asian nations could put a similar initiative together and decide that it was time for them to put an appropriate climate⁴² border adjustment mechanism in place.

Even if there is no attempt to develop such an agreement, there is merit in thinking through the principles that might find their way into a zero draft with a view to assisting the EU to improve its proposed CBAM.

In addition to the development of a set of principles for the management of the international trade-related dimensions of global environmental problems, it is suggested that countries may be interested in developing their own state-of-the-art emissions trading systems.

When exploring opportunities to set up an emissions-trading system, careful consideration could be given to the use of mechanisms that are more flexible and more investment stimulating than the EU ETS. In particular, there are opportunities to design these systems so that two, rather than one, market signals are provided in a manner that increases the incentive for firms to innovate and invest in new technology and, also, for the separate management of distributional issues.

Finally, as part of the suite of opportunities that are emerging, countries may be interested in progressing the development of their own mechanisms for the management of trade-related dimensions of greenhouse gas emissions and other global environmental issues.

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About the author

Mike Young is an Emeritus Professor in Energy, Water and Environmental Policy at the University of Adelaide and was the Founding Executive Director of its Environment Institute. He has held the Gough Whitlam and Malcolm Fraser Chair in Australian Studies at Harvard University and is a fellow of the Academy of Social Sciences in Australia.

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⁴² Use of the word “carbon” is misleading. Carbon dioxide is only one of the causes of global warming.

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Further enquiries

The University of Adelaide SA 5005 Australia
enquiries iit01@adelaide.edu.au
phone +61 8 8313 6900
web iit.adelaide.edu.au