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As part of its Green Deal, the European Union is currently preparing a "Carbon Border Adjustment Mechanism" (CBAM). A CBAM applies carbon pricing to imports with the objective of mitigating concerns about carbon leakage. To reduce complexity, it is likely the EU will rely on "default" values in determining the carbon intensity of imports to which its CBAM will apply. In this paper, we suggest that a CBAM based solely on default intensities runs counter to the economic logic of carbon pricing by distorting the incentives for emissions abatement. Instead we propose a CBAM design with a voluntary "individual adjustment mechanism" (IAM) that allows producers to demonstrate that their *actual* carbon intensity lies below the default value. We argue that the use of an IAM captures additional economic benefits of carbon pricing—notably providing more efficient abatement incentives—and improves the overall legal prospects of a CBAM being found to comply with international law and WTO rules. We discuss practical considerations around the implementation of an IAM, and illustrate with a short case study on the steel sector.

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1. Introduction

As part of its European Green Deal and the vision of climate-neutrality, the European Union (EU) is currently preparing the design and implementation of a "Carbon Border Adjustment Mechanism" (CBAM), more generically also referred to as a "border carbon adjustment" (BCA). The CBAM is meant to extend the geographic reach of the EU's carbon price by applying it to products imported from non-EU countries. Such products could include electricity and fuels, basic industrial materials like steel, aluminium and cement, or more complex semi-manufactured and manufactured goods.[3] Applying a CBAM can ensure that the price of imports more accurately reflects

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[3] For the purposes of the proposal presented in this paper, the exact product coverage of the CBAM is not decisive, but in Section 4.4 below we include a case study that assumes steel imports are covered.

their carbon content, and thereby helps mitigate long-standing concerns about carbon leakage (the relocation of emissions from the EU to non-EU countries without a reduction in overall emissions). For a combination of technical, administrative, and legal reasons discussed in this paper, it is likely that the EU will rely on "default" values when determining the carbon intensity of imports, instead of determining carbon intensity individually at product level.[4]

In this paper, we argue that a CBAM based solely on such default values comes with economic and legal drawbacks, and that a CBAM design based on an "individual adjustment mechanism" (IAM) offers a superior policy option for the EU. An IAM allows application of the CBAM based on a product's *actual* carbon intensity, thus taking into account the producer's decarbonization efforts. Furthermore, making the IAM voluntary allows it to be used alongside a default intensity, but gives companies exporting to the EU the option to demonstrate that their actual carbon intensity lies below the default value. This sidesteps several obstacles under international law that would arise from making the disclosure of individual carbon intensities mandatory within the CBAM.

A CBAM based solely on a default intensity is a "one size fits all" policy that runs somewhat counter to the economic logic underlying the use of carbon pricing to combat climate change. It has two main economic drawbacks. First, relatively clean producers get overcharged compared with high-carbon rivals. Second, it provides no incentives for abatement; the only way for a non-EU producer to reduce its carbon costs is to reduce its sales to the EU. Taken together, this means that key benefits of carbon pricing are lost—in a way that distorts abatement incentives and favours less climate-efficient foreign producers. This also has legal ramifications: first, because domestic producers have to report their actual emissions, the use of default intensities for imported goods treats domestic and foreign products differently, and therefore risks being perceived as discriminatory. Moreover, by sacrificing the incentivising effect of carbon pricing, a default intensity is less likely to be considered justified on environmental grounds. Both factors increase the risk of a violation of international trade law.

We argue that our proposal of a voluntary IAM brings significant economic and legal benefits relative to a default CBAM design—and is practically implementable building on existing architecture for emissions verification in the EU Emissions Trading Scheme (ETS). The IAM (partially) addresses the economic drawbacks identified: relatively clean producers are now no longer disadvantaged, and efficient abatement incentives are at least partially restored in that reductions in actual carbon intensities can pay off. The inclusion of an IAM also lowers the burden of information on the EU regarding the carbon intensities of foreign producers, and improves the prospects that a CBAM will be found in alignment with World Trade Organization (WTO) rules. An IAM can help ensure greater symmetry in the treatment of domestic and foreign goods by allowing foreign producers to undergo the same process of measurement, verification and reporting (MRV) of emissions that domestic producers face under the EU ETS.

[4] Such a default value can have different levels of stringency, ranging from "best in class" to "worst in class" for a particular product. This includes a notional average carbon intensity of all imports into the EU or a particular intensity decile; an example of the latter is the best 10% percentile that currently provides the benchmark for free allowance allocation to trade-exposed sectors in the EU ETS.

Past case law, specifically the affirmation by a GATT panel of a border tax adjustment by the United States on imports related to feedstock chemicals, supports our legal assessment.

The paper discusses economic, legal and practical considerations around a voluntary IAM. Section 2 sets out a simple economic framework to understand the potential advantages of an IAM over the sole use of default intensities. It also discusses concerns about "resource shuffling" as well as accommodating continued free allocation to EITE sectors and carbon pricing outside the EU in CBAM design. Section 3 discusses legal aspects with a focus on how an IAM can improve legal feasibility of a CBAM in terms of WTO law. Section 4 addresses practical considerations around the implementation of an IAM, including emissions verification and a short case on the steel industry. Section 5 concludes.

2. Economic considerations

2.1 CBAMs and principles of carbon pricing

From an economic perspective, the ideal policy is a uniform global carbon price that covers all countries and sectors. Following the logic of Pigou (1920) and Montgomery (1972), this price should be set at the social cost of carbon (SCC).[5] Such a policy provides the correct incentives to internalize the climate externality, in line with the "polluter pays" principle. Stern & Stiglitz (2017) estimate that the dynamic trajectory of a target-consistent global carbon price that is in line with the ambition of the Paris Agreement rises up to \$50–100/tCO_2 by 2030.[6] As a market-based measure, its core appeal lies in achieving emissions abatement in a globally cost-effective manner. The use of carbon pricing is gradually spreading across jurisdictions (World Bank 2020) but still falls well short of an efficient global policy benchmark.

The EU is now seeking to extend the geographic reach of its carbon price signal by introducing a CBAM that applies to imports into the EU. Its idea is summarized as follows: "Carbon leakage occurs when production is transferred from the EU to other countries with lower ambition for emission reduction, or when EU products are replaced by more carbon-intensive imports... a carbon border adjustment mechanism would ensure that the price of imports reflects more accurately their carbon content" (European Commission 2020a). In short, a CBAM can level the playing field in carbon costs between domestic production and imports, and therefore mitigate the risk of carbon leakage. For a combination of technical, administrative, and legal reasons, it looks likely that the EU may rely on "default" values when determining the carbon intensity of imports at the product level which apply uniformly regardless of the country of origin.[7]

The use of a CBAM based on default carbon-intensities runs somewhat counter to the economic logic of carbon pricing.[8] This logic revolves around the carbon price

[5] Rubin (1996) extends this logic to dynamic emissions trading in an intertemporal context.
[6] Stern & Stiglitz (2017) emphasize that complementary policies would be in place alongside carbon pricing; without these, the required carbon-price trajectory may be significantly higher.
[7] We further discuss different choices of the default intensity in Section 4.2.
[8] Arguably it also runs counter to the market-based spirit of the EU ETS which the European Commission has regularly defended since its inception in 2005.

providing incentives that lead to the marginal cost of abatement being equalized across producers—therefore minimizing the overall cost of emissions abatement. A crucial feature is that polluters pay the carbon price according to their *actual* carbon intensity. Instead, relying on a default intensity becomes more akin to a "one size fits all" policy which inevitably raises the overall abatement cost (Newell & Stavins 2003). In practice, carbon intensities can vary widely even within industrial sectors (Lyubich, Shapiro & Walker 2018), so market-based flexibility becomes key to cost-effective decarbonization. So, in principle, there is a good economic case for trying to go beyond the use of default intensities in a border carbon adjustment.

2.2 A framework for understanding CBAM design options

It will be helpful to use a simple economic framework to understand different CBAM design options. Suppose that the EU's carbon price is given by t (measured in €/tCO_2) within the EU ETS. Consider a product i that is produced by a company j based in a country k outside the EU and suppose that its *actual* carbon intensity (i.e., emissions per unit of output) is given by z_{ijk}. Suppose, for now, that this company faces a zero (or very low) domestic carbon price and that the introduction of a CBAM leads to the discontinuation of free allowance allocation to EU-based companies.

A CBAM based solely on a default intensity treats each non-EU[9] firm in the sector that sells product i as having carbon intensity Z_i, regardless of its identity j and location k. So the default CBAM involves a carbon cost of $t \times Z_i$ being applied at the border to each unit of imported product from company j. This framework illustrates how a default CBAM comes with two economic drawbacks. First, there is a static inefficiency: any firm that is cleaner than the default intensity ($z_{ijk} < Z_i$) gets overcharged relative to its actual carbon intensity (and relative to rivals with above-default intensities); this runs counter to the cost-effectiveness property of carbon pricing. Second, there is a dynamic inefficiency: given that the CBAM is based on a default intensity beyond its control, the only way for a firm to reduce its carbon costs is to reduce its sales to the EU; put differently, there is no incentive to engage in abatement that reduces its carbon intensity. Taken together, this means that key benefits of carbon pricing are lost—in a way that favours high-carbon companies.

Following the economic logic of carbon pricing, the ideal way to correct these static and dynamic drawbacks would be for the CBAM to instead be based on firms' *actual* carbon intensities. This would yield a per-unit carbon cost of $t \times z_{ijk}$ being applied at the border so the resulting carbon price faced by company j is identical to that if it were instead located within the EU. Hence this would restore cost-effectiveness and other desirable properties of carbon pricing. However, as noted in the introduction (and explained further in Section 3.3 below), this type of mandatory product-by-product CBAM is likely to be infeasible from a legal perspective.

This leads us to the idea, supported by the legal analysis in the next section, of designing a CBAM with a voluntary individual adjustment mechanism (IAM). This design retains a default intensity but gives the option to companies exporting to the EU to demonstrate that their actual carbon intensity lies below the default value. This

[9] Our exposition here assumes that the liable party under the CBAM will be the foreign exporter; if, however, EU-based importers were designated the liable party, similar arguments would still apply.

yields a carbon cost of t x min$\{z_{ijk}, Z_i\}$ at the border, reflecting that company j can choose the lower of its actual and the default intensity. This voluntary IAM partially addresses the two economic drawbacks identified: (1) relatively clean producers are now no longer disadvantaged, and (2) efficient abatement incentives are partially restored in that reductions in actual carbon intensities can pay off. So, while this design still falls short of a Pigouvian ideal, it can be a significant improvement on the default CBAM design; Figure 1 illustrates. The additional complexity of an IAM comes with increased implementation costs, which we discuss further in the following sections; at the same time, however, a voluntary IAM helps shift the informational burden concerning carbon performance from the regulator to the firms themselves. The remainder of this section discusses other concerns and design features of an IAM as part of CBAM design.

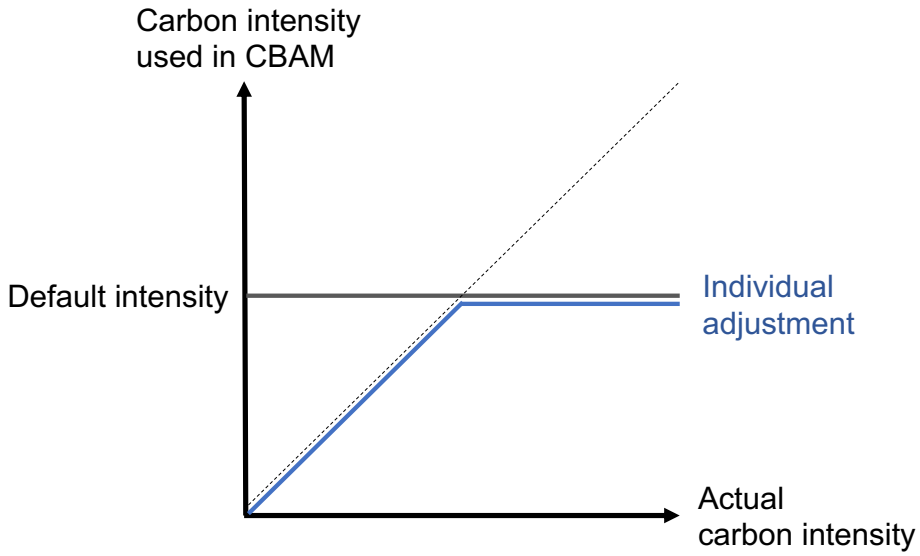

Figure 1. Comparison of default CBAM and individual adjustment mechanism

2.3 Resource shuffling and carbon leakage

Resource shuffling (or "reshuffling") has been an important concern for California's border carbon adjustment on electricity imports from other US states. The California Air Resources Board defines reshuffling as "any plan, scheme, or artifice to receive credit based on emissions reductions that have not occurred, involving the delivery of electricity to the California grid" (CARB 2011). For example, a Californian utility that previously imported coal-fired power might, in response to a border carbon price seek to replace this contract with gas-fired power—with the coal-fired power instead being sold in another state. California's regulation has nominally prohibited such reshuffling—but this has in practice been difficult to enforce (Fowlie & Cullenward 2018; Pauer 2018). Resource shuffling is essentially a form of gaming the system: holding fixed existing trade flows, production from cleaner installations that would have otherwise gone to a third jurisdiction is used to contractually substitute for dirtier production so as to reduce exposure to the border adjustment, with zero effect on overall emissions. With a CBAM based solely on a default carbon intensity, there is no incentive to engage in reshuffling—but such concerns do arise under an IAM.

There are important differences between the Californian experience and an EU CBAM that applies to EITE industrials. California's border adjustment is a sub-national policy that has in-state companies pay a border carbon price on imported electricity; the EU's CBAM would instead have foreign companies pay a border carbon price on exports to the EU. These differences have implications in terms of the potential for resource shuffling. First, reshuffling concerns are perhaps most acute for electricity markets due to the large heterogeneity in carbon intensities between generation technologies combined with the flexibility of trading arrangements in wholesale power markets. By contrast, industrial sectors have different contractual arrangements between buyers and sellers and may also have less variation in carbon intensities. Second, while Californian electricity importers might reshuffle contracts "intra-market" by switching from a dirty to a cleaner supplier, industrial companies exporting to the EU and liable to pay the CBAM could reshuffle contracts only "intra-company" from dirty to cleaner installations under the same corporate ownership (provided these can make the same EU-bound product). Taken together, these points suggest that concerns about reshuffling may be significantly less pronounced under an IAM for industrial sectors than they have been for California's border adjustment on electricity imports. We return to the question of how policy can further mitigate resource shuffling in our discussion in Section 4.3 of practical considerations around the implementation of an IAM.

At the same time, the introduction of a CBAM is likely to also have *market-based* impacts in form of carbon leakage that are distinct from resource shuffling. To see the logic, consider a producer that exports to the EU and to the rest of the world. Suppose that all of its production has the same carbon intensity so that there is no motive for resource shuffling. An EU CBAM will, all else equal, make domestic sales in its own country as well as exports to the rest of the world look relatively more (cost-) attractive. Hence the market-based impact of the CBAM may be lower sales to the EU but higher sales to 3rd countries—which can be seen as a form of carbon leakage. This is distinct from reshuffling: it is not driven by contractual gaming of existing trade flows but rather by profit-maximization across multiple export markets. Such market-based third-country leakage effects would be likely both under a default CBAM and an IAM. Since relatively clean exports experience a lower cost increase with an IAM than under the default CBAM, this may help mitigate this type of leakage.[10]

2.4 Other CBAM design features

To complete our economic analysis, we now incorporate two other features of CBAM design: the continued presence of free allocation within the EU and carbon pricing outside the EU. Both apply to CBAM design in general, and are not specific to an IAM.

Free allocation to EITE sectors. The above analysis assumes that the introduction of a CBAM leads to free allocation to EITE sectors being discontinued. In practice, this process may be phased such that free allocation co-exists with a CBAM over a

[10] Comparing market-based leakage effects under a default CBAM with those under an IAM would require an economic model of multimarket competition, and the answer may hinge on the finer details of the competitive environment.

transition period.[11] This would necessitate adjustments to our formulae for carbon-price equalization. A simplified application to the EU ETS goes as follows. Suppose that y_i^* is the carbon intensity of the best 10% percentile EU producer in an EITE sector. Under current allocation rules, this company receives just enough free allocation to cover its compliance obligation; EU producers with a higher carbon intensity are left with a (post-allocation) compliance gap. Consider, again for product i, an EU producer j with a carbon intensity of $y_{ij} > y_i^*$, receiving free allocation covering a fraction $f_{ij} = y_i^*/y_{ij} \in (0,1)$ of its emissions (per unit of output). Therefore, we can conceptualize an average degree of free allocation $f_i = \text{average}(f_{ij}) \in (0,1)$ across EU companies selling product i, with an average carbon intensity $y_i = \text{average}(y_{ij})$. This leads to an allocation-adjusted carbon cost under the IAM of $t \times \max\{0, \min\{z_{ijk}, Z_i\} - f_i \times y_i\}$, reflecting the watering down of the EU carbon price for EITE sectors from its headline level t.[12] To illustrate, a non-EU producer cleaner than the default intensity, $z_{ijk} < Z_i$, would face an IAM carbon cost of $t \times [z_{ijk} - f_i \times y_i]$, unless its actual intensity is so low in that $z_{ijk} < f_i \times y_i$, in which case its carbon cost is zero. For another example, suppose that the CBAM's default intensity were set at the average EU carbon intensity and that the non-EU producer is less clean, $Z_i = y_i < z_{ijk}$; the formula for the carbon cost simplifies to $t \times Z_i(1 - f_i)$, reflecting the 'dilution' of the EU carbon price due to free allocation.

Carbon pricing outside the EU. The above analysis assumes that the country outside the EU has a zero carbon price. While this assumption is currently applicable in a wide range of cases, carbon pricing has been picking up in the rest of the world. Suppose instead that producer j's product i faces a domestic carbon price t_{ijk} in its country k so that $\Delta t_{ijk} = \max\{t - t_{ijk}, 0\}$, is the shortfall in its carbon price relative to the EU. This adjusted carbon-price differential could then be used for the CBAM. For example, under an IAM, the "top up" carbon price at the border would become $\Delta t_{ijk} \times \min\{z_{ijk}, Z_i\}$, and therefore vary by country of import.[13] From an economic viewpoint, this top-up feature has the attractive property of ensuring carbon-price equalization over time by adjusting to enhanced carbon pricing in non-EU countries—thus providing an incentive for other countries to adopt a carbon price.

The above adjustment is in terms of "explicit" carbon prices that are determined within a cap-and-trade system like the EU ETS or by a carbon tax. It does not attempt to incorporate "effective" carbon prices due to non-price policies that implicitly place a price on carbon; this includes taxes on road fuels, renewable support schemes, fossil fuel subsidies, and compensation schemes for indirect carbon costs due to increased power prices. The plethora of such policies makes estimating effective carbon prices very challenging, and there is currently no standard methodology. Moreover, any such

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[11] A related point is that a CBAM will likely apply only to imports and therefore cannot level the playing field in terms of the carbon competitiveness of EU exports to foreign markets, which creates a rationale for the continued use of free allocation for exports (Evans, Mehling, Ritz & Sammon 2020).

[12] A caveat is that this simple calculation adjusts the carbon price purely based on accounting of free allocation, without incorporating the impact on economic incentives (e.g., on a firm's marginal cost of production). Current EU allocation rules are a complex hybrid with elements of grandfathering, output-based allocation and an emissions performance standard (due to benchmarking); working out its impact on economic incentives would require more detailed analysis.

[13] A producer based in a country with a carbon price *above* the EU level would then be exempt from CBAM-related payments (and its country could apply a CBAM on its imports from the EU).

estimates of effective carbon prices would also vary by EU Member State, creating additional complexity in the calculation of a border carbon adjustment.[14]

Finally, we can extend the formula to account for both carbon pricing outside the EU and free allocation within the EU ETS. This leads to a carbon cost under the IAM of $\Delta t_{ijk} \times \max\{0, \min\{z_{ijk}, Z_i\} - f_i \times y_i\}$. For simplicity, this assumes that the carbon price in the non-EU country itself is either a carbon tax or an auctioned ETS, i.e., it does not have any free allowance allocation. In general, the appropriate adjustment of a CBAM for carbon pricing outside the EU would need to take into account the specific design of free allocation (and potentially of other support policies).

Section 3: Legal considerations

3.1 International trade law

While the introduction of a CBAM raises legal questions in more areas than one, international trade law is particularly relevant because of how the measure will be applied to goods traded across national borders. From the earliest announcement of the CBAM in Ursula von der Leyen's political guidelines to various subsequent statements and documents, the European Commission and its President have consistently emphasised the need to ensure that it be "fully compliant with World Trade Organization rules" (von der Leyen 2019; similarly European Commission 2019a; European Commission 2020a). As will be shown in this section, the inclusion of an IAM improves the prospects that a CBAM will be found in alignment with World Trade Organization (WTO) rules.

At the heart of the WTO regime lies the General Agreement on Tariffs and Trade (GATT), which dates back to 1947 and is a legally binding international treaty with broad membership. According to its preamble, the GATT aims at a "substantial reduction of tariffs and other barriers to trade" and at "the elimination of discriminatory treatment in international commerce." A central tenet of the GATT – and a cornerstone of the multilateral trading system – is the principle of non-discrimination in international trade. For trade in goods, it consists of two elements: the most-favoured-nation (MFN) treatment obligation, set out in Article I of the GATT, and the national treatment (NT) obligation, set out in Article III of the GATT.

Article I:1 of the GATT prohibits parties from discriminating between "like" products originating in, or destined for, any other party, whereas Article III of the GATT prohibits discrimination between domestic products and "like" imported products. What constitutes "likeness" of domestic and imported products is not defined in the GATT, but has been determined in relevant case law based on whether they share

[14] Because the CBAM, as currently discussed, will only adjust for the explicit carbon price paid by EU producers under the EU ETS—and not other climate-related policies, such as energy taxes—it can also be argued that such non-price policies do not need to be taken into account to ensure symmetry between EU and foreign producers (unless perhaps the foreign jurisdiction relies solely on non-price policies to curb emissions from the same activities as those covered by the EU ETS, but this would raise significant methodological and likely also political – e.g. lobbying – challenges).

common physical characteristics and properties, end uses, and tariff classifications; whether they compete in the marketplace; and relevant consumer preferences.[15]

Importantly, differences in the processes and production methods (PPMs) that do not leave a physical trace in the final product – such as the source of energy used during production – are not generally considered to affect the likeness of products.[16] Although the jurisprudence on "like" products remains inconclusive and has seen some evolution in recent case law,[17] there is a high probability that goods produced with low-carbon PPMs and carbon-intensive goods would be considered "like" products, despite their different carbon footprints. Any differentiation between such products that leads to a competitive disadvantage could thus be considered discriminatory (Pauwelyn 2013).

Under international trade law, treating domestic and imported goods differently based on the carbon intensity of their production therefore incurs a risk of judicial challenge (Mehling et al. 2019). A CBAM that imposes a greater compliance burden on carbon-intensive imports than that faced by less carbon-intensive domestic products, for instance, could be considered discriminatory. Because such differentiation on the basis of (actual or assumed) carbon intensity is intrinsic to the notion of a CBAM, however, and because – as shown in the preceding section – differentiation is critical to its environmental effectiveness, it is difficult to envision how the EU can altogether avoid risking a violation of the principle of non-discrimination set out in the GATT.

For the same reason, the literature on border carbon adjustments has routinely highlighted the importance of Article XX of the GATT, which can provisionally justify measures that would otherwise be considered discriminatory (Condon & Ignaciuk, 2013). Two such general exceptions relate to measures "necessary to protect human, animal or plant life or health" (Article XX(b)) or "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption" (Article XX(g)). Both the wording of these provisions and their broad interpretation in past case law suggest that measures aimed at reducing greenhouse gas emissions can fall under either exception (UNEP & WTO 2009).

Several conditions need to be met for Article XX(b) and (g) to be successfully invoked, however, including two that have a bearing on the legal implications of an IAM: the need for a sufficient connection between the CBAM and its environmental objective, which is inferred from the wording "necessary to" and "relating to"; and a requirement that the measure not be applied in a manner which would constitute "a means of arbitrary or unjustifiable discrimination between countries where the same conditions prevail", which is derived from the introductory paragraph – or "chapeau" – of Article XX.

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[15] Appellate Body Report, *Japan – Taxes on Alcoholic Beverages*, WT/DS8/AB/R, WT/DS10/AB/R, WT/DS11/AB/R, adopted 1 November 1996, 20-21; Appellate Body Report, *EC – Measures Affecting Asbestos and Asbestos-containing Products*, WT/DS135/AB/R, adopted 5 April 2001, para. 99.

[16] Going back to, notably, Panel Report, *United States – Restrictions on Imports of Tuna*, DS21/R, DS21/R, 3 September 1991, unadopted.

[17] See, for instance, Panel Report, *United States – Measures Concerning the Importation, Marketing and Sale of Tuna and Tuna Products*, WT/DS381/R, adopted 13 June 2012, para. 7.78; more generally also Potts 2008.

When applied to the concept of an IAM, the foregoing considerations imply the following two takeaways: first, an IAM can help ensure greater symmetry in the treatment of domestic and foreign goods by allowing foreign producers to undergo the same process of measurement, verification and reporting (MRV) that domestic producers face under the EU ETS. It is safe to assume that only foreign producers who are less carbon-intensive than the default intensity applied by the EU will avail themselves of the voluntary IAM, whereas those who are more carbon-intensive will be treated as if they were as carbon-efficient as the default intensity. All else being equal, this would mean that foreign goods will be treated as or more favourably than domestic goods with the same carbon intensity, lowering the likelihood that the CBAM violates Article III of the GATT.

Second, if products with different carbon intensities are considered "like" products despite their different carbon footprints, the CBAM still risks being considered discriminatory because relatively less carbon-intensive EU products will in some cases face a lower compliance burden than relatively more carbon-intensive foreign products. In that case, the admissibility of the CBAM depends on whether it can be provisionally justified by one or more of the general exceptions under Article XX of the GATT. As mentioned earlier, Article XX(b) and (g) are the exceptions of greatest relevance in this context, and both require a sufficient connection between the measure and its environmental objective. The previous section already highlighted how an IAM improves the environmental effectiveness of the CBAM by providing a stronger incentive for foreign producers to reduce their carbon intensity. Additionally, by ensuring greater symmetry in the treatment of domestic and foreign products, the IAM also helps meet the requirements of the "chapeau" of Article XX.

Past case law supports this assessment: in the *United States – Superfund* case, a GATT panel affirmed a border tax adjustment imposed by the United States under the Superfund Amendments and Reauthorization Act of 1986 (SARA) on certain imported substances produced from feedstock chemicals subject to a domestic excise tax.[18] Importers were required to furnish the information necessary to determine the amount of feedstock chemicals and thus of tax to be imposed, but if they failed to do so, the United States was authorized to apply a default – or baseline – rate equal to the predominant method of production in the United States. According to the panel, this approach was sufficient to demonstrate equivalence under Article III of the GATT between the domestic excise tax and the border measure applied to imports.[19]

In a more recent case, *United States – Reformulated Gasoline*, the Appellate Body conversely held that a rule under the Clean Air Act regulating the composition and emission effects of gasoline to prevent air pollution was discriminatory by setting out different calculation methods for domestic and foreign gasoline.[20] In particular, the

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[18] Panel Report, *United States – Taxes on Petroleum and Certain Imported Substances*, L/6175 – 34S/136, adopted 17 June 1987. In assessing whether this border adjustment complied with the national treatment obligation, the panel cited Article III of the GATT, stating that it 'permits the imposition of an internal tax on imported products provided the like domestic products are taxed, directly or indirectly, at the same or a higher rate', see ibid., para. 5.2.7.

[19] Ibid., para. 5.2.9.

[20] Appellate Body Report, *United States – Standards for Reformulated and Conventional Gasoline*, WT/DS2/AB/R, adopted 20 May 1996.

Appellate Body objected to the fact that importers were subject to a default "statutory baseline" that had no connection to the particular gasoline imported, while refiners of domestic gasoline were assessed against an individual baseline representing the quality of gasoline produced by each refiner. This, so the Appellate Body, constituted an "unjustifiable discrimination" and a "disguised restriction on international trade" in the context of Article XX(g) of the GATT.[21] It also rejected practical arguments that verification on foreign soil, and subsequent enforcement actions, would be so difficult as to rule out individual baselines. Here, the Appellate Body pointed to the possibility of relying on documentary evidence provided by the foreign refiners themselves – citing, inter alia, the option of third-party verification – and also highlighted the importance of cooperation on such administrative arrangements.[22]

Box 1: Mechanisms for individual adjustment in the United States

In the two cases cited above, the United States applied – or explored the introduction of – variations of an IAM. In the first case, the inclusion of an individual adjustment component was part of a border tax adjustment for imported substances produced from chemicals subject to an excise tax domestically. It was introduced through an amendment of the Internal Revenue Code (IRC) by way of the Superfund Amendments and Reauthorization Act (SARA) of 1986, which reauthorized the so-called "Superfund" program designed to investigate and clean up sites contaminated with hazardous substances. §4671 of the IRC sets out the border tax adjustment by imposing "a tax on any taxable substance sold or used by the importer thereof." §4671(b)(1) goes on to state that the amount of the tax imposed "shall be the amount of the tax which would have been imposed … on the taxable chemicals used as materials in the manufacture or production of such substance if such taxable chemicals had been sold in the United States for use in the manufacture or production of such taxable substance." §4671(b)(2) specifies a penalty rate for imported substances in cases where "the importer does not furnish to the Secretary [of the Treasury] (at such time and in such manner as the Secretary shall prescribe) sufficient information to determine under paragraph (1) the amount of the tax imposed." This rate, set at "5 percent of the appraised value of such substance as of the time such substance was entered into the United States for consumption, use, or warehousing", was deemed discriminatory by the panel in the *US – Superfund* case. According to the panel, however, the subsequent provision allowed for a non-discriminatory approach to the challenge of insufficient information. §4671(b)(3) authorizes the Secretary to "prescribe for each taxable substance a tax which, if prescribed, shall apply in lieu of the tax specified in paragraph (2) with respect to such substance" and "shall be equal to the amount of tax which would be imposed by subsection (a) with respect to the taxable substance if such substance were produced using the predominant method of production of such substance."

In the second case, concerning a section of the Clean Air Act on reformulated gasoline introduced in 1990, the challenge revolved around a section on "anti-dumping rules" and delegated regulations that treated imported gasoline differently from domestic gasoline by denying it the opportunity to establish an individual baseline. A stated above, the Appellate Body held this approach to constitute "unjustifiable discrimination" and a "disguised restriction on international trade." In its reasoning, the Appellate Body affirmingly cites a rulemaking process which the Environmental Protection Agency (EPA) initiated in 1994, but subsequently abandoned. It would have added a new §80.84 to Part 80 of Title 40 of the Code of Federal Regulations, creating the

[21] Ibid., 29.

[22] An exception could only apply for cases where "the source of imported gasoline could not be determined or a baseline could not be established because of an absence of data", see ibid., 27.

option of individual baselines for foreign refineries.[23] To initiate the process, foreign refiners would have been able to submit a petition to the EPA including data verified by an auditor, who in turn had to be a U.S. citizen. Such petition should contain a signed declaration attesting the completeness and accuracy of the information contained in the petition, and committing to grant "any EPA inspector or auditor immediate and complete access" to relevant premises, regardless of whether such inspections are announced or unannounced. Gasoline from such refiners could not be combined with gasoline from any other sources prior to its entry into the U.S., and each shipment of gasoline would have to be accompanied by an analysis of batch samples at various stages of shipment by an independent, U.S.-based laboratory. Finally, a U.S.-based certified public accountant would have to annually perform an "attest engagement" to determine the accuracy of gasoline inventory reconciliation and other relevant data.

To conclude, thus, the analysis of relevant legal provisions and case law suggests that an IAM improves the prospects of the CBAM being found in compliance with WTO rules, and thereby helps it align with the stated intention of the European Commission mentioned at the outset of this section.

3.2 International environmental law

Under the Paris Agreement, an international climate treaty adopted in 2015 with nearly universal participation, parties agreed that the pace and ambition of domestic climate efforts is to be decided at the national level. According to Article 4(2) of the Paris Agreement, it is up to each party to "prepare, communicate and maintain successive nationally determined contributions that it intends to achieve"; Article 4(3) goes on to state that successive contributions should reflect each party's "common but differentiated responsibilities and respective capabilities, in the light of different national circumstances."

A CBAM could be held to contravene this fundamental principle if it were considered a unilateral measure that coerces other countries to increase their domestic climate efforts in order to avoid or limit compliance obligations for products entering the EU. Whether the Paris Agreement, whose overarching objective is to "strengthen the global response to the threat of climate change" (Article 2(1)), can be interpreted to limit unilateral action if such action – like the CBAM – is primarily aimed at increasing climate ambition, is debatable; be that as it may, an IAM would arguably alleviate such concerns because, relative to a default intensity, it affords foreign producers greater flexibility. The ability to demonstrate actual carbon intensities of foreign products may, in turn, reduce pressure on the respective countries to change existing or adopt new policies mandating lower carbon intensities across the board in order to satisfy the relevant EU default threshold.

3.3 General international law

Finally, by seeking to influence policy choices in foreign jurisdictions and basing its calculation on physical processes taking place on foreign territory, a CBAM could be considered an extraterritorial measure that infringes on the territorial sovereignty of affected trade partners. Territorial sovereignty comprises the right of states to exercise

[23] Environmental Protection Agency, *Notice of Proposed Rulemaking: Regulation of Fuels and Fuel Additives: Individual Foreign Refinery Baseline Requirements for Reformulated Gasoline*, Federal Register, Vol. 59, No. 84, 3 May 1994, 22800-22814.

state authority within their territory, and manifests itself in the principle of non-intervention in the internal affairs of other states.[24] Unilateral measures that take into account circumstances within foreign territory risk being considered a violation of that principle and of the *domaine réservé* of affected states.

In a case involving the inclusion of international aviation in the EU ETS, the European Court of Justice (ECJ) held that a climate policy measure covering foreign entities and based on activities occurring, at least in part, over foreign territory "did not infringe the principle of territoriality" because the entities were physically located within the EU when the measure was applied.[25] Although a similar reasoning could be applied to the CBAM because it will only be applied once imports enter the territory of an EU Member State, the ECJ decision was by no means free of controversy (Hartmann 2013). More generally, coercive action taken by one state to secure a change in the policies of another is likely to constitute an intervention in the internal affairs of the latter (Jamnejad & Wood 2009), underscoring the risk associated with any mandatory policies.

A voluntary IAM can mitigate any residual risk under general international law and the principle of territoriality. It obviates the need for the EU to collect emissions and production data from foreign entities, or to mandate the disclosure of such data. Aside from being difficult to enforce in foreign territory, such mandatory requirements would be more likely to face challenge as an intervention in the internal affairs of affected states. Instead, the combination of a default intensity with a voluntary IAM ensures that any consideration of activities on foreign territory, and any related action taken by foreign entities, occur on a purely voluntary basis. Consequently, the IAM lowers the risk of the CBAM being considered a violation of the sovereignty of affected trade partners.

4. Practical considerations

4.1 Formal considerations

When thinking about the practical implementation of an IAM, the language found in U.S. legislation and rulemaking proposals (see above, Box 1) as well as a Non-Paper introduced into the European policy discussion in 2016 by the French government to stimulate consideration of a border adjustment for the EU ETS (France 2016) provide useful reference. All of these contain elements relevant to an IAM. Additionally, the Committee on the Environment, Public Health and Food Safety (ENVI Committee) of the European Parliament proposed legislative language related to a border carbon adjustment in 2016 which, although ultimately not adopted, includes consideration of the relevant legal process (European Parliament 2016).

As a design feature of the CBAM, an IAM would most likely be operationalised as part of the same process introducing the CBAM. While it remains unclear at this point what

[24] Deriving it from the principle of sovereign equality of states enshrined in Article 2(1) of the Charter of the United Nations: International Court of Justice, *Military and Paramilitary Activities in and against Nicaragua (Nicaragua v. U.S.)*, Merits, Judgment of 27 June 1986, [1986] ICJ Rep. 14, para. 202.

[25] European Court of Justice (ECJ), Case C-366/10, *Air Transport Association of America and Others v. Secretary of State for Energy and Climate Change*, Judgment of the Court of 11 December 2011, 2011 I-13755, para. 125.

type of policy instrument the European Commission will propose to implement the CBAM,[26] the political and economic gravity of this measure suggests that all options will necessitate formal legislation, as set out in Articles 289 *et sqq.* of the Treaty on the Functioning of the European Union (TFEU). In its amendment proposals, for instance, the ENVI Committee sought inclusion of a provision in the EU ETS Directive[27] to enact the border carbon adjustment, and would have authorized the Commission to adopt delegated acts "specifying the exact design of the detailed requirements for this scheme" (European Parliament, 2016).

In the following analysis, we assume that legislative implementation of the CBAM will follow the approach envisioned by the ENVI Committee. In other words, we assume that the carbon price which the CBAM seeks to adjust is that revealed in the allowance market under the EU ETS, and that the CBAM will be implemented through an amendment to the EU ETS Directive. Even if the CBAM is operationalised through an independent act, however, such as a newly introduced customs duty or tax on imports, the design considerations for an IAM outlined below will apply *mutatis mutandis*. Only if the EU ETS is altogether replaced with, for instance, a new carbon tax on both domestic and imported products, certain aspects – such as the methodology for determination of carbon intensity – may have to be elaborated separately.

Formal operationalisation of an IAM could, thus, be most easily achieved by including a relevant provision in the legislative text establishing the CBAM. While technical details could be set out in delegated acts adopted by the Commission pursuant to Article 290 TFEU, the cornerstones of the IAM should be set out at the same level as the CBAM and in sufficiently determinate language to adhere with the principles of legality and legal certainty that flow from the commitment to the rule of law in Article 2 of the Treaty on European Union (TEU). At a minimum, this would necessitate a clear indication that importers have the voluntary option to request an individual adjustment, the main conditions for doing so, and the fallback to a default carbon intensity if the option is not exercised or its conditions are not met. Procedurally, an amendment of the EU ETS Directive would occur through co-decision and with qualified majority voting as set out in Article 294 TFEU. Text Box 3 below illustrates how such a provision could be worded.

4.2 Functional considerations

Functionally, the IAM provision would enable importers to avoid the compliance obligation that otherwise results from application of the default carbon intensity values specified for different products under the CBAM. Such default carbon intensities can be set at very different levels, ranging from the assumption that foreign producers are highly carbon intensive and emit as if they had implemented the "worst available technology" to a sectoral average carbon intensity in a particular geographic

[26] Without ruling out additional design options, the Commission has indicated that it is evaluating three different types of policy instrument: a carbon tax on certain imported and domestic products, a new carbon customs duty or tax on imports, or the extension of the EU ETS to imports (European Commission 2020).

[27] Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 Establishing a Scheme for Greenhouse Gas Emission Allowance Trading within the Community and Amending Council Directive 96/61/EC, OJ L275/32, 25 October 2003 (as amended).

context, all the way to different "best available technology" or "best performer" benchmarks.[28] Given the need to ensure equal treatment of "like" domestic and imported products under Article III of the GATT and the prohibition of arbitrary or unjustifiable discrimination under the "chapeau" of Article XX, the default carbon intensity applied to imports should be at least as favourable as the average carbon intensity of European producers.[29] Which default intensity is ultimately chosen has no bearing on the design and expedience of an IAM, however.

In a CBAM implemented through extension of the EU ETS – the variant we assume here – importers of covered products who do not avail themselves of the IAM would be required to purchase and surrender allowances[30] for the amount of emissions corresponding to the weight of imported product multiplied by the default carbon intensity applied to imports.[31] Importers whose actual carbon intensity is lower than the default intensity of European producers, however, could reduce their compliance obligation by voluntarily triggering the IAM.

To do so, importers would have to furnish reliable information documenting the actual emissions associated with production. An important question, thus, relates to the methodologies and process used to determine and report the carbon intensity of imported products under an IAM. Ideally, the rules applicable to imports should follow the same modalities used for domestic products to minimise differentiation. Domestic producers whose installations are covered by the EU ETS are required to comply with an elaborate compliance cycle setting out an annual procedure of monitoring, reporting and verification (MRV) based on detailed rules, principles, and guidance documents (see below, Box 2).

Box 2: The compliance cycle in the EU ETS

Under the EU ETS, covered installations measure and report emissions in accordance with a delegated act of the Commission, the Monitoring and Reporting Regulation (MRR),[32] and a series of supporting guidance documents. For each installation covered by the EU ETS, operators are initially required to submit a monitoring plan that sets out the methodologies used to calculate

[28] An example of such a "best performer" benchmark are the product benchmarks used for purposes of free allocation to energy-intensive and trade-exposed industries under the EU ETS, representing the average carbon intensity of the 10% most efficient installations in terms of metric tons of CO_2 emitted per ton of product produced during a specified period.

[29] Relying on the average carbon intensity of European producers is also the approach proposed in the French Non-Paper of 2016 (France 2016).

[30] Such allowances would likely be different from the EU ETS allowances (EUAs) auctioned or allocated in the primary market of the EU ETS, and be neither fungible with EUAs, nor have any effect on the emissions cap of the EU ETS. They could be "virtual" allowances purely issued for purposes of the CBAM, sold to importers at a price that reflects the average price of EUAs over a specified period, or the closing price at the previous day. For purposes of outlining the IAM, these details are not relevant.

[31] To the extent that domestic producers still benefit from free allocation of allowances, the compliance obligation would need to be adjusted – to ensure equal treatment – so as to reflect the difference between the average carbon intensity and the more efficient benchmark used to calculate free allocation for relevant domestic products.

[32] Commission Implementing Regulation (EU) 2018/2066 of 19 December 2018 on the Monitoring and Reporting of Greenhouse Gas Emissions Pursuant to Directive 2003/87/EC of the European Parliament and of the Council and amending Commission Regulation (EU) No 601/2012, OJ L 334/1, 31 December 2018.

emissions.[33] Operators have some discretion to choose between alternative monitoring methodologies, such as calculation- and measurement-based methodologies or combinations thereof. Still, based on the annual emissions of each installation, different accuracy requirements – or "tiers" – apply; installations that exceed specified emission thresholds are required to achieve a higher level of accuracy. If producers can demonstrate that observance of a tier incurs unreasonable costs, however, the competent authority can allow a less accurate monitoring approach.

Once the monitoring plan is approved by the competent national authority, operators are required to compile emissions in an annual emission report, applying the methodology contained in the monitoring plan. Relevant information in the report includes annual activity data, such as fuel input and raw material throughput data; calculation values, such as net calorific heat values and emission, conversion, and oxidation factors; and laboratory analyses and sampling results. Prior to submission, annual emission reports have to be audited – often including a site visit – by an independent verifier accredited pursuant to the Accreditation and Verification Regulation (AVR).[34] Accreditation requires periodic attestation by a national accreditation body that a verifier meets the requirements set by harmonised verification standards, such as ISO 14065, and is subject to ongoing surveillance. After submission of the verified report, the competent national authority can perform spot checks and inspections, and - if it detects misstatements or non-conformities – take different facilitative and enforcement measures.

Under the IAM proposed with the French Non-Paper of 2016, foreign producers would have been able to document their actual emissions through submission of an "emissions certificate", which "could take the form of a reporting of direct emissions per ton of product" with a level of stringency "in the methodology for monitoring, reporting and verification" of manufacturing plant emissions "comparable to that of the EU ETS" (France 2016). In essence, the IAM would require importers of covered products to comply with the same monitoring and reporting provisions as European producers. Importers deciding to exercise the IAM would have to furnish a monitoring plan for each installation[35] in which imported products covered by the CBAM are manufactured, and annually follow up with an emissions certificate applying the same calculation methods, with tiered accuracy requirements, as their EU counterparts. Consistent with the compliance cycle applicable to the EU producers, importers would also be required to obtain independent verification by an accredited verifier as a means of ensuring the integrity of reported data (see also below, Section 4.3).

4.3 Specific challenges

Generally, the legal imperative to avoid discrimination between domestic and imported products favours applying the same rules and procedures to importers invoking the IAM. In some matters, however, differentiation may be justified, for instance to avoid undue cost and hardship, or to support the environmental objectives of the CBAM. One such matter relates to the verifiers that are eligible to perform the independent verification of emission certificates compiled by importers. In its

[33] Approval of the plan is not a discretionary decision, but has to be given if the monitoring plan meets the requirements of the MRR, including its principles of completeness, consistency, comparability, accuracy, and integrity of monitoring and reporting.

[34] Commission Implementing Regulation (EU) 2018/2067 of 19 December 2018 on the Verification of Data and on the Accreditation of Verifiers pursuant to Directive 2003/87/EC of the European Parliament and of the Council, OJ L 334/94, 31 December 2018.

[35] In practice, where the importer differs from the operator of the production facilities, the installation operators would perform the required monitoring and reporting activities, but responsibility for their timely provision, accuracy and so on could rest with the importer to streamline and simplify the process.

proposed rulemaking to define individual baselines for the U.S. reformulated gasoline program, the EPA would have required the verification process to be carried out by entities accredited in the United States (see above, Box 1).

Similarly limiting eligible verifiers to those located and accredited in the EU could impose an undue cost on importers, however: as the French Non-Paper rightly observed, the audit cost to importers should be comparable to the cost borne by European producers in order to avoid discrimination (France 2016). Under the EU ETS, verifiers are entities certified by the national accreditation bodies of each Member State. Hence, it appears reasonable to allow verification by entities accredited in the country from which imported products originate, provided the accreditation conditions are comparable in stringency.

Because national accreditation bodies in the EU apply harmonised standards such as International Organization for Standardization (ISO) norm ISO 14065, which specifies principles and requirements for bodies that undertake validation or verification of greenhouse gas assertions, such a requirement of comparability in accreditation conditions should not result in undue cost or hardship for importers. Questions related to the recognition of foreign verifiers – and also, for instance, specifying the equivalence of laboratory analyses performed outside the EU – could be specified in a delegated act of the Commission that details technical and procedural aspects related to emission certificates.

A similar departure from the rules applicable to domestic producers could be justified when it comes to the point of regulation. In the EU, stationary emitters are regulated at the level of individual installations, defined by Article 3(e) of the EU ETS Directive as technical units where one or more covered activities are carried out. Installations operated by the same company at different sites are, thus, regulated separately, each reporting emissions and complying with EU ETS obligations independently. Determination of carbon intensity at the installation level for the purposes of an IAM can raise concerns about reshuffling between different installations owned by the same company, as described above in Section 2.3.

Since such reshuffling can jeopardise the environmental objectives of the CBAM – and thus also its justification under Article XX of the GATT – it could be justifiable to set the point of regulation for importers at the company level, meaning that an importer would have to comply with the CBAM based on the average carbon intensity of all production facilities operated by the same producer in non-EU countries. Importers would then no longer be able to lower their compliance burden by focusing abatement efforts on select installations designated for production for the EU market. Still, such an approach would require further study, for instance on the additional administrative burden and economic cost it would impose on foreign producers by requiring MRV of emissions for multiple installations.[36]

Also, alternative definitions of "company" and their respective implications would need to be evaluated, especially with regard to large corporations with complex,

[36] It is worth noting, however, that domestic producers covered by the EU ETS will also often operate multiple installations that fall within the scope of activity thresholds under the EU ETS Directive and each necessitate individual monitoring and reporting; as such, at a company level, formal treatment would again be symmetrical, even if the number of installations may differ on a case by case basis.

vertically and horizontally layered decision-making structures, as well as state-owned enterprises where centralised decisions can affect several companies at once and are often reached on political grounds. One option for the EU to disincentivise resource shuffling could also be to retain some degree of discretion with regard to the IAM, and reserve the option of returning to a default carbon intensity for imported products if there are objective factors suggesting that the importer may be engaged in resource shuffling practices. At worst, thus, importers would fall back to the default intensity, which, if set at the average carbon intensity of EU producers or better, should not constitute arbitrary or unjustifiable discrimination.

Finally, the process through which importers submit the emissions certificate should be as straightforward as possible and aligned with existing processes to the extent possible. On this point, the French BCA Non-Paper of 2016 offers a template for integration of the emissions certificate with the existing customs process, allowing its submission as part of the Single Administrative Document (SAD) used as the harmonised customs declaration across Member States when products enter the EU market (France 2016). Already, the customs declarations filed with each import contain some of the requisite data needed to operationalise the IAM, including the quantity of imported product and the importer, identified by the unique EORI (Economic Operator Registration and Identification) number issued to entities engaged in customs activities.

Such data collected by the customs authorities would enable precise and automatic determination of the number of allowances to be surrendered by each importer, based on import volumes multiplied either by the default carbon intensity applied to that product or, where an emissions certificate has been submitted through the IAM, the specific emissions associated with the imported product. Because all products covered by the CBAM would bear a customs tariff nomenclature reference corresponding to an EU ETS product code, production and emissions data as well as the average share of free allocation for the corresponding domestic products would be readily available. Ultimately, so the French Non-Paper, this would ensure equal treatment of "like" domestic and imported products (France, 2016).

Box 3: Legislative language to operationalise an IAM

When amending the EU ETS Directive to include one or more provisions setting out the CBAM, the EU legislator could include a passage operationalising the IAM as a voluntary option for importers. Although the exact wording and terminology would have to be aligned with that employed for the CBAM,[37] in its simplest form the text setting up an IAM could read as follows:

"1. For purposes of compliance with the Carbon Border Adjustment Mechanism, any importer of a covered product may request determination of its obligation to acquire and surrender allowances for imported products on the basis of the individual greenhouse gas emissions intensity of that product, provided that:

(a) the importer has submitted an application to the [authority responsible for implementation of the CBAM] *containing the information listed in Article 5 (a) to (d) for the installation from which the imported*

[37] Note that this wording assumes the IAM will operate at the level of the individual installation producing the imported product, instead of relying on the average emissions of all relevant installations operated by the same company as a way of addressing reshuffling concerns. If the latter approach is favoured, additional language would be needed to specify the exact boundaries of the IAM and the scope of monitoring and reporting it requires from importers.

product originates, including a description of measures planned to monitor and report emissions in accordance with the guidelines adopted pursuant to Article 14;

(b) the importer reports to the [authority responsible for implementation of the CBAM] *the emissions from that installation during each calendar year after the end of that year in accordance with the guidelines;*

(c) the importer ensures that the report submitted pursuant to paragraph 1(b) is verified in accordance with the criteria set out in Annex V by a verifier accredited in any Member State or in the country of origin of the imported product, as specified in the delegated act mentioned in paragraph 4.

2. The [authority responsible for implementation of the CBAM] *grants the request for individual determination mentioned in paragraph 1 if the conditions in paragraph 1(a) to (c) are met. It can deny the request, or revoke it if previously granted, if there is credible indication that the importer is engaged in practices aimed at minimising its compliance obligation under the Carbon Border Adjustment Mechanism by means other than emissions abatement or a reduction of imports. Any importer affected by such denial or revocation can appeal the decision of the* [authority responsible for implementation of the CBAM] *through the process specified in the delegated act adopted pursuant to paragraph 4.*

3. Upon entry into the customs territory of the Union, the importer seeking individual adjustment pursuant to paragraph 1 shall submit an emissions certificate documenting the verified individual greenhouse gas emissions intensity of the imported product, expressed in terms of emissions of covered greenhouse gases generated per ton of product, with the single administrative document accompanying the imported product pursuant to Commission Delegated Regulation (EU) 2016/341 of 17 December 2015.

4. The Commission shall adopt a delegated act by [date] *specifying the detailed requirements for adjustment on the basis of individual greenhouse gas emissions intensity of imported products, including further guidance on monitoring, reporting and verification of emissions, eligibility of verifiers, oversight by the* [authority responsible for implementation of the CBAM]*, and the appeals process mentioned in paragraph 2.*

4.4 Case study: applying the IAM in the steel sector

To visualise how operation of the IAM could look in practice, this section traces the steps described above in general terms as they would be implemented in a real-world setting for an importer of steel manufactured outside the EU. The steel sector is an example of an industry in which there is significant variation in carbon intensities even among the largest players (CDP 2019). For this case study, we consider a (hypothetical) importer seeking to introduce into the EU a quantity q_{ijk} of steel i originating from steel mill j located in country k outside the EU. Steel mill j uses a blast furnace process to produce crude steel.

We suppose that the EU has enacted the CBAM as an extension of the EU ETS to imports, the CBAM is in force, country k falls within the geographic scope of the CBAM, and steel is one of the products it covers. The closing price of EU allowances on the day prior to importation is t, and we here assume that foreign steel producers in country k do not face an explicit carbon price ($t_{ijk} = 0$). The EU's CBAM applies a default carbon intensity Z_i that is set at the level of the average carbon intensity of EU producers y_i, and that the actual carbon intensity of the foreign steel is z_{ijk}, which is reflected in the IAM.[38]

[38] For the sake of simplicity, we apply in the following one aggregate carbon intensity for the various process steps (coking, sintering and hot metal production) at steel mill j, assume that the steel mill does not further process the steel it produces, and do not consider indirect emissions from imported heat or electricity, nor the role of waste gas. For a more accurate breakdown of the individual steps in steelmaking that fall under assigned benchmarks under the EU ETS, see European Commission 2019b.

We compare the compliance burden under a default-only CBAM with that arising under an IAM under two scenarios on free allocation. In the first, domestic EU steel producers are allocated, on average, free allowances to cover 80% of their emissions; in the second, free allocation is discontinued with the introduction of a border adjustment. We use hypothetical but plausible figures for these variables,[39] as summarized in the following table:

Variables	Description and value
q_{ijk}	Quantity of 100,000 tonnes of crude steel
t	EU carbon price 25 €/tonne CO_2
y_i	Average EU carbon intensity of 2.1 tonnes CO_2/tonne steel
f_i	Average share of free allocation in the EU of 80%
Z_i	CBAM default carbon intensity of 2.1 tonnes CO_2/tonne steel
z_{ijk}	Actual producer carbon intensity of 1.9 tonnes CO_2/tonne steel

Table 1. Summary of variables used for case study on steel

We can thus calculate the compliance burden faced by the importer, using the formulae derived in Section 2.4. First, under the CBAM based only on a default intensity, upon entry into the customs territory of the EU, and without furnishing an individual emissions certificate as part of the customs forms compiled in the SAD, j would face a compliance obligation, expressed here in monetary terms,[40] as follows:

Payment = q_{ijk} x t x Z_i x $(1 - f_i)$ = 100,000 x 25 €/tCO_2 x 2.1 tCO_2 x 20% = 1,050,000 €.

If, instead, the EU CBAM includes, as a voluntary option, an IAM for covered products, and importer j chooses to avail itself of this option, the calculation becomes:

Payment = q_{ijk} x t x [min{z_{ijk},Z_i} – f_i x y_i]
= 100,000 x 25 €/tCO_2 x [1.9 tCO_2 – 80% x 2.1 tCO_2] = 550,000 €.

The ability to exercise the voluntary IAM here decreases the payment obligation for importer j by almost 50%, reflecting that it is cleaner than the default carbon intensity.

Similarly, we can compute the compliance burdens for the scenario in which free allocation in the EU is discontinued (so instead f_i = 0). Under the default-only CBAM, this leads to payment that is five times as large at 5,250,000 €. With the voluntary IAM,

[39] Our assumed carbon intensities are loosely based on the data in Material Economics (2019) and the benchmarks contained in Commission Delegated Regulation (EU) 2019/331 of 19 December 2018 Determining Transitional Union-wide Rules for Harmonised Free Allocation of Emission Allowances pursuant to Article 10a of Directive 2003/87/EC of the European Parliament and of the Council, OJ L 59/8, 27 February 2019.

[40] Since, in our example, we assume that the CBAM is implemented through extension of the EU ETS to imports, this compliance obligation would more likely be calculated on the basis of an obligation to purchase a specified quantity of allowances, factoring in free allocation to domestic producers (and any carbon price imposed on the imported product in the country of origin).

the payment increases by the same amount in absolute terms to 4,750,000 €. The reduction in compliance burden due to the IAM is now around 10%.

This example underscores the risk of a CBAM implemented without an IAM being seen as imposing an arbitrary or unjustifiable discrimination, in line with the case law presented in Section 3. As a condition for the reduced compliance burden, however, importer *j* will have been required to first submit an application as well as an emissions certificate setting out the emissions during the previous calendar year in line with provisions of the Monitoring and Reporting Regulation and relevant guidance documents.[41] Additionally, that certificate will have required verification by an independent verification body, which—if the CBAM is operationalized as suggested in Section 4.2—could be an auditor accredited by a national accreditation body in country *k* attesting that it meets the conditions of a relevant norm such as ISO 14065.

5. Concluding remarks

As noted by Helm, Hepburn & Ruta (2012), opposition to border carbon adjustments due to concerns about implementation costs is to see "the perfect as the enemy of the good". In this paper, we have explored how far the good can be pushed in terms of policy design for a CBAM on imports. We have proposed a CBAM design with a voluntary individual adjustment that allows producers to demonstrate that their *actual* carbon intensity lies below a default value. Relative to a CBAM based solely on the default value, an IAM captures additional economic benefits of carbon pricing—notably rewarding producers' decarbonization efforts—and improves the overall legal prospects of a CBAM being found to comply with international law and WTO rules. We outlined practical considerations around the implementation of an IAM drawing on the EU ETS's existing architecture for emissions verification.

Another consideration is the ability of a CBAM to raise additional EU fiscal revenue. The European Commission has already revealed its likely importance by noting, in a discussion of the recovery from Covid-19 and its reinforced financial framework for 2021–2027, that "a carbon border adjustment mechanism could bring additional revenues ranging from about €5 billion to €14 billion, depending on the scope and design" (European Commission 2020b). Reliance on a CBAM design based solely on default intensity arguably has the benefit of bringing relatively greater certainty about the likely size of the tax take. Use of an IAM would lead to an additional layer of budgetary uncertainty—but, as shown in this paper, also offers significant economic and environmental benefits. The latter, in particular, will also play a significant role in determining the legal prospects of a future CBAM.

[41] Section 5 in Annex IV of the MRR details the MRV requirements for pig iron and steel. In the case of steel produced through EAF, direct CO_2 emissions will result from fuel and carbon from electrodes and scrap that is oxidised in the furnace. Because the EAF in our example is powered entirely by renewable electricity, fuel-related emissions will be minimal, explaining the low carbon intensity z_{ijk}.

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