Drying up tax havens
A mechanism to unilaterally tax maritime emissions while satisfying extraterritoriality, tax competition and political constraints

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A mechanism to unilaterally tax maritime emissions while satisfying extraterritoriality, tax competition and political constraints*

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Abstract
Among academics and policymakers, it is generally agreed that implicit tax subsidies for maritime fuels—which are currently granted around the world—are inefficient, but that their abolishment requires a unanimous international agreement. Such an agreement is deemed indispensable because any unilateral action would be impossible due to massive tax competition in this industry, competitiveness effects and the legal limits on regulating an industry operating mostly in international waters, thus outside of any state’s jurisdiction. However, an international agreement to solve these problems has proven impossible to reach, thus resulting in the conservation of the status quo. To break this deadlock, we propose a mechanism whereby a small coalition of countries, to start with, can abolish these implicit tax subsidies even in the absence of an international agreement. The effects of acting without a world-wide agreement are analyzed from an economic perspective, taking into account the current legal framework. The coalition considered in this article focuses on EU member states, although the mechanism is applicable more widely.

JEL Classification Codes: H23, H87, K33, K34, Q54, Q5
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Part I

Economic Analysis

1 Introduction

To mitigate climate change, large reductions in global greenhouse gas (GHG) emissions are required. Emissions from the maritime sector, however, are rising fast. Shipping accounted for just 2.7% of global CO\textsubscript{2} emissions in 2012 and 2.5% of global GHG emissions\textsuperscript{1} on a CO\textsubscript{2} equivalent basis, the lion’s share of which was released in international maritime transport (accounting for 2.2% and 2.1% of the global emissions, respectively). But as trade volumes rise, these emissions are projected to rise by 50-250% by 2050, depending on future economic and energy developments (\textsuperscript{2}). Given the difficulties of achieving emissions reductions elsewhere in the economy, these increases from the maritime sector make it ever harder to curb overall emissions. However, there is an enormous potential for maritime emissions reduction that has not yet been exploited. Compared to the baseline scenario, combined technical and operational measures could reduce CO\textsubscript{2} emissions by 60-75% per tonne-kilometer (t-km) by 2050 (\textsuperscript{3}). Yet, to date, implicit subsidies for maritime fuels considerably weaken incentives to adopt such measures, such that ships today are less efficient than 25 years ago.

There is little incentive to improve this fuel efficiency because, unlike for other transport fuels (except for international aviation), maritime fuels are not subject to taxation. Nor are international maritime transport emissions covered by the Kyoto Protocol of the United Nations Framework Convention on Climate Change (Kyoto Protocol)\textsuperscript{2} or other climate change agreements.\textsuperscript{3} Consequently, the negative environmental effects of maritime emissions are not internalized, although there is agreement among global governance institutions about the need to tackle the issue (e.g. \textsuperscript{4}; G20 2011). Using official accounting costs per tonne of CO\textsubscript{2} endorsed by the governments of the United States, Great Britain and Germany, the external cost of carbon\textsuperscript{4} emitted by

\textsuperscript{1}GHG considered for this estimate are CO\textsubscript{2}, CH\textsubscript{4} and N\textsubscript{2}O.

\textsuperscript{2}Kyoto Protocol to the United Nations Framework Convention on Climate Change, Kyoto, 10 December 1997, in force 16 February 2005. 37 International Legal Materials (1998). 2303 UNTS 148. (1997). Bunker fuels are excluded by Art. 2 II, Kyoto Protocol. This exclusion has been justified with perceived difficulties in allocating responsibility for emissions released in international waters to individual Kyoto parties (although these accounting problems can be solved, see Heine 2015). Additionally, as international transport is vital for global growth, governments have been reluctant in implementing any restrictive regulation on the sector (\textsuperscript{5}).

\textsuperscript{3}GHG emissions from marine transport have been subject to negotiations in law-making bodies (UNFCCC’s working groups SBSTA and AWG-LCA, the Ad Hoc Working Group on the Durban Platform for Enhanced Action (ADP) that is in charge of the issue since 2011 under the UNFCCC umbrella, and the IMO) but no treaty limiting these emissions has evolved.

\textsuperscript{4}In this paper the term “carbon” refers to both CO\textsubscript{2} itself and the carbon equivalent of other GHGs.
this sector in 2012 amounts to between USD-2010 33.7bn (U.S. estimate) and 82.6bn (British estimate), with the German estimate tending more towards the British one at 77.8bn.\(^5\) Regardless of which of these cost estimates comes closest to reality, all three estimates reveal that it is a large external cost that producers and consumers of maritime fuels impose on third parties. These third parties are forced to make transfers to the former, and thus implicitly provide them with a subsidy\(^6\). Such a subsidy is conventionally called an implicit tax subsidy or a tax expenditure (i.e. a forgone tax revenue), reflecting the failure of fiscal policy to compensate for the forced transfer by an emission tax of equivalent size.

At the beginning of 2013, amendments to the MARPOL Annex VI Regulations to improve the energy efficiency of vessels came into force. This was an important step in order to target emissions released by maritime transport, though on their own, these policies do not set dynamic incentives to reduce emissions. These regulations are justified because they tackle network externality problems, and have benefits for R&D in the sector. However, the marginal incentives to optimize fuel consumption are not affected and the stand-alone effect of R&D policy on carbon emissions has been estimated as being very weak\(^7\). To achieve efficient emissions mitigation, it is therefore important to complement the established regulatory policy with price-based instruments.

To considerably improve the GHG footprint of the sector one has to look into how indirect subsidies for maritime fuel can be removed by introducing a carbon pricing scheme. Many authors have agreed on the need for taxing maritime fuels, but at the same time expressed doubt over three types of feasibility for any such change. Since most maritime emissions occur in international waters, taxation by single states may be legally infeasible. Due to legal prohibitions of “extraterritorial” taxation, each country might only be allowed to charge emissions arising in its internal waters, but then almost all of the maritime sector emissions would still be uncovered. Due to the mobility of sea trade, taxation might furthermore also be economically infeasible. There is already severe tax competition in ship-owner taxes in the world, and concerns are that maritime emissions taxes could be similarly avoided in tax havens. Furthermore, a maritime emissions tax might be infeasible if trade patterns are to be safeguarded from distortions. All these feasibility concerns have led to the conclusion that the taxation of maritime emissions may only be feasible through a unanimous international agreement (e.g. \(^8\)). Yet, while the taxation by individual nation states was found to be legally and economically infeasible, the taxation through a unanimous international agreement appears politically infeasible. Due to incompatibility of views, for instance between island states and oil producing countries, such unanimity is utopian. Consequently, years of negotiations within the IMO and the G20 on carbon pricing in maritime transport

\(^{5}\) These estimates follow from multiplying the total amount of maritime emissions from \(^6\) with the US Cost of Carbon \(^7\), the UK Treasury’s Shadow Price of Carbon \(^8\) and the German estimate of the external cost of carbon \(^9\).
have produced no tangible progress. This gridlock is symptomatic for negotiations on climate change mitigation in general where any reluctant party can bring the whole process to a halt because unanimity is required for a global agreement.

In this paper we suggest an economically and legally viable solution on how to remove tax subsidies for carbon emissions released by maritime transport in the absence of an international agreement on this issue.\(^6\) In doing so, we focus on a coalition formed by the member states of the European Union (EU), although the mechanism is applicable more widely (e.g., in the U.S. and Canada or in Japan). Furthermore, we explain how unilateral action by the EU may unsettle the gridlock in international negotiations on including maritime fuel emissions under a carbon pricing mechanism and provide an incentive for international cooperation. By sketching out a unilateral mechanism in a sector particularly hard to reform due to its genuine international features, we want to make a point for a general reorientation toward unilateral climate policy\(^7\), hoping that—ideally—the mere existence of credible unilateral alternatives will finally make unanimous climate action incentive-compatible for those currently blocking it. The mechanism we propose would furthermore impose only a small additional administrative burden on tax subjects and authorities by drawing on existing institutions and databases.

Economic contract theory suggests that parties negotiating a global climate agreement will block the introduction of an emission tax in case it reduces their payoff relative to their reference point, i.e. the noncooperative alternative. For negotiations requiring unanimous agreement, the reference point equals the status quo, as parties know that without their consent no deviation from the status quo is possible. This gridlock may be unsettled if at least one party is able to credibly threaten to set up a unilateral tax scheme—which requires such a tax scheme to be effective and its implementation to be feasible. After such a unilateral scheme will have been introduced, those parties that are currently blocking a global agreement will need to re-evaluate their stance towards a global tax scheme; this time, however, vis-à-vis the payoff they realize as outsiders faced with the effects of a policy that is unilaterally implemented by another negotiation party. Ironically, it is the introduction of a unilateral mechanism that could then render a unanimous agreement possible. This is because the existence of a feasible unilateral tax scheme improves the outside option of those who want to tax shipping emissions, while simultaneously changing the reference point for those who are blocking a global emission tax: If its negative effects on the non-cooperative payoffs are large enough, unilateral action will make the outsider willing to engage in a global agreement, thus breaking the current gridlock.

\(^6\)In the remainder of this text we will make the case for a unilateral emission tax on maritime transport emissions. However, the concept can also be transferred to an EU cap-and-trade mechanism with a carbon price equal to the implicit carbon price set by the tax rate.

\(^7\)See e.g. \(?\) who defended unilateral action (or threats for unilateral action) as one of the ways to get out of the stalemate with regards to maritime (also aviation) emissions.
The paper is divided in three parts, covering the economic design of the mechanism, its legality and its political effects. Part I is structured as follows: Section 2 reviews the previous literature on introducing a unilateral emission tax scheme. Section 3 explains how an emission tax scheme for the EU could look like. It expands first on what the appropriate tax bases should be for international and intra-EU shipping, by whom the tax should be paid, and how the tax base could be computed. Subsequently, it elaborates on why using two different tax bases is unproblematic, and how the tax rate should be set. Section 4 concludes. Part II analyses the compliance of the mechanism with different sources of law, covering in section 5 the UNFCCC climate change mitigation framework, followed by the mechanism’s WTO compliance in section 6, the United Nations Law of the Sea (UNCLOS) (7) and EU law (8). Section 9 concludes our legal analysis. Part III analyses how the mechanism changes the incentives faced by political actors, investigating in section 10 how the availability of a unilateral emissions tax eases negotiations for an international tax, before discussing in section 11 how the revenues from the tax should be used in an optimal and the politically most likely outcome. Section 12 analyses to what extent unilateral taxation may cause concerns for the competitiveness of shipping companies. Part IV provides an overall synthesis of the results presented in this paper.

2 Related Literature

The intuition to break the gridlock in international negotiations through the use of unilateral mechanisms is known from the literature on border carbon adjustments (BCA). Unfortunately, the legal viability of BCA has been called into question for exactly those types of BCA that economists consider the most efficient and simplest to administer. These legal doubts have arisen particularly with regard to WTO-compliance. Legal scholars have reacted to this debate by describing forms of BCA that would likely be WTO-compatible. However, the requirements for making emission taxes work in the prescribed, WTO-consistent manner are administratively particularly complex, expensive and thus potentially infeasible. Moreover, there is considerable political resistance from abroad against the establishment of BCA, as it was the case with the inclusion of aviation in the EU emission trading system (EU-ETS). Whether economically and legally viable compromises exist remains an open question as there is no conclusive case law on the matter. In the meantime, however, even the uncertainty in the absence of relevant case law is holding political action back. As a result, the implementation of BTCA is currently not on the political horizon, at least in the EU.

8 [p.7, define a BCA as “a measure applied to traded products that seeks to make their prices in destination markets reflect the costs they would have incurred had they been regulated under the destination market’s greenhouse gas emission regime.”]
A question then is: If BCA is currently out of reach because the political and either the legal or the administrative problems are considered insurmountable, is there any concept related to BCA that is simpler and better manageable than the former and that thus could represent a more realistic first step into the right direction?

We argue that taxing emissions released during the transport of goods rather than taxing life-cycle emissions associated with the production of these goods would be such a step into the right direction. The related administrative issues will be shown to be modest, at least relative to those from estimating emissions released in the production of products in the countries of origin. Furthermore, the legal jurisdiction over the emissions is established more easily.

On a request by the European Commission, \textit{?} conducted a study on the feasibility of a unilateral EU GHG pricing scheme targeted at a reduction of maritime transport emissions. They find that the introduction of a unilateral mechanism is possible in general. However, the authors do not recommend any specific policy option to be chosen. Furthermore, they suggest that any exact tracking of released GHG emissions and of other relevant data would carry a high administrative burden. We aim to fill in this void by drafting an emission tax scheme which could be introduced using existing institutions, systems and databases, hence reducing administrative cost to a minimum. We also make suggestions on the design of the scheme and conclude that the difficulties identified by ? can be overcome.

Equally commissioned by the European Commission, \textit{?} analyzed an emission tax that covers intra-EU shipping. According to this proposal, the scope of emissions covered by the tax varies by whether the incoming vessel carries a single Bill of Lading\textsuperscript{9} (i.e. all cargo shipped shares both the same port of origin and the same port of destination) or multiple Bills of Lading (i.e., the vessel carries cargo with different ports of origin and/or ports of destination). The scheme recommended by the authors is based on the vessel, not on the cargo shipped. This implies that emissions released in transshipment outside EU waters cannot be considered, as a vessel is taxed only for the last leg of its voyage into the EU. As a result, \textit{?} find that this scheme provides opportunities for tax avoidance, however to a limited extent. The emissions coverage is further reduced by the proposed introduction of size thresholds: The authors recommend that the tax should be based on data from emissions measurements executed by every vessel. As this is considered costly for the smallest ships, these would be exempted from the tax. This is particularly an issue for river-going vessels, where “it would be much harder if not impossible to incorporate these vessel types [inland vessels] in the scheme” (?, p. 144). We present a mechanism that is closely related to the mechanism recommended by ? but which tries to solve certain economic, environmental and legal issues that we see with their proposal.

\textsuperscript{9}A Bill of Lading contains information on the port of lading and discharging, the vessel and the carrier.
A mechanism for unilateral taxation of maritime fuel emissions

Both ? and ? recommend taxing maritime emissions through a fuel tax, but recognize that, for international shipping, unilateral fuel taxation causes too much base erosion as vessels could refuel easily outside the geographical coverage. Therefore, they hold that international shipping should be exempted, at least temporarily, from the tax. Like ?, also ? and ? situate the tax liability with the ship; even though only with ships in internal waters. In the medium-term, ? envisions a gradual increase of the regional coverage of the emission tax, extending it to the last leg of incoming voyages and the first leg of outgoing voyages, similar to the proposal in ?. As in the latter study, the scheme presented by ? also incurs the problem of how to deal with vessels with multiple Bills of Lading. ? considers the case where the last leg into the EU is not representative for the composition of the cargo on board of a vessel. He recommends that “a ship that sails from a non-participating country would on arrival to an EU port have to declare how much it has emitted from the port on its journey where most of the goods intended for Europe were laden” (? p. 6). How “most” is to be determined is not fleshed out in the text, and one could add that shipping lines would be able to reduce their tax liability by some margin through varying the location of transshipments and the composition of their cargo.

? examined a system based on the full distance cargo has traveled from its port of origin to its port of destination as one of three options to integrate maritime emissions into the EU-ETS.

In the remainder of this text we present a unilateral Pigouvian tax scheme on emissions from maritime shipping, i.e. a price-based mechanism internalizing the present value of marginal future climate damages caused by these emissions. Doing so we build upon the strengths of the above discussed strand of literature while sketching a mechanism that both reduces the opportunities for tax avoidance and solves extraterritoriality issues usually occurring with unilateral taxation. Furthermore we present new arguments on the effects of the schemes established in the literature referred to above.

3 A mechanism for unilateral taxation of maritime fuel emissions

3.1 Choosing the right tax base

3.1.1 Taxable act

There are several studies on the own-price elasticity of maritime fuels with results indicating that it is rather low (???). Thus, demand for maritime fuels can be expected to only slightly decrease as a reaction to the introduction of a tax on maritime fuels
on a global level. An also low elasticity of cargo demand leads to a considerably high pass-through rate of the tax induced price increase to the purchasers of freight services (7). As a result, introducing a tax on maritime fuel consumption is an effective means to internalize climate damage from carbon emissions on a global scale. By this logic, the taxable act for taxing emissions could be the act of bunkering maritime fuels.

The success of introducing a tax exclusively in one region, however, depends on the cross-price elasticity of the demand for maritime fuels in that region relative to demand for maritime fuels in regions not participating. This elasticity is much higher because, to avoid the tax, vessels navigating in several jurisdictions can refuel en route in a port not included in the tax scheme or in international waters (e.g. from tank ships or floating platforms). Many argue that these avoidance opportunities render regional taxation of maritime emissions infeasible (e.g. ?? ?? ?). As a result, a previous attempt to unilaterally introduce a maritime fuel tax in Port of Long Beach/California has failed (7) and ever since served as a striking counter-argument against unilateral emission taxation on maritime fuels.

Consequently, if a unilateral EU emission tax on maritime transport emissions was introduced, internationally mobile deep-sea vessels should not be charged based on their fuel uplifts in the EU. Instead, another tax base should be chosen which still covers the emissions but circumvents the issue of tax avoidance which results in carbon leakage.10 While the elasticity of demand for refueling internationally mobile vessels in the EU is too high for fuel consumption to serve as a tax base in the case of unilateral action, the elasticity of demand for the naturally linked service of lading and discharging cargo11 in the EU is much lower. In this case, a EU port authority could hence charge for the emissions released during inbound, outbound and intra-EU voyages. Exploiting the low elasticity of port demand, the arrival and departure of cargo at/from EU ports could thus be defined as the taxable act that incurs the legal tax liability. Only regarding vessels that do not leave the EU’s Exclusive Economic Zone (EEZ) the elasticity of fuel demand would be sufficiently low to render taxing emissions through a fuel tax an effective option. In the remainder of this paper we will consider both cases: taxing emissions from international shipments exploiting the low elasticity of demand for deep-sea ports, and taxing emissions from internal shipments exploiting the lower elasticity of fuel demand in that market segment.

If EU ports all levied the tax alike, there would be no intra-EU shifts in the port choice. In addition, for geographical and economic reasons, EU ports have almost no serious competitors outside the EU,12 apart from in transshipment. Shipping cargo to non-EU

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10 Carbon leakage describes a situation in which reducing emissions in one region is (partially) offset by an increase in emissions in another region. See 7 for an in-depth analysis of this issue.
11 In the remainder of the text we use the term “cargo” as a collective term for both containers and bulk cargo.
12 Once the ports in the St Petersburg area will have been enlarged and modernized they could attract more trade destined to CEE which would likely increase avoidance behavior but not to an extent that would
ports that have little overlapping hinterlands with EU ports, i.e., that are far away from
the cargo destination or origin within the EU, only to avoid an emission tax, is in most
cases commercially nonviable. Thus, the tax will turn out minor compared to the extra
time, rent, scheduling, trucking and railway costs needed to avoid it, especially since
the cost advantage of maritime transport over road and rail transport is considerable.
Moreover, price is by far not the only criterion for port choice, albeit it is an important
one (e.g., ?; ?). Port choice is also influenced by path dependencies in the development
of inland transport networks, problems associated with a sharp increase in inland trans-
port such as capacity limits and congestion, and the specialization of and differences
in service levels provided by different ports (? ? ? ? ?). All those factors result in a low
cross-price elasticity of port demand across regions. EU ports could therefore levy a
tax on emissions released in inbound and outbound cargo shipping to/from EU desti-
nations without having to fear measurable deadweight losses arising from a mobile tax
base.

3.1.2 Transshipment and transit

Taxing emissions without risking the competitiveness of EU ports or tax base erosion
requires an exemption for transshipment—the act of shipping cargo to a hub port for
onwards shipment to a destination port—and for transit—the act of transporting cargo
through the EU to third countries without releasing the cargo into free circulation in
the EU. One reason mandating these exemptions is that the implementation of an EU
emission tax must not discourage other countries from putting in place an emission
tax themselves. If emission taxes were levied on several legs of a transportation chain,
however, the taxation process would likely become complex, hence increasing trans-
action costs markedly. Second, the elasticity of demand for transshipment and transit
services is large, unlike that for destination ports. While in most cases it is commer-
cially nonviable to substitute EU destination ports with non-EU destination ports, this
does not hold for transshipment and transit services. This is because it is to a certain
degree irrelevant where the transshipment (and to a lesser degree also transit) takes
place. Hence without an exemption of transshipment/transit in place, an EU emission
tax could distort transshipment/transit patterns and constitute a comparative disadvan-
tage for EU ports.

Exempting transshipped cargo is administratively simple. Transshipped cargo does not
clear customs, so if the emission tax is levied at the point of customs, transshipped
cargo does not enter the transactions anyway. Furthermore, the transshipment status
of products is documented in the existing customs systems. A similar logic holds
in transits. Exempting cargo in transit is again not administratively complex. The

\footnote{For a model to compute the competitiveness of a given port over other ports see ?.}
cargo is treated separately by customs already, and their tracking and control is already automated using the EU’s electronic transit system NCTS. Taking transit cargo out of the tax bills would hence be highly automatable and not require extensive new tax administration or any rule compliance processes.

3.1.3 Geographical coverage

Previous authors suggested that any unilateral emissions tax should only cover emissions released on the last inbound leg or first outbound leg (???). If cargo was transported, from—say—Sydney to Rotterdam with transshipment in Singapore, these authors suggested taxing only the emissions released on the transport from Singapore to Rotterdam, not the more upstream emissions. We instead argue that in order to avoid distortion of shipping routes, emissions released during the whole voyage should be subject to the tax. If only emissions released on the last inbound or first outbound leg were included under the tax scheme, a shipping company previously transporting cargo directly from its port of origin into the EU would now have an incentive to call at or have cargo transshipped at a port just outside of EU waters.\textsuperscript{14} The costs of transshipment might not outweigh the tax savings for all shipments, but on the margin defining the tax liability this way would distort trade routes, compromise environmental effectiveness and reduce tax revenues. Furthermore, transshipment would come at a cost to shipping companies, thus raising the cost of trade. The overall cost of maritime transport would therefore rise by more than the emission tax itself suggests.

A second consideration in favor of including the emissions released on the whole voyage is that the positive impact of this scheme on international climate negotiations would be much higher. If the emission tax is levied on the last inbound and first outbound leg only, non-EU transshipment ports in general and non-EU transshipment ports located close to the EU in particular could raise their market shares. As a result, the countries hosting these ports would likely prefer the unilateral EU scheme over an international or global one and thus block negotiations on international alternatives. The same arguments hold against the option of taxing emissions from all ship movements within territorial waters of the EU only. The above mentioned issues would even be aggravated under such a scheme.

To sum up, the optimal tax base for covering emissions from international shipping are the emissions released throughout the whole voyage to and from EU ports, excluding transshipment and transit. By contrast, for intra-EU shipments the emission tax can

\textsuperscript{14}Even if the transshipment occurred far away from the EU (so in the most optimistic case, where the tax evasion effects are still limited) the revenue losses from basing the tax liability only on the last leg could be significant. For example, if a shipment from Tokyo to Rotterdam that was previously shipped directly now included transshipment in Singapore, the tax liability could already be reduced by 26% (comparing the distances of the standard shipping routes used in both cases using www.sea-distances.org).
be levied on the maritime fuels without facing considerable base erosion. In the next section we will outline who should be the taxable entity.

3.2 Defining the legal tax liability

3.2.1 Association of geographical coverage, legal tax liability and accounting unit

Authors who advocate for restricting the geographical scope of the tax to the last in-bound leg of a voyage (???) or even only to voyages within EU waters (short-run policy favored by ?), also recommend locating the legal tax liability for an emission tax with the ship owner and to use the vessel as the accounting unit for the computation of the tax. We argue that these two recommendations are interdependent. If the ship owner is declared the legal taxpayer, obviously the vessel has to be the corresponding accounting unit. From that connection it results that only the emissions released by the very vessel calling at the first EU port are considered for the computation of the tax liability. Compromising the efficient use of this computation method, many cargo items are transshipped on their route from the port of origin to the port of destination. Consequently, the last vessel that transports the cargo from the last transshipment port to the first EU port accounts for just part of the emissions that were released in transporting that given cargo to the EU. This problem is small in bulk transport, where transshipment is rare, but large in container transport.

If, however, the total emissions released are to be covered under the tax scheme, the emissions released by the previous vessels in the transport chain also need to be included. But this requires refraining from treating the vessel as the accounting unit and its owner as the taxable entity. Otherwise, tax agencies would need to charge the owner of the last vessel for emissions that were released by vessels owned by other entities. Such a tax seems to lack a legitimate basis.

Instead, the tax liability should be situated with an agent who stays involved throughout the whole transport chain, irrespective of transshipment. The consignee of the cargo for imports and the consignor of the cargo for exports fulfill this requirement. The accounting unit that matches the consignee (consignor) is the unit of cargo. This solves the problem of how to tax the emissions in cases where vessels carry cargo from various ports of origin or to various ports of destination, respectively—the problem of multiple Bills of Lading that are considered potential sources of tax avoidance by ? and ?.

Within this framework, the effective tax rate would not vary in the composition of the cargo origins or destinations, as every cargo consignee (consignor) pays for the emissions released on the total distance from the port of origin to the port of destination.
3.2.2 Impact for extraterritorial extension

Defining the consignee (consignor) as the taxable entity has legal and political advantages, too. The consignee (consignor) of cargo imported into (exported from) the EU must always be a resident of an EU jurisdiction (Community Customs Code). Ship owners, by contrast, can be incorporated anywhere in the world. If the tax liability was on ships, it would hence often fall on foreigners, causing political and potentially also legal concerns of extraterritoriality. Extraterritoriality describes the legal limits on a country’s ability to impose obligations outside its own jurisdiction (Scott 2014). Given that most emissions are released in international waters, states need a solution to efficiently price the admissions at their source, while at the same time complying with their jurisdictional limits.

This solution is available through contract law. As above mentioned, extraterritoriality concerns only arise if a state is directly involved in imposing obligations outside its own jurisdiction. This is not the case if instead private parties charge each other across borders, though. If the EU imposes a legal tax liability on the domestic cargo consignee, that consignee will generally pass on some of the costs for this tax to his transaction partners. These transaction partners can be incorporated overseas, such as the foreign cargo consignor and the shipping company. The portion of cost being passed on depends on the relative elasticities of demand and supply and the market structure along the supply chain. Unlike public law, cost sharing through contract law is not limited by national borders: the private parties negotiating their prices will just take into account that the prices for the products have changed due to the tax. Which way the legal tax liability is distributed does not alter the fact which transaction partner pays the cost of the tax (??). Instead, the distribution of economic incidence of a Pigouvian tax always reflects exactly the relative shares of the transaction partner’s contribution to the environmental damage (Heine 2015). Due to this invariance, a state can levy a tax within its jurisdiction only—and hence not violate legal extraterritoriality restrictions—and, nevertheless, the foreign contributors to the occurrence of the emissions will pay a share of the tax. This share is efficient (ibid), and in any case, it could not be changed if the extraterritoriality constraint did not exist (??). Situating the legal tax liability for imported products with the domestic cargo consignee, and for exported products with the domestic cargo consignor thus enables the bypassing of legal extraterritoriality constraints without failing to efficiently make all domestic and overseas contributors to the externality pay in accordance with their responsibilities. Simultaneously, the political resistance from non-EU jurisdictions against a unilateral carbon pricing scheme established by the EU—which e.g. hampered the introduction of the EU-ETS—could be overcome since only EU residents would be subject to the emission tax.
3.3 Computing the tax base for international shipments

3.3.1 Overcoming the data problems

The computation of the right tax base requires detailed knowledge on the amounts of emissions released. This requirement is generally a concern in implementing environmental taxes. In one’s own jurisdiction, governments can overcome such data problems—for example for taxing emissions at power stations—by accompanying the tax with regulatory requirements for polluters to provide the needed data, e.g. through installing monitoring equipment. For emissions taxes in the maritime sector, similar regulatory requirements are complicated by extraterritoriality restrictions. The latter prevent domestic tax authorities from mandating control equipment on foreign ships. There is a way to sidestep this limitation—by mandating that ships which enter a state’s internal waters need to have certain monitoring equipment installed—but even such port access standards could not extend to ships used en route in transshipment services. Getting detailed information on maritime emissions is therefore legally even more complex than in other areas of environmental taxation and would require a mechanism to overcome this problem. One possible solution is combining taxation on default values with subsidies for being below these default values.

3.3.2 Impact on administration and compliance costs

The first step of this mechanism is to tax the domestic cargo consignee (for imports) or the domestic cargo consignor (for exports) for the emissions associated with their cargo on the basis of default values. This means that the tax authority would calculate the tax bill based on the emissions usually released by a vessel transporting one tonne of cargo cargo with the given characteristics for the given distance.

\[
\text{Tax bill} = (\text{Assumed distance}) \times (\text{tonnage}) \times (\text{assumed efficiency}) \times (\text{assumed emissions factor}) \times (\text{carbon price}) \times \frac{1}{2}
\]

Notice that only half of the incurred climate damage would be taxed. This is due to the assumption that the EU only has a legitimate claim on half of the tax base, while the country of origin (for imports) or the country of destination (for exports) has the right

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15This data-intensiveness holds particularly for local pollutants because, unlike the situation for CO₂, different processes of fuel combustion (for NOₓ, PM2.5, and VOCs) and different technologies for emissions capture vary the amount of pollution that is emitted per unit of fuel that is combusted.
16Distance from the port of origin of the cargo to the port of importation, assuming the most direct of major sea routes between the two places
17Tonnage of the cargo that was imported from the aforementioned port of origin
18Default value for the tonnes of fuel consumed per tonne-kilometer of cargo transported
19Tonnes of emissions of CO₂ per tonne of fuel consumed
20Tax rate, expressed in currency per tonne of carbon dioxide-equivalent
to claim the other half. Thereby no multiple carbon pricing would occur even if other jurisdictions introduced a similar carbon pricing scheme.

We cover in the next section how these items would be calculated quite precisely, but first consider further the mechanism. If the tax authority is right in its calculation of the tax base, and the default value matches the actual emissions, the tax provides the consignee (for imports) or consignor (for exports) with the Pigouvian price signal and no further complications arise. If, however, the calculation of the tax base was wrong because the tax authority used a default value that did not match the actual emissions, setting the right Pigouvian price signal requires one more step. To see this, assume first that the emissions were actually lower than was assumed by the tax authority. This case is dealt with by allowing the shipping company to optionally provide the tax authority with data proving that the transport of the cargo actually caused less emissions than the tax authority assumed in setting its default value. When such proof has been provided, the tax authority pays back the amount of the tax that has been charged too much. To overcome the extraterritoriality constraint, it is now important that the tax authority levies initially the tax at the cargo consignee (for imports) or the cargo consignor (for exports), but that any amount that the tax authority refunds upon proof that a given cargo was transported releasing less emissions than assumed, is repaid to the shipping company. This is important because the shipping company has the most information about how cargo was transported, so the shipping company will be able to provide the proof that cargo was shipped more sustainably than assumed.

The amount of the subsidy that the shipping company receives is given by the formula

\[
\text{Subsidy per unit of cargo transported} = (\text{Tax bill charged on that cargo}) - (\text{actual distance}^{21}) \times (\text{actual efficiency}^{22}) \times (\text{actual emissions factor}^{23}) \times (\text{carbon price}) \times \frac{1}{2}.
\]

Providing the data to prove the entitlement to a subsidy is not actually hard for shipping companies given that all these data are already easily accessible; many shipping companies even display this information on their website or in communication to their customers. The definition of distance underlying the formula is defined such that several ships can claim subsidies on the same piece of cargo and each receives only the portion of the distance that each ship should rightly claim given its contribution to transporting the cargo over the direct distance for between the port of origin and the port of destination.

For the distribution of the net costs of the tax, it does not matter that the state offers shipping companies a subsidy and charges cargo consignors (consignees) a tax—the

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[21] Total distance sailed by the ship after loading the cargo until offloading it. Unlike in the calculation of the tax bill, which assumed that the voyage was undertaken using the most direct major shipping route, this distance is based on the actual course of the ship.

[22] Actual tonnes of fuel consumed per tonne-kilometer of cargo transported

[23] Actual tonnes of emissions of CO\textsubscript{2} per quantity of fuel consumed
real incidence of the fiscal payments is not affected by the question to whom a tax or subsidy is remitted. This is because the cargo consignee (consignor) negotiates freight rates with the shipping company, and hence a shipping company that receives a subsidy will have to agree to a lower freight rate. The incidences would have been the same had both the tax and the rebate been on the consignor (consignee), but in order to both overcome the extraterritoriality problem and to establish the direct contact between the tax authority and the player that has the most information about emissions, this arrangement is needed.

Through these payments, shipping companies have an incentive to emit less than the default value set by the tax authority. With the subsidies that a more efficient shipping company receives, it can offer better freight rates, and it also must, since consignors and consignees choosing between different shipping companies will negotiate price such as to raise the amount of the subsidy that is passed through to them. Through this process, shipping companies have an incentive to supply the tax agency with an increasing amount of data, which enables the tax agency to incrementally improve the calculation of the default values that it uses to tax domestic consignees (consignors). The tax agency receives all the data it needs without having mandated the provision of this data. In this way, the tax agency becomes able to levy taxes over precisely quantified emissions even though it does not have the legal ability to mandate the taxpayers to report the emissions. The tax authority just needs to demand that the taxpayers providing the data also grant it rights to control the accuracy of the submissions through occasional tests. This way the tax authority’s rights problem is solved, and the occasional tests also incur much less administration costs than would have to be incurred if the tax authority had to prove to each polluter their emissions quantity.

Taxation on defaults, also called typification\(^\text{24}\), is a mechanism frequently used in other fields of tax policy (e.g. income taxes) when data constraints are dire. Such systems facilitate organizational learning due to taxpayers iteratively volunteering data that the tax agencies use to improve their calculation on realistic default values. These mechanisms are justified if the alternative—tax agencies calculating and proving the exact tax liability for each special case of a taxpayer—is too costly. Taxation on default values saves compliance and administration costs, including auditing costs. This cost reduction, however, is matched by losses of public revenue. These losses arise because only those taxpayers who believe that they have been over-charged have an incentive to opt for reassessment and provide the required data. Those knowing that they are less efficient than their average peers will just silently accept the agency decision. As a result, the tax agency will not earn as much tax revenue relative to mechanisms where they determine the liabilities of all taxpayers on a case-by-case basis. The loss in tax revenues can be balanced against the saved administration and compliance costs. If

\(^{24}\text{Typification is the systematic adaptation of default values for different stylized types of taxpayers.} \)
the tax agency sets the default values very highly, only little revenue will be lost because only few taxpayers can benefit from silently accepting that they have been taxed too lowly, but the administration and compliance costs become high, because a larger number of taxpayers demand the recalculation of their tax bills. In the extreme, an unrealistically high default value causes all taxpayers to provide data and demand a recalculation, so the tax agency has to return to individual calculation of taxes, on taxpayer at a time. The optimal default value is set by weighing these different costs. This is also a trade-off between environmental effectiveness and the costs of policy. A policymaker who cares most for the maximum environmental effectiveness will set the default value higher, as a greater proportion of maritime transport is then covered by dynamic incentives. A policymaker is willing to reduce environmental effectiveness a bit for lower administration and compliance costs, will instead set a lower default value. And a policymaker who most wants to cautiously implement a mechanism—for example to gradually expand the case-load of tax authority officials—would start with a lower default value and then gradually increase it.

3.3.3 Geographical coverage

The mechanism can have global scope without causing either extraterritoriality or data problems or more costs. The extraterritoriality problems are excluded because the legal tax liability in each case falls on domestic entities. The data problems are excluded because the incentive to shipping companies to provide the required data can be provided through subsidies towards shipping companies in the whole world without net costs.

A shipping company that claims the subsidy would prove that they have transported a given weight of cargo that either ended in the EU or originated in the EU, and that—in transporting this cargo—less emissions per tonne-kilometer have been released than the default value. For a ship that transported cargo that was imported into the EU, the amount of the subsidy that the shipping company would receive is the difference between the actual emissions per tonne kilometer and the default value, times the total tonnage of its cargo excluding any cargo that did not end up being imported into the EU, times the direct distance between the EU port and the cargo’s port of origin, times one-half to take into account that the EU is only taxing half the tax base.

The shipping company does not need to be the last carrier in the supply chain, so the one who brings the cargo into the EU destination port, in order to claim the subsidy. It is enough that the shipping company shows that cargo that it carried for some of the way to the EU has afterwards been imported into the EU. For example, if a piece of cargo was transported from Sydney to Rotterdam with transshipment in Singapore, the shipping company that transported the cargo from Sydney to Singapore can claim a subsidy for the share of the voyage that it accounted for. This way, carriers along
the whole supply chain are provided with the incentive to reduce their emissions and
provide their data. Whether these ships also transported cargo that did not end up in
Rotterdam does not matter for the calculation of the subsidy as the subsidy is paid only
per tonne of cargo that ended in Europe. That way the calculation of the subsidy is not
distorted by the composition of the cargo on board.

3.3.4 Computing the default values

Even though obtaining data about the emissions of ships in international waters is
legally and administratively complex when done for each ship, tax authorities in EU
member states already have precise knowledge of reasonable average values for such
emissions. The most important information in the calculation of the tax liability is the
weight of cargo transported, its ports of origin, destination and the identification num-
bers of the ships on which the cargo traveled. This data is readily available to customs.
The data used to be provided in paper, which would have made the tax calculation too
expensive to administer, but almost all of data is now in electronic form and automa-
table.\textsuperscript{25} Another important determinant of reasonable default values is the efficiency
of ships. Making adequate assumptions about the efficiency of different ship types is
still complex, but for a great proportion of ships and almost all ship types energy con-
sumption classification systems are now available.\textsuperscript{26} Ship efficiency changes a lot with
the speed of ships, and depending on the oil price, the average speed prevalent in the
maritime industry varies a lot. Taxes often have difficulty keeping up with such devel-
opments, but it is important that the default values could be adjusted. The data to make
these adjustments is available in customs data for the average speed\textsuperscript{27} and through AIS
positioning systems it is available in real time, which will be readily accessible from
2018. Tax authorities will be able to approximate the actual fuel consumption by using
data on the speed of the given vessel, the meteorological and oceanographic conditions
prevailing at the respective location of the vessel, its fuel economy classification, and
its load factor (EMSA 2014a; EMSA 2014b). All this data is automatable through integra-
tion of existing databases, thus enabling tax authorities to calculate adequate default
values and frequently update them without high administration costs.

It helps here politically that out of all departments of tax administrations, customs de-
partments are probably the most used to cross-country collaboration, with established
data transmission systems and even deeply integrated databases in the case of the EU,

\textsuperscript{25}In the EU, cargo information previously provided in FAL forms in paper form is since 1 June 2015 fed into
the eManifest, a harmonized electronic cargo manifest (Directive 2010/65/EU).

\textsuperscript{26}Through the Energy Efficiency Design Index (EEDI) and the Ship Energy Efficiency Management Plan
(SEEMP).

\textsuperscript{27}Through the times of cargo loading and discharging and the sea route distance.
which is not the case in most other fields of tax policy. By rooting our mechanism in custom departments, the calculation of the default value will hence be less held back by political games on database access.

*Calculation available in the European Union*

The above description of the calculation of default values could be used in most of the big destination markets. In the European Union, however, the calculation can be refined further. This is because, for the last leg of inbound shipments, the first leg of outbound shipments and intra-EU shipments, exact data on carbon emissions will become available to the European Commission and the EU member country’s tax authorities from January 2018 under the regulation on the monitoring, reporting and verification (MRV) of carbon dioxide emissions from maritime transport. The MRV system will cover about 90 percent of the relevant emissions, as vessels below 5,000 gross tonnage are excluded to reduce the administrative burden (7). This data is provided once per year, at great detail: down to the individual ship and the individual voyage.

The MRV system will provide precise estimates of the emissions for each individual ship, and in combination with customs data, MRV provides the emissions per tonne-kilometer for a specific ship.28 The emissions data are all known for the previous year, and taxation can proceed on the assumption that emissions continue as before. Such assumptions would then not need to be based on emissions of other ships, but can be estimated for each ship separately. Furthermore, this computation would come at little administrative or compliance cost.29

MRV will not include the emissions further upstream than the last port a vessel has called at before entering the EU, though. For this upstream part of the journey, the

28The future MRV system will collect data on emissions per tonne-kilometer released by a specific ship on a specific voyage. Even though the MRV system itself will not provide information on which cargo was transported with the given vessel or how much emissions were released broken down on each piece of cargo, it will record the ship identification number and how much CO₂ will have been released per tonne of cargo transported on the vessel at a given time. This piece of information can then be enriched with cargo information which is already available at EU Finance Ministries through their customs systems. The latter register the individual weight of all cargo loaded on vessels importing cargo into the EU or exporting cargo from the EU. Customs authorities furthermore have information on the port of origin or port of destination, respectively, of imported and exported cargo, which provides a reasonable approximation of the distance over which the cargo was shipped. This customs data—weight and distance of specific cargo on board an identified ship—can be combined with the MRV data on the emissions released per tonne-kilometer by the respective ship. This yields the emissions released per unit of cargo, which can be attributed to an individual consignee (regarding imports) or consignor (regarding exports) for the purpose of taxation.

29The calculation of the tax base described here would involve only little administrative complexity. First, the MRV and customs data is going to be collected at that level of detail mentioned above whether or not it is used for taxation, so this use would not cause additional system cost. Second, the data in the MRV and customs systems are likely to be suited for highly automated processing: The MRV data will be available via an electronic and hence automatable system, applied uniformly across the EU. The existing customs system is to date the most integrated building block of EU tax policy, with automatic data exchange between member states, common rules for the data items raised, and plans for even further harmonization in the future.
above-mentioned alternative data systems would need to be used to compute the default values, or the default value would be set at the average amount of emissions of comparable ships in the MRV system. For example, if there was transhipment of containers at a foreign port, the default value for the emissions assumed to have occurred in transporting the cargo from the port of origin to the transhipment port could be based on the average emissions of container ships in the MRV system or it could be assumed that the first leg of the journey released as much emissions per tonne-kilometre as the second leg for which that data is available. Further refinements to these default values are possible through varying choosing a default value for the upstream ship that matches emissions typical for a ship with the same energy consumption classification index (from EEDI) and the same speed (from AIS). The default value would then be based on the emissions per tonne-kilometer released on average by a ship with the same EEDI value and the same speed in the MRV system. Since the MRV will collect a very large dataset, a precise and automated propensity score matching would be possible, and produce close default values for most ship types.

Data proof of the subsidy claims

It is already common industry practice for shipping companies to calculate their CO₂ emissions, and shipping companies do already retain their fuel delivery notes which allow a simple computation of these emissions. The mechanism therefore does not impose large additional cost on shipping companies when those collect data in order to claim the subsidy. The main new data item comes from our formula’s requirement that for subsidization claims the ship must be able to proof its actual routings. But also this data is readily available and verifiable through AIS positioning systems. So for these parts of the above formula, the tax authority has precise data on which it can base its assumptions for calculating the tax liability, and established and trusted data exchange mechanisms exist for the shipping companies to make claims for subsidies in an easily automatable form.

3.4 Computing the tax base for intra-EU shipments

When emissions from international shipping are taxed, it is important to equally tax emissions from domestic shipping. Excluding them from an emission tax would not compromise the environmental effectiveness of the tax, but this imperfect coverage would equally raise legal concerns. This is because to achieve WTO-compliance, the definition of the tax base should not result in a discrimination between imported and non-imported products within the European market (see Section 6 for a detailed discussion). While products imported from non-EU countries would fall under the coverage of the tax on international shipping, a fraction of domestic products would be
transported by vessels operating within European territorial waters. If emissions from vessels operating in EU territorial waters are exempted from the tax, discrimination could be constituted to the extent by which the products transported by these vessels compete with products transported in international shipping. We hence describe in the following how emissions from domestic shipping could equally be taxed at the same rate as international shipping.

Using a customs-based taxation of emissions also for intra-EU shipments is possible but not optimal. The taxation of the cargo consignee (consignor) could not be organized as easily for intra-EU transport as for international transport. The reason is that for charging the consignee (consignor), the MRV data on emissions per tonne-kilometer needs to be complemented with customs data on the weight of the cargo and the distance over which the cargo was transported. In certain cases customs authorities do raise data also on intra-EU shipments—even if customs do not have to be cleared for the inland cargo—since the status of the cargo as “community goods” needs to be demonstrated in various circumstances. But there are also situations in which this data is not raised by customs authorities, i.e. when vessels never leave EU waters and exclusively transport community goods. Then the tax base could not be computed. Furthermore, even where the data is raised to establish the status of cargo as “community goods”, it would not be used to charge the consignee (consignor) for anything. The intuition of the mechanism that we have suggested for international shipping, however, is that established transactions and systems should be re-used to the greatest extent possible to keep system costs down. But for intra-EU cargo, there are no existing customs bills to which the emission tax could be added. Accordingly, using the customs system to tax emissions for intra-EU trade seems less appealing than it is for emissions arising through trade of EU member states with the rest of the world.

Introducing a fuel tax on emissions from intra-EU shipping as suggested e.g. by ? and ? would circumvent these issues. Under such a design the emissions would be taxed upstream, i.e. the GHG emissions would indirectly be taxed by determining the tax rate according to the carbon content of the fuel. A fuel tax would be simple to administer and to comply with. By contrast to the mechanism we have outlined previously, under a fuel tax the consignee (consignor) of the cargo cannot be the taxable entity, though. Both extraterritoriality concerns (as the emissions are released within EU territorial waters) and the issue of multiple Bills of Lading (as the tax base is independent of the cargo origin) can be waived for a fuel tax on intra-EU shipping. Instead the taxable entity should be the vessel owner. This does not preclude levying the tax at refueling companies in order to reduce compliance and administration costs.

The weak point of a fuel tax for intra-EU shipping, however, is that it offers loopholes for tax avoidance – the very argument that has led us to disfavor such a tax in the case of international shipping. This Achilles heel would not be as strong, though, in intra-EU
shipping. If the tax was levied throughout the EU, the opportunities for tax avoidance for vessels transporting goods within the EU would be limited. The only opportunity to avoid the tax would be by leaving EU waters in order to refuel outside the geographical coverage of the fuel tax. However, this would not suffice to completely avoid tax liability, since if a vessel left EU waters for refueling, it would automatically be covered by the above described emission tax on international shipping. This is because under existing EU customs laws a domestic vessel leaving and re-entering the EU must register its cargo in the EU customs system, even if it transports EU cargo only, to have the EU status of the cargo re-determined. As a result, a domestic vessel leaving the EU in order to refuel elsewhere and thus avoiding the fuel tax would be covered under the custom-based tax on emissions arising from international transport.

Opportunities for tax avoidance by refueling outside EU waters could also be limited by prohibiting the installation of refueling platforms within the EU member state’s EEZ. The sea area covered by the EEZ is so large in comparison to the 12 nautical miles of territorial waters, that any remaining incentives for tax avoidance should be effectively reduced. The Netherlands, Belgium and Germany are examples of countries that already use maritime spatial planning. The prohibition of floating refueling platforms would only be an extension to this existing system.

Where two systems for computing a tax base co-exist, they can overlap. Thus, these systems would need to be safeguarded against double-taxation. For this purpose, international vessels that refuel in EU ports should be exempted from the fuel tax. This is because emissions from international vessels are already covered by the emission tax. Hence they should not be taxed twice through a tax on their fuel consumption. Furthermore, vessels departing from the EU for international destinations are equally covered by the emission tax and should thus be exempt from the fuel tax, too. The amount of tax-free refueling by vessels leaving the EU should not be limited, e.g. to the estimated quantity of fuel to be consumed on the remainder of the voyage outside EU waters. Any such limitations would compromise the EU share in the international bunkering business because refueling quantities sufficient for more than one voyage is common practice, not just a potential tax-avoidance strategy.

However, if bunkering of tax-free fuel per eligible vessel should not be limited, emphasis has to be placed on which vessels are eligible. Clearly, vessels not leaving EU waters after refueling should not be entitled to tax-free bunkering. But leaving EU waters for a short distance only should not qualify vessels either in order to discourage tax avoidance through disguised round-trips. To be entitled to tax-free bunkering vessels should have to leave EU waters for a voyage long enough to just disincentivize fuel tourism. Eligibility for tax-free bunkering should have to be proved by producing the relevant customs documents which indicate the next port of call and thus document that the vessel will travel outside EU waters for a long enough distance.
Another form of overlaps could occur where domestic vessels that have already paid the fuel tax leave the EU for a nearby port, load cargo there, and subsequently re-enter the EU. The consignee of these goods would then be liable to pay the emission tax, passing some of the economic incidence of the emission tax onto the vessel owner. As the latter, however, would already have paid for its emissions through the fuel tax, he would carry more than the intended tax burden. To correct for this over-taxation, the vessel owner would have to be allowed to demand a rebate on its previous fuel tax bill, accounting for the amount of emissions that were covered under the emission tax.

3.5 Defining different taxpayers in international and intra-EU shipping

Above we have argued that for the emission tax applied to international shipping the taxable entity should be the consignee or consignor. Whereas, for the fuel tax applied to domestic shipping we argued that the taxable entity should be the vessel owner. At a first glance, an observer might find this variation in the taxable entity discriminative in some way. Economically, such discrimination does not exist, however. Instead, this arrangement minimizes the overall system costs.

3.5.1 Tax remittance invariance

By the standard Tax Remittance Invariance (??), the costs that vessel owners, consignees, consignors and fuel suppliers bear as a result of the taxes proposed would be the same independently of whom is the taxable entity. This is because the agent on whom the tax burden is imposed will pass some of it onto his transaction partners. For example, the ship owner or the shipping company will pass some of their fuel tax burden onto the consignees and consignors of the cargo. The same applies to the custom-based emission tax in international shipping. For example, if the consignee of the cargo foresees to be charged additional costs associated with the cargo, he will pass it partially onto the shipping companies. Again, the shipping company, which is thereby indirectly burdened by an emission tax, will pass some of that cost onto its fuel suppliers. The extent to which each agent is able to pass the real incidence of the tax onto other agents is determined entirely by the market structure and the elasticities of demand and supply along the supply chain (??). The fact that for domestic shipping, the legal obligation to remit the tax would be on ship owners, while for international shipping that remittance obligation would be on consignees/consignors does not change the distribution of the tax incidence borne by ship owners and consignees (consignors).
3.5.2 Minimizing system costs for domestic and international shipping respectively

Compliance costs

Instead, this attribution minimizes the overall size of the costs borne by these agents. This is because one way in which the legal incidence matters for the economic incidence is in determining the extra burden for the taxpayer. Paying a tax is associated with compliance costs (the taxpayer needs to organize how to pay the tax, what documents need to be filled in, etc.). These compliance costs are not the same for all possible taxable entities. Thus, the taxable entity should always be the agent facing the least compliance costs. This way, the overall burden associated with the tax is smallest. As a result, all agents benefit because the agent who bears the legal tax liability is going to pass on not just part of the tax itself, but also part of the compliance costs. So if the agent with the lowest compliance costs is the taxable entity, also the economic incidence borne by all agents participating in the transaction will be reduced. This means that the legal tax liability is actually relevant for the economic incidence of the tax, but only in terms of the amount, not in terms of the proportion of the total cost.

For the customs-based emission tax in international shipping, we have shown why the compliance costs are low for the consignee. This is because the consignee (consignor) is already the taxable entity for other custom-based charges on the same cargo. Adding one more item to the list of existing custom charges appears to cause lower compliance costs than establishing a whole new transaction between the custom department of a tax authority and shipping companies. For domestic shipping, the custom-based transaction does not exist and hence defining the consignee (consignor) as taxable entity would establish a whole new transaction and thus increase compliance costs. Adding a fuel tax to an existing fuel bill, however, causes only low compliance costs.

Administration costs

The second way in which the definition of the taxable entity could change the economic burden arising from the tax is through administration costs. The costs for the tax authorities in administering the tax payment vary in the taxpayer. The lower the administration costs the higher the net revenue. As a result, government needs lower taxes (or lower borrowing) to raise the same public revenues. The transaction partners could benefit therefrom directly through a lower tax rate, or indirectly as participants in economic life. In the case of a Pigouvian tax, the tax rate is set reflecting the external damage and should therefore not be varied in administration costs. Both effects would, however, reduce somewhat the net economic burden of the tax.
Again, as regards international shipping, administration costs should be lower using the existing customs system—which already refers to consignees (consignors)—than setting up a completely new system. For domestic shipping, setting up a system similar to the custom-based system for international shipping would be costly to tax administrations, though. As fuel taxes are established already in other areas of energy policy with very low administration costs, they appear to be the second-best option.

3.6 Setting the tax rate

The tax rate can be determined in two different ways. Either the EU sets a tax rate reflecting the damage inflicted on the EU only. Such a tax rate would imply a price of GHG emission much lower than the accounting prices for CO$_2$ usually used by governments, since the latter are always calculated as to mirror damages accruing to the whole world. For legal reasons, a tax rate set along these lines might legally be easier to maintain. Alternatively, the EU could set the tax rate according to the estimates of global damage caused, thereby achieving greater climate change mitigation effects. However, in this case accommodating expenditure policy, i.e. earmarking of tax revenues, might be necessary to ensure compliance with the United Nations Law of the Sea (UNCLOS). For a discussion of the legal implications see further in Part II.

The nominal tax rate levied on emissions in international shipping should be equivalent to the implicit tax rate levied on fuel in domestic shipping. I.e., if a tonne of GHG is taxed at a certain rate in the custom-based system, the fuel tax should be set based on its carbon content such that the implicit tax per tonne of CO$_2$ released at the point of combustion will be the same. Keeping the nominal tax rate the same for the emissions from international and domestic shipping is important both for Pigouvian considerations and for WTO compliance (see Section 6 for a detailed analysis).

4 Conclusion

This part of the paper has set out how indirect tax subsidies for maritime fuels in the EU can be removed by unilaterally introducing an emission tax on the latter. The starting point of our analysis is the lack of an international agreement on the inclusion of maritime transport under an emission pricing scheme, and the failure of fiscal policy to compensate for the climate damage caused by an emission tax of equivalent size. In previous literature it has been held that the high mobility of the tax base as well as possible distortions to trade patterns and thus global growth made a unanimous agreement on a global level indispensable. We propose a feasible and cost-effective tax mechanism which takes account of the above mentioned issues. In doing so, we argue that
by introducing a unilateral tax scheme covering maritime transport emissions, the EU could change the reference point in international negotiations such that the currently prevailing grid-lock could be startled and a global agreement could be reached.

Part II

Legal Analysis

This second part of the paper analyzes the legal framework surrounding the regulation of GHG emissions from maritime transport and provides a legal assessment of the carbon tax proposed in this paper. Most legal challenges arise from the unilateral character of the measure which would likely raise concerns under international law, in particular with regards to the climate change, Law of the Sea and WTO regimes, as well as other principles of international law. A different set of issues arises from the specific design aspects of the measure to be implemented in the EU. Therefore, this section considers the key external aspects, including the legal interplay at the international and European level, and specific aspects of internal EU law.

5 The Climate Regime

This section analyzes whether the EU and its member states (MS) would be in compliance with their commitments under the climate agreements they are part to. It is concluded that these agreements do not represent any obstacle for the proposed measure, and furthermore, it is argued that adopting such measure is in line with the EU climate commitments.

In areas of shared competence, the EU and its MSs can negotiate and conclude international agreements. In virtue of this competence, the EU and its MSs are signatories to the United Nations Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol (KP), and participate in the conferences and meetings of the parties.

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30 The EU may conclude international agreements aiming to the protection of the environment, which are binding upon the EU institutions and MSs. Article 216 of the Treaty of Functioning of the European Union (TFEU) and Article 191.4 TFEU.
31 Council Decision 94/69/EC concerning the conclusion of the United Nations Framework Convention on Climate Change approves the UNFCCC on behalf of the EC.
32 Council Decision 2002/358/EC concerning the approval, on behalf of the European Community, of the Kyoto Protocol to the United Nations Convention on Climate Change and the joint fulfillment of commitments thereunder. Articles 2 and 3. EU’s commitment to reduce their GHG emissions 8% below 1990, for 2008-2012, which the so-called 'Burden Sharing Agreement' translated later the common 8% into differentiated emissions reduction for EU countries.
(COP/MOP) and other climate bodies in implementing the obligations, and in negotiat-
ing a future climate agreement. Here we assess the competence of the EU to introduce
the proposed tax on maritime emissions, given its obligations and commitments under
the climate regime and the legal challenges that the measure could face in this connec-
tion.

5.1 The UNFCCC

The UNFCCC is the umbrella instrument for the regulation of GHG emissions whose
provisions regarding its objectives, guiding principles and obligations also relate
to emissions from maritime transport. Parties opted for the formula of a framework
convention-protocol, familiar to other environmental regimes, where the UNFCCC
rather than setting binding restrictions on GHG for countries provides a framework for
negotiating subsequent agreements that are called to set the specific limits. However,
the Convention established a common, ultimate objective for the Parties in achieving
“the stabilization of greenhouse gas concentrations in the atmosphere at a level that
would prevent dangerous anthropogenic interference with the climate system’ (UN-
FCCC, Article 2). And, as stated at the end of Article 2, the stabilization level is to be
achieved within a certain time frame “sufficient to allow ecosystems to adapt naturally
to climate change, to ensure that food production is not threatened and to enable eco-
nomic development to proceed in a sustainable manner.’ As such, the convention does
not propose an absolute ban on GHG emissions or on the activities causing such emis-
sions, but to stabilize them. In terms of articulating a legal obligation, the provision
can be regarded as ‘an ill-defined obligation’ (, p. 352). However, some authors have
argued that the agreement at the Copenhagen Accord and Cancún Agreements to keep global temperature under 2°C over pre-industrialized levels constitutes the ‘quantifi-
tation’ of the Convention’s objective (, p. 51-53). This overarching objective
applies to the climate regime as a whole, i.e., to the Convention and any related legal
instruments that the COP may adopt. However, as a framework convention, the UN-
FCCC does not specifically state how to achieve its objective and the commitments are phrased in non-binding language.\(^{39}\)

In a similar fashion, the UNFCCC embraces some principles which should guide Parties ‘in their actions to achieve the objective of the Convention and to implement its provisions’.\(^{40}\) These guiding principles are located in the Preamble and in Article 3 of the Convention and although the legal status of these principles is not necessarily binding, Article 3 is not without legal effect for interpretation, implementation and future negotiation issues.\(^{41}\) They are, namely: the principle of intra- and intergenerational equity and of Common but Differentiated Responsibility and Respective Capabilities (CBDRRC)\(^{42}\), especially in connection with the most vulnerable countries,\(^{43}\) the precautionary principle,\(^{44}\) cost-effectiveness,\(^{45}\) sustainable development and growth.\(^{46}\) It has been argued that together, the precautionary principle,\(^{47}\) the principle of sustainable development\(^{48}\) and the principle of CBDRRC ‘form a basis for the substantive provisions of the Convention’? p. 345.

The commitments established for all Parties\(^{49}\) in Article 4.1 (a) and 4.1 (c) are specifically relevant to maritime emissions. Firstly, Article 4.1 (a) asks countries to ‘Develop,

\(^{39}\) For example the soft aim of returning the GHGs emission to 1990 levels for developed countries by 2000.

\(^{40}\) UNFCCC, Article 3 expresses that the Parties shall be guided by the principles contained in it.


\(^{42}\) UNFCCC, Article 3.1 states that ‘The Parties should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.’

\(^{43}\) UNFCCC Article 3.2 states that ‘The specific needs and special circumstances of developing country Parties, especially those that are particularly vulnerable to the adverse effects of climate change, and of those Parties, especially developing country Parties, that would have to bear a disproportionate or abnormal burden under the Convention, should be given full consideration.’

\(^{44}\) UNFCCC Article 3.3 states that ‘The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, (…)’. \(^{45}\) UNFCCC, Article 3.3 (…) that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost.”

\(^{46}\) UNFCCC Article 3.3 and 3.4. The former states that ‘The Parties have a right to, and should, promote sustainable development. Policies and measures to protect the climate system against human-induced change should be appropriate for the specific conditions of each Party and should be integrated with national development programs, taking into account that economic development is essential for adopting measures to address climate change.’ See also, UNFCCC, Article 5, which states that ‘The Parties should cooperate to promote a supportive and open international economic system that would lead to sustainable economic growth and development in all Parties, particularly developing country Parties, thus enabling them better to address the problems of climate change. Measures taken to combat climate change, including unilateral ones, should not constitute a means of arbitrary or unjustifiable discrimination or a disguised restriction on international trade.’

\(^{47}\) The precautionary principle stated in principle 15 of the Rio Declaration, implies that the lack of full scientific certainty cannot be used as a reason for inaction in relation to an environmental threat.

\(^{48}\) Sustainable development is ‘the development that meets the needs of the present without compromising the ability of future generations to meet their own needs’ (Brundtland Report).

\(^{49}\) Taking into account their common but differentiated responsibilities and their specific national and regional development priorities, objectives and circumstances’. This is translated in different content and timetables for the reporting obligation of Non-Annex I countries.
periodically update, publish and make available to the Conference of the Parties, in accordance with Article 12, national inventories of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, using comparable methodologies to be agreed upon by the Conference of the Parties.

However, the regime distinguishes between the domestic and the international sphere when it comes to emissions from maritime transport. While emissions from domestic maritime transport are included in their national totals as part of the country’s transport emissions, the international ones are reported separately and do not count towards national totals.

The second provision in the convention that relates to maritime transport emissions is Article 4.1(c) which prompts Parties to ‘promote and cooperate in the development, application and diffusion, including transfer, of technologies, practices and processes that control, reduce or prevent anthropogenic emissions of greenhouse gases not controlled by the Montreal Protocol in all relevant sectors,’ including transport.

Furthermore, the climate change regime has embraced the use of flexible and economically efficient instruments, including the use of market-based measures (MBMs), to reduce GHG emissions. The UNFCCC states among its guiding principles that ‘…policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost’. MBMs can be adopted by countries and regions or globally.

Global taxes can be defined as taxes adopted by a group of countries on a coordinated basis, and whose revenues could also be used as a source of international finance. Here the only issue at stake in the establishment of the proposed tax relates to issues regarding the use of the potential revenues. Specifically, there is scope for taxes imposed on the sector that can generate additional finance to invest in climate change adaptation and mitigation measures in developing countries. One of the main reasons to support a revenue-raising measure is found in the polluter pays principle (PPP) which in the case of the climate regime is considered to build on and complement the CBDRRC principle. In this connection, some MBMs can be considered to be regressive, for example an ETS which allocates allowances of an economic value to the polluters free of charge, whereas they should be paying.

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50UNFCCC, article 12 contains the obligation of communicating to the COP, among other issues, parties’ national inventories. Art 12.1 (a). ‘In accordance with Article 4, paragraph 1, each Party shall communicate to the Conference of the Parties, through the secretariat, the following elements of information:(a) A national inventory of anthropogenic emissions by sources and removals by sinks of all greenhouse gases not controlled by the Montreal Protocol, to the extent its capacities permit, using comparable methodologies to be promoted and agreed upon by the Conference of the Parties.’

51UNFCCC Article 3(3).

52For the case of aviation, see ?.

53However, if environmental taxes are not established internationally, they can entail ‘loss of competitiveness for domestic industry and regressive impacts that disadvantage the poor’ ?, p. 75.

54See, for example, ?.

55An overview is offered in ?.

56See further in ?, p. 15-16.
according to the PPP, for the environmental cost of their activities. Hence the proposed tax is more in line with the PPP.

5.2 Article 2.2 of the Kyoto Protocol

Although transportation was mentioned in the UNFCCC, Article 2.2 of the KP is the only hard-law provision in the climate regime which explicitly names and establishes rules for international maritime emissions. Article 2.2 urges parties to take action through the IMO in regard to emissions from shipping. However, the text of the article is not clear in various aspects, thus requiring further analysis. The exact role given to the IMO is imprecise and the relationship of the signatories to the KP with the IMO regime is also unclear. Neither is there explicit direction on whether States, individually or jointly, should refrain from acting in this area, or indications in cases of conflict or in the event of inaction or delays in action within the IMO. However, even if a multilateral solution is envisioned in the KP by assigning responsibility to the IMO regime to tackle emissions, it can be inferred that Article 2.2 does not appoint exclusive authority or either preclude action from outside these fora. In this regard, a restrictive interpretation of the article would oppose the objective of limiting emissions; therefore a teleological interpretation is more appropriate.

Eckhard Pache presents two arguments in support of the idea that Article 2.2 lacks any intention to adjudicate the ‘sole authority’ in tackling emissions from international maritime transport to the IMO. First, a veto on advancing the regulation in other fora would undermine the aims of the protocol and the climate regime as a whole. Second, two provisions in the UNFCCC support this interpretation; principally Article 7.2 of the UNFCCC, which ‘reserves the right to review any legal instrument adopted on the basis of this convention, thus leaving competence for monitoring and implementing...\)

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57UNFCCC, Art 4.1.
59Kyoto Protocol, Article 2.2: “The Parties included in Annex I shall pursue limitation or reduction of emissions of greenhouse gases not controlled by the Montreal Protocol from aviation and marine bunker fuels, working through the International Civil Aviation Organization and the International Maritime Organization, respectively”
60See, in regards to room for State action in 2.2 KP, ?.
61Also, in regards to aviation, see, Case-366/10. Opinion of Advocate General Kokott.
63UNFCCC, Article 7.2, ‘The Conference of the Parties, as the supreme body of this Convention, shall keep under regular review the implementation of the Convention and any related legal instruments that the Conference of the Parties may adopt, and shall make, within its mandate, the decisions necessary to promote the effective implementation of the Convention’.
to the COP’ \( (??) \). In fact, after COP 13 in Bali (2007), international maritime transport was included in the negotiations under the UNFCCC for a post-2012 agreement, demonstrating that the UNFCCC is also a legitimate authority and forum for action \( (??, \text{p. 616}) \). Secondly, there is Article 4.2(a) of the UNFCCC which requires developed countries to take the lead in limiting their emissions. Also, the opinion of the Advocate General of the Court of Justice of the European Union (CJEU) regarding the ATAA Case\(^{64}\) uses pleas of uneven membership to embrace the non-exclusivity authority of the specialized agencies in Article 2.2.

In any case, Article 2.2 is a commitment of the Parties to take subsequent action in limiting the emissions from bunker fuels, given the impossibility of reaching an agreement in Kyoto. This is summed up by \( ??, \text{p. 17} \) who states that ‘the wording negotiating history and subsequent practice related to article 2.2 of the Protocol do not seem to support the view that parties to the protocol have conferred on the ICAO (or IMO) the sole authority to address aviation emissions and have prohibited any other multilateral or unilateral measures.’ The subsequent practice of Annex I countries reporting their work under IMO, and the fact that such commitment is subject to review by experts and the Facilitative Branch of the KP compliance committee, also supports the idea that Article 2.2 was not a full delegation of power \( (??) \).

In this context, the term ‘shall pursue’ used in the Article, points towards a direction for action, involving a request for the IMO to find a route forward, rather than an exclusive mandatory requirement, or a prohibition on any work on international maritime emission through different arenas. The other official language versions of the KP, i.e., Spanish and French, point towards this interpretation as they use non-binding formulas, in this case the words ‘procurarán’ and ‘cherchent’, respectively. Neither of these terms express the sense of obligation that ‘shall’ could confer to the provision. The binding force of the provision is also elucidated in the Advocate General Kokott’s opinion to the AATA Case.\(^{65}\)

In particular, with regards to unilateral action, it is useful to consider the argument put forward by Kokott with regards to the ATAA Case. Although she recognized the preference of Article 2.2 for multilateralism, she argued that this cannot be understood as an exclusive competence of the UN agencies or a prohibition for the EU to regulate emissions from international aviation. According to Kokott, this is especially relevant as regards the lack of progress and overall delay of action at the international level.\(^{66}\)

In the same line of thought, the CJEU ruling considered that Article 2.2 lacks precision and that its assignment of responsibility to ICAO (and IMO) is not unconditional.\(^ {67}\)

\(^{64}\)Case-366/10. Opinion of Advocate General Kokott delivered on October 6, 2011.

\(^{65}\)Case-366/10. Opinion of Advocate General Kokott. However, the Court did not enter to value the claim in this point.


\(^{67}\)Case C-366/10.
However, there is no unanimity among the legal community and some authors question this matter, considering that the mandate of the KP is exclusive (??).

In addition to the above topics, Article 2.2 opens questions on two other fronts. Firstly, on the issue of which States should be pursuing measures, i.e., just Annex I countries, all signatory states of KP or all members of the IMO. The issue of membership between regimes arises here. Secondly, there is the issue of whether Parties and the IMO are somehow bound to work under a differentiated basis when dealing with climate change. Both issues, however, are interrelated.

It seems from the wording of Article 2.2 that differential treatment with regard to the regulation of maritime transport is the favored option. Although the article points towards the IMO as the preferred forum for advancing negotiations, it is unclear whether they are obliged to work on the basis of differentiation. The question becomes especially relevant because the IMO operates, as a general rule, on the premise of equal treatment, which is given in its constitutive instrument and has been secured through the regime’s practice. In any case, the scope and content of the principle is contentious. And the obligation of parties to make use of CBDRRC with regards of their policies is weak, since CBDRRC does not enjoy the status of general principle of the law and that CBDRRC applies to countries. Additionally, differentiation can be established in a variety of ways, through commitments, but also in terms of implementation and technology and financial assistance.68

To conclude, there is no prohibition on unilateral action in the climate regime preventing the EU from establishing measures that contribute to the achievement of: firstly, the national commitments which include the EU’s domestic emissions; secondly, the legitimate pursuance of fulfilling the UNFCCC’s ultimate objective. With regards to CBDRRC, although the proposed tax must be established on a non-discriminatory basis, the use of the revenues could be directed to climate adaptation and mitigation projects in developing countries, if not for the purpose of avoiding legal claims, in order to increase the legitimacy of the proposed tax at the international level.69

6 WTO Law

This section analyzes the legality of the proposed tax under the WTO system which is comprised by the WTO Agreement and the General Agreement on Tariffs and Trade (GATT). We conclude that the measure is in compliance with the WTO regime.

The objective of the WTO system is to ensure a level playing field, at the international level, of trade activities though rules in different areas, including services, ensuring

68 This issue has been explored somewhere else for the case of international aviation emissions, by ?.

69 In the same vein see ?.
fair competition. Transportation is considered a service area\(^{70}\) and it is comprised in the WTO General Agreement on Trade in Services (GATS)\(^{71}\) and regulated under the same principles.\(^{72}\)

Despite its remit to promote trade liberalization through the principles of Most Favorable Nation and National Treatment, WTO law generally permits exceptions and limitations based on environmental grounds (\(?\), p. 507-556). In that connection, interactions between climate change and trade measures have been established (\(?\)). The regulation of international maritime emissions at the global level, would in principle be compatible with WTO law provided that there is no discrimination between vessels delivering goods from jurisdiction A to jurisdiction B, i.e. that the national treatment in jurisdiction B does not discriminate against international or national ships. If, for example, a global measure was created in the field of international maritime transport through a convention or any other instrument administered by the IMO this would greatly reduce the scope for disputes to be settled by the WTO. This is because the IMO is not a member of the WTO and only countries can bring disputes against other members in front of WTO tribunals.\(^{73}\) However, the situation is different in the case of national or regionally enacted legislation, such as the measure proposed here, which could be regarded as being incompatible with WTO law. Within this framework this section assesses the potential challenges that EU could face if the above mentioned measure was implemented.

### 6.1 Article III (2) GATT

Since a tax on emissions from maritime transport is likely to increase the price of the transported goods, it arguably falls under the provision of Article III (2) GATT.\(^{74}\)

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\(^{70}\)For an overview see ?.

\(^{71}\)In 1995 the WTO adopted The General Agreement on Trade in Services (GATS), in order to pursue the elimination of barriers to services trade in a similar fashion as the GATT does with the trade in goods. It relies upon the principle of non-discrimination that is translated into two more specific principles: most favorable nation and national treatment, as for products. The usual WTO dispute settlement applies to GATS.

\(^{72}\)The present work focuses on the legality of the proposed tax under the GATT because the Decision of the Council of Trade in Services of 28 June 1996 (S/L/24) has suspended the application of the Most Favorable Nation principle to maritime shipping, leading many observers to maintain that the international maritime sector is de facto outside of the scope of the GATS (see for instance: ? and ?). As a consequence, it is unlikely that the measure could be challenged under the GATS. In addition, article XIV GATS provides similar exceptions to article XX GATT. In the absence of relevant case law on article XIV GATS, the existing case law on article XX GATT might offer a useful guideline for the interpreter. In this connection, the analysis offered in the present work is likely to be relevant in the occurrence of a challenge of the measure under the GATS.

\(^{73}\)A similar explanation was provided in regards to maritime transport at the 62nd MEPC of the IMO in a presentation from an WTO official. Report of the third Intersessional Meeting of the working group on greenhouse gas emissions from ships. Note by the Secretariat. MEPC 62/5/1 (8 April 2011). pp 19-20. It was contested by the Indian delegation in the Annex of the same document, pp.4-5.

\(^{74}\)Article III (1) GATT reads: “The Members recognize that internal taxes and other internal charges, and laws, regulations and requirements affecting the internal sale, offering for sale, purchase, transportation,
However, because of its environmental character, the measure can be justified under Article XX GATT, which is argued in the following.

Article III (2) GATT aims to guarantee equal conditions of competition between imported and non-imported products within a market (7). In this connection, two arguments can challenge the tax proposed here: First, based on the claim that imported products are ‘like’ domestic products but the former would be taxed in excess to the latter (Article III (2) GATT first sentence route). Second, it could be argued that despite being directly competitive or substitutable products, imported products and domestic ones are not similarly taxed and that this difference in taxation is applied so as to afford protection to domestic production (Article III (2) GATT second sentence route). When the Article III (2) GATT first sentence route is followed, there is no need to prove that the taxation in excess is applied so as to afford protection, since the taxation in excess of a like product amounts automatically to an infringement to the “applied so as to afford protection” requirement (7). Interpretations from the Appellate Body (AB) and the legal literature on the key terms of this provision are numerous and divergent (7). Here it should suffice to notice that whether two products are “like” or “directly competitive and substitutable” has to be established on a case by case basis (75). Additionally, for a party to show that a measure is applied in a way that affords protection (Article III (2) second sentence GATT), a comprehensive comparative analysis of the structure and application of the tax on domestic and imported product will be required (7). With regards to the term “excess”, it has been held that “even the smallest amount of excess is too much” (76). Conversely, “dissimilar taxation” is interpreted as a heavier taxation of imported products that surpasses a de minimis threshold (77). Thus it is important to establish the conditions for a tax on emissions from international maritime transport to be either in excess to the taxation of domestic products or regarded as dissimilar taxation.

There are two main scenarios where this is possible: First, if emissions from vessels transporting cargo within EU waters—being exempted from clearing customs—were not taxed, the taxation of emissions released in international shipping could be challenged as being a tax in excess or dissimilar taxation under Article III GATT. Second, it could be argued that a tax on maritime fuel emissions could amount to be a de facto excess or dissimilar taxation when vessels that transport cargo from outside EU wa-

ters were made to bear a higher cost than those operating within EU waters, due to the longer distances covered by the former compared to the latter (??). Given that the emission tax proposed above, with the double scheme covering both international and intra-EU shipments, would be applied both to vessels that clear customs and those that do not, the first scenario is ruled out. Nonetheless, challenges regarding the second scenario remain possible.\textsuperscript{78}

A further, related question is whether the exclusion of vessels departing from EU ports from the tax could also raise issues of discrimination. In this regard, it has been argued that “if the scope of coverage includes only incoming ships [...] Such a scheme would benefit exporters from the EU, who would not have to incur carbon costs for their emissions in voyages out of the EU, as compared to importers to the EU that would be covered by the scheme” (??). The inclusion of exports into the measure prevent this issue from arising.

6.2 Exceptions according to Article XX GATT

Under the GATT regime, measures adopted in breach of the general rule of non-protection set in Article III, can be justified under Article XX, which provides various exceptions. In particular, Article XX (b) and (g) contain two exceptions, restricted by the provisions incorporated in the chapeau of Article XX, that are relevant to the assessment of the legality of the proposed tax.\textsuperscript{79} In order to be justified under Article XX, the measure must fall under one of the above-mentioned exceptions.

Article XX (b) regards measures that are “necessary to protect human, animal or plant life or health”. In order to be considered as necessary, a measure “does not have to be indispensable. However, its contribution to the achievement of the objective must be material, not merely marginal or insignificant”.\textsuperscript{80} It could be argued that a tax on emissions released by international maritime transport and imposed unilaterally by the EU does not fulfill the requirements set by Article XX (b) because maritime emissions amount only to a small fraction of the world GHG emissions and the scope of the tax would cover only a portion of it (??). In addition, the measure alone would not be sufficient to solve the climate change issue (??). Nonetheless, the measure could be evaluated in the light of both the overall efforts that the EU is undertaking to reduce GHG emissions (e.g. the EU’s target of 40% emission reductions for 1990-2050)

\textsuperscript{78}Notice that, if the tax is challenged under Article III (2) GATT second sentence, it would be required to inquiry into the structure and application of the tax so as to establish whether the measure is applied so as to afford protection. The tax’s architecture, design and structure and the magnitude of the difference between the taxation applied to the imported and the domestic products could play a pivotal role in this analysis.


and the potential of this measure to incentivize other jurisdictions to enact regulations aimed to mitigate climate change. In this case, the tax could be seen as a material contribution to climate change mitigation (7) or at least as being “‘apt’ to make a material contribution to its objectives”(7). Furthermore, in line with the UNFCCC’s new “bottom-up approach” the structure of the climate change negotiations since the failure of the Copenhagen COP15 conference to reach a grand cross-sector agreement has been sector-based. Any sector-based solution, however, will always be able to tackle only part of the overarching issue. On these grounds it does not seem justified to reject an emission tax covering only the maritime sector under Art XX (b) GATT for not being ‘material’.

A last hurdle for the application of Article XX (b) to the tax on bunker fuel emissions would be the existence of “reasonably available and less trade restrictive” (8). Alternative measures for the reduction of GHG emissions that if implemented would render the tax non-necessary (8). In this regard, the AB has held that Article XX (b) does not require a party to demonstrate that there are no less restrictive alternative measures to the one challenged because such burden would result often being impossible and in any case always impracticable. Furthermore, the EU could point out that the unilateral mechanism is only adopted after that long negotiations attempting to establish a global mechanism by unanimous agreement have taken place, e.g., under the umbrella of the G20, UNFCCC and the IMO. Implementing less restrictive measures has been tried so the provision seems satisfied.

Second, Article XX (g) provides an exception for measures “relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption”. With regards to the meaning of “exhaustible natural resource”, the AB has held that clean air falls under this category. Although air and atmosphere are not synonyms, it would be reasonable to extend the qualification of exhaustible natural resource to the atmosphere (7) because the resilience of the climate system is exhaustible and its functioning is a resource to humans.

The meaning of “relating to” in the provision has been interpreted as showing a “substantial relationship” between the aims and the design of the measure. Thus, for Article XX (g) to apply, it would be necessary for the tax to be designed in such a way as to show a substantial relationship with its environmental purposes (7). In this regard, it could be argued that a tax on emissions from international shipping would clearly be in a relationship with the preservation of environmental resources. However, some

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83 For a similar conclusion see who argues that the EU Aviation Directive (Directive 2008/101/EC amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission
authors have argued that if MS had discretion regarding how to spend the revenues deriving from the emission tax, it could be claimed that it is not clear whether the tax actually reduces GHG emissions (?). A counter-argument that could be brought forward is that expenditure policy regarding these revenues does not need to be left to MS: revenues could be earmarked for expenditure in low-carbon activities, which would rule out any such a challenge of the measure. The strictest earmarking would consist in dedicating the revenues to climate finance, as suggested by ?. For instance, they could be contributed to the UNFCCC Green Climate Fund which fosters climate change adaptation in developing countries. Another counter-argument is that “countries with higher revenues from these types of taxes also exhibit higher reductions in CO₂ emissions, PM10 emissions, and energy consumption and production from fossil sources” (?).

Article XX (g) requires also that the measure is “made effective in conjunction with restrictions on domestic production or consumption.” The tax discussed here applies both to domestic and non-domestic vessels. In addition, the tax would most likely be part of a broader EU set of policies to reduce GHG emissions, which, is in line with the provision (?).

In addition to the exceptions’ specific requirements, the measure has to comply with a number of additional requirements, namely: 1) the tax shall not constitute a way to unjustifiably or arbitrarily discriminate between countries where the same conditions prevail; 2) the tax shall not constitute a disguised constraint on international trade.

The chapeau of Article XX is interpreted as an expression of the general principle of “good faith” in international law. In the context of the proposed measure, the chapeau serve the function of balancing the right of a member to implement a climate-related tax and the right of the other members under WTO law. In order not to constitute an arbitrary or unjustified discrimination, the measure should take into account the different situations that countries may face. In this regard, as noted above, the emission tax could result being more onerous for vessels that cover longer distances before calling at a port within the EU. However, as the taxation remains related to the carbon emissions, the measure could be considered non-arbitrary and justified (??). In the mechanism described above the tax rate is applied to all agents in the same way; the amount that vessels traveling further need to pay more is simply reflecting the greater contribution.

84 Outdoor air pollution of ultra-fine particulate matter, which is estimated to cause 3.7 million deaths per annum globally (WHO 2014) and which arises, amongst many other sources, from the combustion of bunker fuels.
85 If the emission tax is not applied both to domestic and non-EU vessels, this requirement may not be fulfilled ? and ?.
87 Similarly, with regards to the EU-ETS Scheme for the aviation sector, see ?.
to the underlying environmental problem.

Furthermore, the chapeau of Article XX is interpreted as a manifestation of the good faith principle in international law. The AB holds that good faith to promote international cooperation to cope with the problem of climate change is a relevant factor in the determination of arbitrary or unjustified discrimination.\(^8^8\) Thus, the promotion of international cooperation in limiting GHG emissions by the EU is pertinent to the issue (?).

With regards to the tax as constituting a disguised restriction on international trade, it has been argued that if the tax is levied upon both domestic and foreign vessels the requirement is likely to be met (?), which is the case of the tax proposed here.

Concerning arbitrary discrimination, the AB establishes an extra requirement: that the application of the measure respects “certain minimum standards for transparency and procedural fairness”.\(^8^9\) This requirement should be taken into account in implementing the measure.

Lastly, in order to comply with the chapeau of Article XX, the measure should be designed in a way that emissions subject to similar taxation in another country are exempted (?). The design of the mechanism described above satisfies this requirement.

To conclude, although the tax might be challenged under Article III GATT, the requirements set under Article XX GATT are likely to be satisfied, providing a justification for the measure.

7 UNCLOS

A tax on maritime emissions could also be challenged under the UNCLOS\(^9^0\) for being an extraterritorial measure. However, the legality of the measure is upheld by a number of considerations.

The UNCLOS also has a role in the regulation of environmental taxation matters since it establishes a general framework for legislative and jurisdictional rights and obligations for states with regards to marine issues. The Convention differentiates five zones in which countries have different rights and jurisdiction, namely: internal waters, territorial waters, contiguous zones, exclusive economic zones and the high seas.\(^9^1\) From

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\(^{9^1}\)For an overview see ?, p. 379-423.
these, only the high seas are beyond the jurisdiction of any State.92 With regards to vessels, the UNCLOS recognizes three different types of state jurisdiction: flag state jurisdiction, i.e., the jurisdiction of the state where a vessel is registered; port state jurisdiction, i.e., the jurisdiction of the state of the port where a vessel stops; and coastal state jurisdiction, i.e., the jurisdiction of the state when a vessel navigates close to its coast without stopping at its ports.93 Vessels navigating on the high seas are under the jurisdiction of the flag state. While UNCLOS reaffirms the main role of flag States in the protection of the environment by warranting that ships under their registry comply with international standards, it also allows for jurisdictional and enforcement rights of coastal States and port States.94 The mechanism described above identifies the taxable act for emissions released in international waters with the arrival and the departure of cargo at ports. Therefore, the following discussion focuses on port State jurisdiction.

7.1 Port State Jurisdiction under the UNCLOS

Since ports are part of internal waters, States have territorial sovereignty over vessels that voluntarily enter in their ports95. This jurisdiction comprises the right to set conditions and deny entrance for non-compliance for vessels to enter into ports96. Article 211(3) UNCLOS establishes that conditions for entry could be set to control marine pollution. In this regard, it has been argued that the definition of marine pollution under Article 211 (3) UNCLOS is broadly defined and therefore it would comprise GHG emissions from shipping (?). The same provision establishes that the right to deny entrance to vessels not abiding pollution standards set by port States is limited by the duty to inform the competent authority regarding the conditions for entrance and the duty of publicity.

In addition, the UNCLOS sets two more limitations to the right to deny entrance to vessels that do not comply with the conditions set by the port State: non-discrimination and abuse of right. On the one hand, the non-discrimination principle (Article 227 UNCLOS) requires the port State not to set conditions that either formally or de facto discriminate against some vessels on the basis of the state in which they are registered (?). As illustrated above, the flag state of the vessel is not one of the factors that are considered for the taxation of carbon emissions. Consequently, the tax object of the present work would easily meet the non-discrimination requirement.

On the other hand, Article 300 UNCLOS establishes that “States Parties shall fulfill in good faith the obligations assumed under this Convention and shall exercise the rights, jurisdiction and freedoms recognized in this Convention in a manner which

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92 UNCLOS Article 89 states that ‘No State may validly purport to subject any part of the high seas to its sovereignty’.
93 See Badin (2002).
94 For an overview on the role of UNCLOS in the protection of the high seas see ?.
would not constitute an abuse of right”. Under international law, there are four main situations in which a condition to port entry could be considered an abuse of right. A first case is identified with a condition that would “improperly interfere with another State’s right under international maritime treaties or law” (7). Since the tax liability for emissions released in international shipping is situated on EU resident entities (either the consignee or the consignor), and that vessels would provide data to the tax authority on a voluntary basis, it is unlikely that the measure could be considered as interfering with another State’s right. A second type of abuse of right would occur when the condition set for port entrance does not have a legitimate goal (9). As discussed above, the UNCLOS recognizes protection of the marine environment as one of the legitimate reasons to deny entrance into a port. From this it follows that it is unlikely that a tax on carbon emissions would be considered as being without a legitimate purpose. Thirdly, a condition for port entrance could be considered an abuse of right if it illegitimately discriminates vessels on the basis of their flag or when it could be considered “blatantly arbitrary and unjustifiable” (9). As discussed above, the taxation of carbon emissions would not be based on the flag of the vessel. Thus, it could not be considered an abuse of right on the basis of discriminative reasons. In addition, the scientific basis on which the tax is designed should assure that the measure could not be considered either blatantly arbitrary or unjustifiable.

7.2 Extraterritoriality and Territorial Extension under the UNCLOS

The mechanism described above covers emissions released both in EU waters and on the high seas. For the latter, the issue arises of whether the tax could be considered as an act of sovereignty under Article 89 of UNCLOS, which establishes that “No State may validly purport to subject any part of the high seas to its sovereignty”. Various arguments suggest that the tax would not represent an act of sovereignty and therefore would not infringe Article 89.

The distinction between territorial and extraterritorial jurisdiction is fuzzy and leaves room for interpretation for those called to apply the law. In this regard, one needs to distinguish between extraterritorial jurisdiction and territorial extension (7). While extraterritorial jurisdiction refers to “the application of a measure triggered by something other than a territorial connection with the regulating state”, a measure could be seen as having territorial extension when “the application of a measure is triggered by a territorial connection but in applying the measure the regulator is required, as a matter of law, to take into account conduct or circumstances abroad” (7). The main difference

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95 Similarly see 7.
96 See on this 7 and 9.
between the two categories is that territorial extension is based on the territorial presence of the regulated entity on the territory of the regulator, while extraterritoriality is based upon other criteria.\textsuperscript{97}

With regards to the territorial presence criterion, the mechanism described above distinguishes between international and intra-EU shipments. For vessels that do not leave EU territorial waters, and are therefore covered by the intra-EU tax scheme on fuel, no issue of extraterritoriality arises.\textsuperscript{98} Conversely, for international shipping the taxable entity is the consignee (consignor), which, according to the Community Customs Code needs to be a resident of an EU jurisdiction. This establishes a territorial connection between the regulated and the regulator.\textsuperscript{99} In addition, in applying the emission tax, the EU is required, as a matter of law, to consider conducts and situations that occur abroad.\textsuperscript{100} Firstly, the emission tax covers all the emissions released from/to the port of departure/arrival and the EU port. Secondly, if a non-EU country implements a measure that is meant to reduce maritime carbon emissions, the EU may exempt vessels that are complying with that measure. In addition, if a global agreement on carbon emissions in international shipping is reached, the EU would have to take the agreement into account when considering the legality of its emission tax. The existence of a connection between the regulated entity and the regulator, coupled with the requirement for the EU to consider situations outside the jurisdiction of the EU, suggests that the tax on carbon emissions should be categorized as having solely territorial extension. A similar conclusion has been arrived at with regards to the inclusion of aviation in the EU-ETS\textsuperscript{101}

An additional argument in favor of the legality of a tax on emissions released in the high seas is that it is not uncommon for the EU to enact regulations which have effects outside its territory (\textsuperscript{98}). The legality of these measures under international law is still debated (\textsuperscript{?}), however, the Court of Justice of the European Union (CJEU) has ruled on the compatibility of the inclusion of aviation in the EU-ETS with the territoriality principle. Both the CJEU reasoning\textsuperscript{102} and the previously emitted Advocate General Kokott’s opinion\textsuperscript{103} held that the inclusion of aviation in the EU-ETS was compatible with international law. Similarly, the WTO’s AB seems to uphold the legality of measures having territorial extension under WTO law (\textsuperscript{98}).

\textsuperscript{97}On extraterritoriality see ?.
\textsuperscript{98}Notice that when a vessel traveling between two European ports leaves the territorial waters, its status changes and the tax on international shipping is applied.
\textsuperscript{99}In the same way, EU member states have jurisdiction over vessels that voluntary enter their port. This creates a connection between the accounting unit of the tax (the cargo) and the regulator.
\textsuperscript{100}With regards to the inclusion of the aviation sector into the EU-ETS see ?.
\textsuperscript{102}Case C-366/10, Air Transport Association of America and Others [2011] ECR I-13755.
\textsuperscript{103}Case C-366/10 Advocate General Opinion, paragraphs 145-159.
Lastly, if the tax rate is set at the measure of the harm suffered by the EU, a reasonable interest of the EU in regulating the activity would be easily identifiable. Under general international law this reasonable interest strengthens the power of a State to exercise jurisdiction (7).

In conclusion, we argue that, in light of existing case law, practices and scholarship, the potential extraterritoriality concerns are unlikely to represent a major threat to the survival of the proposed measure.

7.3 The Right of Innocent Passage

The taxation of emissions from shipping is unlikely to infringe the right of innocent passage of foreign vessels. Article 17 UNCLOS awards to vessels of all States a right of innocent passage through the territorial sea of other States. Passage is defined in Article 18 of the UNCLOS as “navigation through the territorial sea” when: 1) The vessel does neither call a port nor enters internal waters; 2) The vessel is proceeding either to or from a port or internal waters. In Article 19 UNCLOS a passage is defined as innocent when it “is not prejudicial to the peace, good order or security of the coastal State”. In addition, Article 26 (1) UNCLOS reads: “No charge may be levied upon foreign ships by reason only of their passage through the territorial sea”. However, under Article 26 (2) UNCLOS charges can be levied for specific services that the State has rendered to the vessel under condition that the principle of non-discrimination is not violated.

It has been argued that a tax on maritime emissions could not be considered a charge levied for the provision of services to the vessel. As a consequence, the tax could be challenged under Article 26 UNCLOS (7). The mechanism proposed above obviates to this concern by shifting the legal tax liability from vessels entering/leaving territorial waters to either the consignee or the consignor of the transported cargo. Thus, despite at a first glance Article 26 UNCLOS could be invoked to challenge the tax, a closer scrutiny reveals such attempt would be unlikely to be successful.

8 EU law

This section analyzes whether the EU has competence to unilaterally introduce a tax on emissions from shipping. It is concluded that the measure would be in compliance

Footnote 7: The possibility of an emission tax being challenged under article 26 UNCLOS is however discussed in the literature. This is because it could be argued that an emission tax would not be levied by reason of the passage of the vessel but for environmental purposes. In addition, the tax would be levied solely upon voluntary entrance into the port and not for the mere passage of a vessel through the territorial waters of a Member State. On this see ?and ?. 
with the relevant provisions of the TFEU.\textsuperscript{105}

The EU holds exclusive competence in custom union’s affairs, although it shares competence with its MSs on environmental, transport and energy matters (meaning that generally MSs cannot exercise competence in areas where the EU has done so).\textsuperscript{106} In these shared matters internal and external competence increasingly mirrors and is interconnected\textsuperscript{?}. With regards to taxation and environmental measures of fiscal nature, the special legislative procedure\textsuperscript{107} applies, as opposed to the ordinary legislative procedure of co-decision.\textsuperscript{108} Additionally, although the Lisbon Treaty fosters the use of qualified majority voting in many areas, unanimity voting (meaning that all MSs at the Council have to agree in order for a proposal to be adopted) is needed with regards to taxation.\textsuperscript{109}

In establishing the proposed carbon tax Articles 30 and 110 of the TFEU are of crucial relevance: Article 30 TFEU prohibits MSs to apply custom duties or charges having an equivalent effect on imported and exported goods within the EU, while article 110 TFEU prohibits both discriminatory and protectionist taxation. Since the tax can be framed as a tax affecting goods that cross a border and therefore resulting in a higher taxation of imported products\textsuperscript{?}, Articles 30 and 110 TFEU are to be considered.

Equivalent effect for the purposes of Article 30 is defined as “any pecuniary charge, however small and whatever its designation and mode of application, which is […] unilaterally imposed on domestic or exported goods by reason of the fact that they cross a frontier of one of the Member States and which are not custom duties in a strict sense”.\textsuperscript{110} Article 30 does not prohibit the imposition of charges for services, although two conditions need to be fulfilled in order for a charge to be considered a charge for services: First, the subject to the charge needs to individually receive a “real benefit”.\textsuperscript{111} In this regard, the CJEU has held that when the service provided facilitates the fulfillment of a compulsory formality, the economic agent does not receive any real

\begin{footnotesize}
\textsuperscript{105}Consolidated Version of the Treaty on the Functioning of the European Union, 2008 O.J. C 115/47.
\textsuperscript{106}On exclusive, shared and supporting competences see art 4 and 5 Treaty on the European Union (Consolidated Version of the Treaty on European Union 2010 O.J. C 83/01, hereafter TEU) and art 2, 3, 4, 5 and 6 TFEU.
\textsuperscript{107}Legislative acts are adopted by either the Council with consultation or consent of Parliament or by Parlia-
ment with consent of the Council.
\textsuperscript{108}551 EC Treaty. Legislative acts are adopted by the Parliament and the Council, acting by QMV – Art 289 and 294 TFEU.
\textsuperscript{109}Nonetheless, ‘the Commission’s view that a move to qualified majority voting at least for certain tax issues is indispen-
sable. Since the legal basis will, for the present, remain unanimity it will, after enlargement, be much more dif-
ficult to have any new Community legislation agreed. So where legislation is not absolutely essential (notably in the direct tax field), other methods will have to be found to achieve progress in removing tax obstacles and distortions to the internal market, which taxpayers have a right to expect.’ See, Communication from the Commission to the Council, the European Parliament and the Economic and Social Committee. Tax policy in the European Union – priorities for the years ahead (2001/C 284/03). COM(2001) 260 final, 4.1.
\textsuperscript{111}Case C-389/00 Commission V. Germany (2003) ECR I-2001, para. 35.
\end{footnotesize}
Second, the amount of the charge should be proportionate to the actual cost incurred to provide the service. Given these requirements, it is unlikely for a tax on GHG emissions to be conceived as a service charge excluded from the application of article 30 TFEU. Nonetheless, two arguments could be made to maintain that the measure does not infringe Article 30 TFEU. First, the measure does not apply to vessels traveling from a port of a MS to a port of another MS when the vessel does not leave the territorial sea or inland waters. Second, the measure would not apply to goods destined to transshipment. Both arguments show that the reason for the imposition of the tax is not the mere crossing of a frontier. Thus, despite a tax on maritime emissions could be seen as a charge having the equivalent effect of a custom duty under article 30 TFEU, there are reasons to support that such measure would not necessarily be considered as not conform to this provision.

Article 110 TFEU prohibits discriminatory and protectionist taxation. Article 110(1) TFEU prohibits taxes that discriminate imported products by favoring local production of similar goods. Similarity between goods is assessed by considering whether the imported and domestic goods are substitutes. The second paragraph of article 110 TFEU interdicts internal taxation that has an indirect effect to protect domestic production, regardless of whether this effect is observed between similar products or whether the tax burden borne by the imported and domestic goods are equal. The emission tax is likely to increase the cost of some of the imported products, and therefore could be seen as favoring internal production. Nonetheless there are two arguments that could be made to show the non-discriminative nature of the emission tax object of this report. First, with regards to the prohibition set by Article 101(1) TFEU, it is not clear under the existent case law whether a de facto dissimilar taxation between imported and domestic products based on the different environmental impact of the two categories of products would be considered an infringement of Article 101(1) TFEU. In this regard it should be noted that the European Commission has held that in determining similarity between products, it is necessary to consider their relative environmental impact. This interpretation of “similarity” is supported by Article 11 TFEU, which states that “environmental protection requirements must be integrated into the definition and implementation of the Union’s policies and activities, in particular with a view to promoting sustainable development”. Second, the tax would be applied both to import and export and therefore it would not necessarily favor internal production.

Even if the tax is considered as non-complying with articles 30 and 110 TFEU, it could be justified by legitimate public policy aims, since the CJEU has held that the protection

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114Similarly see [7, p. 19.]
of the environment is an important policy aim for the EU. Furthermore, since the measure would have to be adopted by unanimous vote of the Council, a challenge under Articles 30 and 110 TFEU is unlikely (RICARDO AEA, 2011).

In conclusion, there are several arguments suggesting that an emission tax from shipping could be considered lawful under EU law.

9 Conclusion

The legal analysis has discussed the legality of the maritime emission tax proposed in this paper with regards to major international agreements and European law. In particular, the UNFCCC and KP, the GATT, the UNCLOS and the TFEU. We have shown that although the proposed tax could be challenged mainly under Article III GATT, and Article 89 UNCLOS, several arguments and exceptions can be made and invoked in favor of the legality of the measure.

Part III

Political Economy Analysis

10 Impact on International Negotiations

Failing to reflect the associated environmental damages in the prices of maritime fuels would leave a significant gap in any strategy to battle climate change. The EU is known to be among the more ambitious international players when it comes to reducing emissions, aiming to become the “Global Leader in Climate Action”. Accordingly, the EU has a strong interest to remove the currently prevailing implicit subsidies for maritime fuels.

For legal and economic reasons, the general expectation is that the only way to remove these subsidies is through an international accord that has unanimous support. Despite various attempts in numerous IMO and G20 meetings over the past years to establish

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117 In this connection, framing the measure as a charge instead of a tax would remove the unanimity vote of the Council of the EU (Article 191 and 192(1) TFEU), since a charge could be approved by majority vote, which however increases the chances for challenges under these provisions. Additionally, the advantage of implementing a charge instead of a tax would be present solely if intra-EU shipping is not taxed with an excise tax. The reason is that article 14 of the Energy Taxation Directive poses and obligation on Member States of exempting from taxation maritime fuels, so this provision would need to be modified by unanimous vote.
a MBM that can curb shipping GHG emissions, no tangible progress has been made. The fact that these negotiations involve many parties, each of which individually has the power to block an agreement, seem to result in the type of gridlock we also observe in a more general sense when it comes to climate change mitigation.

The legal and economic infeasibility of a unilateral measure, in combination with the political infeasibility of a global, unanimously supported measure, means it is rather realistic that this substantial (and growing) share of maritime emissions in global emissions cannot be addressed. It is important to note that the obstacles in the way of reaching a global solution and those impeding unilateral action should not be viewed separately. Not being able to take unilateral action can, in fact, create or at least entrench the negotiation gridlock for joint action.

The measure proposed in this paper provides a way around the infeasibility of an EU unilateral measure. The legal analysis presented in this paper shows that it circumvents the need for other (‘non-coalition’) countries to approve. The economic analysis shows that also the undermining effect of tax competition will be largely avoided. This could in turn affect the international negotiations for a global measure, as it will change the alternative scenario. In bargaining terms, the possibility of the unilateral action changes the outside option, both for those in favor of a global mechanism, and for those blocking it. One might say that reducing the need for global agreement can help realizing it. Conversely, the gridlock we are currently in can be taken as an indication of how crucial the need for international agreement on this topic is.

This section aims to describe through what channels adding the proposed mechanism to the EU policy toolbox might affect the gridlock in the negotiations for a global solution. Three types of motives are identified that countries might have for blocking a global fuel tax, followed by a discussion of the extent to which these can be reduced. The impact on the EU position will then be discussed, as well as some strategic approaches the EU might take towards realizing a global agreement.

10.1 Motives for Blocking an Agreement

Oil Sales

Three types of motives for avoiding international agreement on a global tax can be identified, of which more than one could apply to one country. Firstly, oil-selling countries have a commercial interest to prevent any tax on oil-generated emissions. Although a global tax on maritime fuels can be expected to reduce their revenues, it is not exactly clear by how much. This will depend on how elastic their demand is, which in turn will depend on, among other factors, the availability of low-cost fuel saving methods, and can therefore change over time.
Oil producers are not necessarily concerned about having to impose a fuel tax themselves. Their interest lies in the global demand effects. They have the power to prevent a reduction in revenues, and if this outweighs the advantage of justly pricing the externality fuel consumption produces (which seems to be the case for most major oil producers), they will veto a global tax.

*Hold-up*

Given the need for unanimity, every actor has the disproportionate power to single-handedly block any deviation from the status quo. Even if certain actors have no reason not to want to have a global fuel tax, they might still want to exploit this power. Knowing that a shift towards such a global measure generates value for the EU, these actors have the opportunity to hold up the EU and demand something in return for their support. These countries know that, under unanimity, the last veto to be given up is of great marginal value, which they aim to exploit.

An analogy can be drawn with the known example of hold-up in development projects such as a railway line. A landowner knows that its agreement is required in order for the railway line to build. He values his land at some amount, but might ask for a much larger amount from the railway company. Knowing that the project’s realization depends on his compliance, he could be able to extract an amount up to the total value of the railway line if all other necessary parties comply before he does. Expecting such opportunistic behavior from one or more landowners, the railway company never builds the railway line, even though the various landowners and the railway company might all have benefited from it.

*Tax Haven Strategies*

As a third motive, countries that do not sell oil can have an incentive to blocking an international mechanism if, firstly, they expect that the European Union will then act unilaterally and, secondly, that they may derive pay-offs from the EU doing so. Such pay-offs include gains from employing tax haven strategies.

When the alternative to a global fuel tax is a unilateral fuel tax, there is a lot to gain from offering ships a way to avoid these taxes. Countries employing such strategies would not gain in terms of tax revenue, given that it would involve a zero-tax on fuel, but could gain refueling business. The flexibility ships have in terms of their refueling location thus not only reduces the effects of a unilateral fuel tax severely, it also generates a group of potential tax haven-countries that thereby have a strategic incentive to block a global agreement. Moreover, this group is large as any country located favorably relative to big shipping routes would qualify.
10.2 New Option

The new unilateral option the EU has with a cargo-based-tax has several relevant effects. Firstly, it changes the so-called threat point, or default option, that is relevant to the negotiations. The proposed mechanism shifts that point from the current situation, where international maritime transport emissions are not taxed at all, to a situation where a share of those emissions is properly taxed. Figure 10.1 illustrates this shift for two sides of the negotiation table: the vertical axis measures the value of an outcome for a 'green' player, such as the EU, while the horizontal axis measures value for oil producing countries. The fact that the EU would prefer agreement point $a$ over the current status quo, threat point $d$, while oil producers have reversed preferences, is reflected by $V_{EU}(a) > V_{EU}(d)$ and $V_{OIL}(a) < V_{OIL}(d)$. The availability of a unilateral measure shifts the threat point from $d$ to $d'$, the location of which will be determined by several factors. If at $d'$ a share of maritime emissions is taxed at an efficient tax rate, thereby achieving a reduction in emissions and a reduction in oil demand that are a proportion of what a global fuel tax would achieve, we know that $V_{OIL}(a) \leq V_{OIL}(d') \leq V_{OIL}(d)$. Also, as long as the effectiveness of the unilateral measure outweighs the cost of its implementation, we have $V_{EU}(a) \geq V_{EU}(d') \geq V_{EU}(d)$. Combined, these inequalities tell us that $d'$ cannot lie to the right or below $d$.

This share is determined by the relative weight the EU ports, and those of any coalition partners, have in global (sea-transported) trade. The larger this weight, the closer the tax coverage achieved by unilateral action comes to that which would be achieved by a global fuel tax.

The location of $d'$ largely determines to what extent global agreement becomes feasible as a result of a new unilateral option. Relevant to the first motive is the horizontal distance between $d'$ and $d$, given by $V_{OIL}(d) - V_{OIL}(d')$, which shows how much the outside option of oil-producing countries will deteriorate, the extent to which depends on the tax coverage that can be realized, as well as on the resulting effect on fuel demand. A partial coverage will, however, result in revenue streams that are still higher than would be the case under a global fuel tax. In absence of any other factors, the introduction of a unilateral tax on emissions would therefore only make oil producers give up their opposition if enough major trading countries were to implement it, thereby reducing oil revenues by at least as much as a global fuel tax would do. The threat point would then have shifted so far left that $V_{OIL}(a) \geq V_{OIL}(d')$, making global agreement an attractive enough option.

A second effect of the mechanism is that the countries aiming to extract rent by holding up the EU will see less opportunity to do so. The ability to apply this strategy is relies on two elements. First, there needs to be value generated for the EU. Second, the EU has to disproportionally need this party in order to be able to generate this value.
The first element will be reduced by the vertical distance between between $d'$ and $d$, or $V_{EU}(d') - V_{EU}(d)$, which represents the increase in value the EU can now achieve without the need for unanimity. The more coalition partners it manages to attract that will also take unilateral action, the narrower becomes the gap between outside payoff and agreement payoff, $V_{EU}(a) - V_{EU}(d')$. It is exactly this difference that strategic blockers try to exploit. As for the second element, this disproportionate power will be severely reduced, since in theory only significant trading countries would need to agree to a cargo-based tax to achieve full coverage. The marginal value of adding such a country to a coalition would be proportionate to its trading volume, and would not increase as others join. The last country to give up its veto would then still be crucial towards achieving a global fuel tax, but would only be able to exploit the difference in value between a full-coverage cargo-based tax and a global fuel tax.

Previous proposals for unilateral fuel taxes created an additional obstructive opportunity for transhipment countries. These countries would be required to force ships to release data over their emissions to the EU. The mechanism proposed in this paper creates an incentive for ships to provide such data, as it can secure a tax rebate. The problem of transhipment countries exploiting their essential role in obtaining emission data is therefore avoided.

Thirdly, under the proposed mechanism, the benefits from tax haven strategies would be much smaller, if still existent at all, than under previously proposed unilateral options, such as a unilateral fuel tax. In the scheme that is suggested here, there would not be a fuel tax for international shipping, but a cargo-based tax. That cargo-based tax renders the tax haven strategy ineffective for most states in the world. The main reason for this is that being located on major shipping route yields no advantage anymore. One would need to have a land connection to the EU in order to still offer an avoidance service, and transport over land is very expensive, such that only countries that are very close to the EU could offer such an avoidance strategy. Even then, one could only offer tax avoidance strategies for ships bound for a port close by, in the EU’s periphery.

For example, in the case of Turkey it could be the case that the land connection between the port of Attali and the port of Piraeus is good enough to deliver cargo to Attali by ship and then by truck to Piraeus, that only helps one for the little cargo that has its final destination near Piraeus and not for cargo that goes further into the EU. So the opportunities to run a successful tax haven will be much smaller with a cargo tax than with a fuel tax. Accordingly, fewer countries will have an interest in blocking an international tax in order to trigger the EU to set up a unilateral tax which one can then undermine as a tax haven.

However, besides the cargo-based tax, our mechanism contains a fuel tax for domestic transport. This domestic fuel tax cannot be undermined by non-EU countries as long as domestic ships never leave the EU’s territorial waters. This is the case for most
domestic ships, and therefore there is no big market for offering tax avoidance services to such ships. Nevertheless, there are some domestic ships that are technically able to leave territorial waters and go into international waters. This could therefore result in some extra refueling business for adjacent countries. In the case that a unilateral EU-tax has been established, this could cause such countries to protect this extra business and block a global fuel tax.

Although the tax haven motive might not be entirely eliminated, it will play no significant role anymore. Firstly because the potential gains from the strategy will shrink immensely and secondly because the motive will shift to a far smaller number of countries that are determined by proximity to the EU and thereby posing an opposition that is easier to control, as EU interacts with them on a great number of political issues.

10.3 Strategy Towards a Global Fuel Tax

The previous paragraph explained how the option of a unilateral cargo-based tax will eliminate certain obstacles towards achieving international agreement, while for other parts of the opposition agreement will be closer, but not yet achieved. For these latter cases, however, one could imagine that reducing the payoff difference between the outside option and the cooperative option of a global fuel tax, whilst not eliminating it completely, might still be enough to bring about international agreement.

This could be the case if, for example, the negotiations are bundled with other negotiations, and the loss from cooperating on the issue at hand is small to enough to compensate for on another issue. Another way of bridging the remaining gap might be found in the revenue a fuel or cargo-based tax will generate. Not joining the coalition nor supporting a global tax on fuels would always mean a country has zero tax revenue, whereas the alternative would entitle them to something more than that. The revenues, which will be briefly discussed in the next paragraph, may prove a very useful bargaining chip.

As for using the mechanism as a credible threat, several factors have to be taken in to account. Firstly, it requires EU’s negotiation partners to believe that it will take such unilateral action in case of disagreement. This requires the benefits of the tax to outweigh the costs, which this paper has argued is likely to be the case. In figure 10.1, credibility of this threat is achieved as long as all relevant actors believe $V_{EU}(d') \geq V_{EU}(d)$.

The benefits are not merely a combination of tax revenues and emission reduction, but in the context of the negotiations also include, say, political benefits. Public pressure in the EU to take climate action is what brings about its attempt to take a leading role in the first place, and taking unilateral initiative, when international negotiation
partners are not willing to do so, could satisfy this desire more than would be described by its quantifiable effect. In this sense, increased public pressure, as well as political commitment by those representing the EU will help make the ‘threat’ more credible.

Besides credibility, the second factor a credible threat needs is it truly being a threat. The oil producers might believe the EU will take action, but if the effects are very limited the threat will still not have much of an effect. To truly make a difference, the unilateral action therefore needs to significantly damage the disagreement payoffs of the opponents. Relating to figure 10.1, this would require a substantial vertical shift from $d$ to $d'$. As has been argued, the more countries the EU can get to join their coalition, the larger this damage would be.

It could be the case that there is some uncertainty among those at the negotiation table about the costs and effectiveness of the proposed mechanism. In that case, it could be important that an actor like the EU assumes the leading role and implements the unilateral mechanism. This would realize the threat for the EU itself (costs will be sunk), thereby circumventing non-credibility, while at the same time reducing uncertainty regarding other countries that are tempted to take the same action. By showing feasibility of the mechanism, as well as effectiveness, one party implementing it could thereby tilt the negotiations towards a ‘greener’ outcome.

To have a serious chance of bringing about a global tax, the above analysis shows that credibility requires an increase in EU disagreement payoff, while threat effectiveness requires a decrease in opponent disagreement payoff. These two might not be one-to-one inversely related. The size of the coalition that takes unilateral action will certainly help both ways, however.

### 10.4 Revenues from an unilateral versus an international tax

With the international mechanism, the use of revenues would be internationally decided, and the IMF and IMO have put forward proposals for that in which many developing countries would be favorably treated. With the unilateral mechanism, the European Union would likely still be required to share some of its revenue, but generally its use will be more on EU terms.

The availability of a unilateral tax mechanism would therefore raise the potential for action, because the non-coalition countries have a greater incentive to support the international tax, knowing that the taxation of maritime emissions will come anyway, they want to at least be able to co-decide its use.

To protect against tax haven strategies, the EU might pay compensation to bordering countries for getting them to agree to apply EU taxes to EU ships that come to their territory to refuel. Once the EU has set up compensation schemes like this one, these
bordering countries have an incentive to see the unilateral scheme ongoing, since with an international scheme the EU would not need to pay compensation to keep its ships from avoiding the tax. These countries might therefore be against an international scheme in order to keep the unilateral scheme, particularly after the unilateral scheme is established and has hence become credible. However, as has been argued above, the magnitude of this problem would be small, and the high level of interaction with these countries facilitates the bundling of negotiations to achieve a compromise.

11 Distribution of revenues

To make the introduction of emissions taxation politically viable, several gatekeepers need to receive their share of the pay-offs. To make the introduction economically optimal, the distribution of pay-offs should furthermore improve social welfare of the status quo. The more gatekeepers there are, the smaller may be the chance that the political and the economic conditions for progress can be satisfied jointly. Here we investigate first how revenues should be used from the point of view of public welfare maximization, and then whether this outcome is realistic given the interests of the main political players.

11.1 Optimal use of revenues

The literature on the Double Dividend highlights the importance of using the revenues from environmental tax reforms for lowering more distortive taxes (“revenue recycling”) instead of earmarking the revenue for spending programs such as lump-sum rebates.\textsuperscript{118} What it means to use extra revenue from environmental taxes to cut other taxes depends on the counterfactual fiscal policy. If, in the absence of the environmental tax reform, the more distortive taxes (on income, capital or consumption) would be stable, then the optimal use of the extra revenue is actual reductions of such taxes. If, as in many countries of the European Union today, the counterfactual fiscal policy is instead that governments raise these distortive taxes to consolidate budgets in face of a public debt crisis, the optimal use for the extra revenue from an environmental tax would be to prevent some of these tax increases. Both variants would be in line with the Double Dividend literature, given the fiscal situations of the countries where the environmental tax reform is carried out, and also reflect current advice by the leading fiscal policy fora.\textsuperscript{119}

\textsuperscript{118}For a summary of the main Double Dividend literature see ?, and for recent updates to this literature see ? and Hafstead & Williams (2015).

\textsuperscript{119}The IMF is recommending such policy in ?, the OECD is recommending it in its Green Growth series and the EU in its recommendations “Tax Reforms in EU Member States".
For maritime fuels, there is one exception to this general defense against revenue earmarking. Since most of the emissions from international shipping occur in international waters, the international public at large has a certain claim on some of the revenues. Therefore recommend that a share of the revenues should be earmarked for international climate finance, but that the remainder should not be earmarked. The main danger for an efficient use of environmental tax revenues is earmarking for special domestic interests. The analysis here will therefore try to work out which of these revenue uses would be more likely.

11.2 Main gatekeepers

For an emissions tax in the European Union, the different interest groups participating in the decision over the use of revenues appear to be the European Commission, member states with large ports, member states with large ship-owning companies, landlocked member states that use other countries’ ports, tax bureaucracies, developing countries’ representations in the UNFCCC and IMO, and industry pressure groups.

11.3 European Commission

The Economic and Financial Directorate General has an incentive to support the mechanism if it generates direct revenues for the EU, given the Commission’s objective to become more independent from indirect financing through its member country contributions and raise direct taxes.

Currently, the only source of direct taxes in the EU is customs revenues, which are shared across member states. Of the mechanism that we suggested, the taxation of emissions from international shipping is executed through custom authorities. Institutional Economics suggests that rules, once established, tend to be persistent. So the fact that EU member states have already set up clear rules how existing revenues raised by their customs departments are shared would suggest that the revenues from the taxation of emissions from international shipping would be shared in the same way. This moves the establishment of a taxation of emissions from international shipping into the objectives of the DG ECFIN wing of the European Commission.

The revenue rules for the existing customs system go beyond stating that the revenues must be remitted to the European Commission though. They also state that these revenues must go into the Commissions general budget, instead of being used for special purposes. This is the first reason for us to expect that the revenues from the taxation of international marine emissions would be used in line with the efficiency conclusions from the Double Dividend literature. The second reason is that the European Commission has a fixed overall budget. If it raises more funding from customs, country
member states need to remit less funding. That funding from member states is largely raised with distortive taxes (income taxes, VAT and capital taxes). A greater customs income for the European Commission hence implies a lower need for this distortive source of funding from member states.

11.4 National governments

The national governments of EU member states falls into two groups with different interests, depending on whether they have large ports.

11.4.1 Land-locked nations

Land-locked nations have an interest that not all of the revenues from a maritime emissions tax accrues to the states where the ports are located. Their justification for a claim on the resources is that they contribute to the demand at the ports even if those ports are not located in their territory. It is for this reason that the EU did set up the existing revenue sharing rules. The fact that the suggested mechanism for taxing international emissions is located in the customs departments and that the revenues would therefore likely be shared in the same way as previous customs charges is therefore in the interest of these land-locked countries.

To defend their claim on any part of the revenues, the land-locked states would have an interest to defend that existing distribution key. From an economic point of view, it is not relevant whether land-locked nations or others receive the revenues but that they are not used for special interests. The fact that the existing distribution key takes the decision over the use of these extra resources out of the hands of member states and forces the contribution into the general EU budget shields these funds from those special interests.

11.4.2 Port nations

Port nations have accepted the revenue sharing for the existing customs system, but to equally share revenues from emissions taxation is, in principle, not in their interest. It is not that the distribution of customs revenues discriminates against port nations, but it does not over-compensate them either, and these seafarer nations might seek to receive slightly more than the average country from a maritime tax.

The mechanism that we suggested has two parts, however, and the second part would secure this slightly higher share. Besides the taxation of emissions from international shipping, which is located in the customs system, there is also the taxation of domestic
emissions, which is done through a fuel tax. And the revenues from fuel taxes in the EU is traditionally not shared. The revenue from motor fuel taxes, for instance, accrues to the nation state where the fuel is sold. Most of the internal shipping in the EU is concentrated in the main port nations, particularly in the Netherlands. The refueling is therefore concentrated in these countries, and so would be the tax revenues.

In most of the EU member states, the revenues from fuel taxes are not earmarked. Again following the principle that conventions tend to be persistent, the establishment of taxation for domestic shipping emissions would hence also follow the efficiency recommendation from the Double Dividend literature that revenues should not be earmarked but used in the general budget.

### 11.5 Developing countries

Developing countries may be able to press for some of the tax revenues since Article 3 of the UNFCCC guarantees them a differential treatment. Such differential treatment could be secured in two ways: either through a differentiation of tax rates for cargo from developing countries or through rebating to them a share of the revenue. Differentiating the tax rate would be inefficient. Fortunately, it would also not be in the interest of the EU or its member countries to make such a rate differentiation, since the EU would lose revenue this way and distort trade patterns, while it could provide the same rebate to developing countries without the extra costs from the trade distortion.

Developing countries would hence likely be able to receive some degree of compensation because of the rights that UNFCCC provides them with, and this compensation would likely be provided as a rebate of revenue rather than a rate reduction. That politically motivated revenue sharing is exactly the minor earmarking that recommends from an efficiency standpoint. Another reason points to an efficient sharing: The legal basis for developing countries’ rights on some of the revenue is grounded in the UNFCCC treaty’s recognition of their “common but differential responsibility” for climate change. For the EU to satisfy that responsibility, it is not required to provide the funds as a direct transfer to developing countries’ governments, where some governments might squander the extra revenue. Instead, the architecture of existing climate negotiations would suggest that this revenue would be paid out through the Green Climate Fund, which has established oversight mechanisms ensuring the efficient use of funds.

The inefficiency arises because differentiating the tax rates would distort trade patterns, cause emissions leakage, transfer less utility than a comparable money transfer by mandating an earmarked use of the revenue (for shipping instead of any other budget item that might be more pressing). Furthermore, differentiating the tax rates would also conflict with the intention of UNFCCC Article 3, which aims to compensate the poor. Any reduction in the tax rate for shipping from poor countries would be shared, according to the elasticities of demand and supply for those countries products, with their trade partners; so money aimed at the poor would leak to unintended recipients. Both the efficiency and equity concerns are therefore better served with direct transfers of revenue, instead of differentiations of the tax rates. Further reasons for the inefficiency of rate differentiation are discussed in?
11.6 Bureaucracies

11.6.1 European Commission

The Environment and Climate Action Departments have an interest simply because the mechanism effectively supports their declared objectives. Less obviously, the establishment of a maritime emissions tax is also in the policy interest of the Economic and Finance Directorate General because it supports the unit’s declared economic growth strategy (???). Other Directorates Generals that work on specific industries have an interest in the mechanism because maritime emissions are currently rising fast and—given the EU’s targets for overall emissions—the more emissions there are from the maritime sector, the greater is the pressure on other sectors to compensate through extra mitigation efforts. So a reduction in the so-far uncontrolled maritime sector eases the other Directorate Generals’ share of mitigation needed to meet the Union’s overall targets.

11.6.2 Tax bureaucracies

The taxation of emissions from international shipping would be located in customs departments and it is also those departments that have a special interest in taking on this new role. This is because custom departments are the largest units in the average EU country’s Finance Ministry, due to the traditionally important role of customs charges in overall government revenue. With increasing trade liberalization, the contribution of customs to overall tax revenue has progressively eroded, but due to the persistence of institutions, their staffing did not experience the same decay. Accordingly, these units of tax administrations face increasing problems in justifying their staffing. Environmental taxes, much unlike traditional tariffs, are a forward-looking field for tax policy and could hence provide customs authorities with a sustainable justification for their continued existence. In the political economy within ministries, customs departments would hence have an interest in supporting the introduction of this tax.

11.7 Business lobbies

To business lobbies, the general results of the literature apply also in the case of this tax reform. The introduction of the tax would likely be in the interest of most businesses if revenues are used to reduce more distortive taxes. This is not only the case if revenues are used to reduce corporation taxes, but equally for VAT, given the demand effects. Lobbying would nevertheless be against the tax, because the gains from a tax shift are wide-spread across all industries, whereas the losses would be concentrated in a
comparatively small organised sectors (Olson 1965). The losses would furthermore precede the gains.

These political counter-forces do not just change the probabilities that the tax is introduced but can equally change its structure in inefficient ways. One possible outcome is that businesses lobby for kickbacks of the revenue through earmarking. In Norway, for example, the creation of a tax on the NOx emissions of domestic ships led to the creation of an industry fund, which receives all of the revenue for its projects. This earmarking was not entirely inefficient, however, as the fund supports technological change. If the earmarking is productive, it does not need to undermine efficiency; both cases are possible.

Another possible distortion is a differentiation of tax rates. Businesses may, for example, push for a reduction of tax rates on emissions from specific types of ships. Such a measure would be inefficient, given that the marginal damage of the emissions does not vary with the ship types. A common call for reduced rates or exemptions is for small businesses, which can also be justified because the marginal compliance costs for most taxes tend to fall in the size of the tax base, thus discriminating against small players. The taxes that we have suggested do not have this feature. A small shipping company would mostly be affected by the domestic fuel tax, and there the compliance with the tax is just an effortless by-product of the refueling activity. The tax can be collected through fuel suppliers, which invariably have a large tax base. The small-company argument is hence not applicable.

Lobbying for a differentiation of rates for domestic ships is also not possible, as such a tax reduction would qualify as discrimination under WTO Article 2.

A more stealth form of lobbying for a reduction in tax rates would be if businesses in developed countries supported demands of developing countries for a tax differentiation on the basis of UNFCCC Article 3. Remember that one potential way for compensating developing countries in line with the requirement for Common But Differentiated Responsibility would be to reduce the tax rate for shipping trade between the EU and these countries. Such a compensation would work legally because the criterion that the UNFCCC imposes for the compensation of developing countries does not specify the form of compensation—and neither the amount—but just that some form of compensation would be needed, if that is little or involves large leakages. Those leakages could motivate European businesses to support a demand of developing countries to be compensated through reduced tax rates. Since the economic incidence of the tax rate would be shared between the trade partners in developing countries and their counter-parties in Europe, also the gains from a reduction in the tax rate would be shared. The compensation granted would hence partly leak to the European trade-partners. This leakage could be large particularly for the poorest developing countries whose exports Europeans demand with a high price elasticity of demand since their
products are less differentiated and thus more easily replaceable with products from other countries. European businesses could hence benefit significantly from largely failed attempts to compensate the poorest. If they know their good negotiation position, they then have an interest to lobby for a tax reduction for emissions released in ship trade with developing countries. In the political debate it may appear easier to sell a reduction of tax rates if it appears to be granted to the poorest nations than directly to European shipping and trading firms.

But why would such an alliance between European businesses and developing countries be possible then, given that developing countries will equally perceive the real tax incidence and not be myopic about their lot in such a deal? Rational foresighted negotiators of developing countries may agree to such a deal if the alternative—that Europe pays compensation through sharing some of the revenue as climate finance—is even worse. If Europe’s offer of direct climate finance were extremely little, developing countries might prefer a tax reduction even if that option entails large leakage. But because of that leakage, Europe would always find it cheaper to raise the amount of direct climate finance that it provides to developing countries relative to paying the same amount as a tax reduction. Either Europe or developing countries would need to be shortsighted, or Europe’s offer of climate finance would need to be so little that developing countries have nothing to lose, for the lobbying coalition between developing countries and European businesses to arise.

This risk of such a coalition forming could actually save as a protection against Europe becoming too selfish on its revenue. Remember that, in the optimal use of revenues, a share of the revenues would be provided for international climate finance. If a European Union only considers its personal interests but does not want to risk lobbying groups to space in the political debate over the introduction of its emissions tax, the EU has an interest to promise some reasonable amount of climate finance to developing countries so they do not support business groups’ call for exemptions and reductions to the tax rate.

11.8 Conclusion

In section 11.1 we have studied the economically optimal outcome and found that a share of the revenues should be contributed to international climate finance, and the other share should be used for the general budget. This share should not be earmarked for special purposes but be used either for budget consolidation or for the reduction of distortionary taxes. We then studied the existing budget rules for similar taxes and the distribution of interests of the main political players and found that the rules and the personal interests of these players largely support the economically optimal outcome.
The one important exception is for the interests of business lobby groups, which may undermine the economically optimal outcome.

12 Competitiveness effects

Above we have analyzed the interests of countries with large ports but not the interests of countries with large shipping companies. In this section we analyze whether the unilateral introduction of a tax on maritime emissions would reduce the competitiveness of shipping companies in the taxing coalition. In the literature these competitiveness effects are estimated to be small. We show here that they would be even smaller with the mechanism that we have suggested compared to the other mechanism suggested in the literature.

12.1 Reasons for generally low competitiveness effects

There are three reasons why the competitiveness effects of a unilateral tax of maritime fuel are likely to be low.

Firstly, the literature’s estimates of the tax incidence that shipping companies would bear from an international fuel tax are low (e.g. Faber et al 2009, IMF 2011). For a unilateral tax, the incidence should be higher because shipping, as a transport mode, is not replaceable, also when the tax applies only for transport to and from a region. And if the tax incidence is not large, competitiveness effects would be small, too.

Secondly, the taxation of maritime fuels could, in principle, prepare European shipping companies for a future of higher oil prices and stricter climate policy. In the long-run, more adjustments now could then raise the competitiveness in the future. This argument builds on the “energy paradox” literature. This literature documents that many fuel-saving investments that are actually cost-efficient are not taken up unless policy-makers intervene. This literature is controversial as it contradicts the common assumption that market players know best what investments are in their interests, including for complex technical decisions.

A third argument equally relates to underinvestment in fuel-saving technology but with the difference that this problem arises even if all firms take all their investment decisions optimally. This is because of coordination problems that arise due to the existence of external economies of scale in all stages of the production\(^\text{121}\) of more efficient ships. Ship-building companies face increasing returns to scale in the production of new ship types. An individual ship-owning company may want to invest in a more

\(^{121}\)Research, development, deployment and commercial production
efficient ship-type, but the ship may not be offered at a sufficiently low unit cost until many ship-owning companies demand the same product. Foreseeing this problem, the ship-building company may not even research and develop the new ship type. These network externalities can hold rational market players back even if everyone individually would like to act if they just had more confidence that the others we equally act. When such network externalities arise (and they are widely document in the literature on the role of technologies in energy transitions) policymakers can coordinate the expectations of the network’s participants, such that everyone expects that the others will act. If a tax on maritime emissions is introduced, ship-building companies can expect that the demand for efficient new ship types will rise, and accordingly increase supply (in research, development, deployment and fabrication) of the new ship types, so unit costs fall. As unit costs fall, the ship-owning companies do actually buy and the expectation is fulfilled. The tax can then play the role of enabling investments that companies wanted to undertake anyway.

The first argument is less controversial than the second and third. Together they imply that the competitiveness effects of a maritime tax would likely be small, particularly in the long-run.

For these reasons, also other proposals for unilateral maritime taxes expect little problems with competitiveness. Our point here is, however, that the mechanism suggested above could reduce these competitiveness effects further, when compared to these other proposals. This is because the mechanism appears more robust against the following indirect effect on competitiveness.

### 12.2 Impact of market shares on total costs that cannot be passed through

Under the mechanism that we have proposed, foreign-owned vessels are taxed for their emissions on voyages to and from the EU in the same way as European-owned vessels. As a result, there is no direct effect on the competitiveness of European ship-owning companies. There could be an indirect effect, however, if the EU emission taxation schemes affect European ship-owning companies to a larger extent than their non-European peers, because a larger portion of their business falls under the coverage of the EU tax schemes.

This competitiveness effect is due to asymmetric market shares, and it arises because the demand and supply structure of the shipping industry is such that some of the costs for an emission tax would always stick with ship-owning companies. They would not be able to pass the entire cost to consumers because the price elasticity of demand for their services is not inelastic enough, and because the price elasticity of supply of
the ship-owning industry is not sufficiently elastic for a full pass-through of the economic incidence of the emission tax to consumers. Whether or not this pass-through is achieved does not depend on who the taxpayer is (whether it is the consignee (consignor) or the ship-owning company or the shipping company); in all cases the ship-owning company would face part of the cost (i.e. as discussed above, the legal liability for the tax does not change the economic incidence of the tax). And as some of these costs are borne by ship-owning companies, and as European ship-owning companies do a greater portion of their business within the EU, the tax would raise the costs of European ship-owning companies by more than it would raise the costs of non-European ship-owning companies.

12.3 Impacts of raised costs on European shipping companies’ business outside Europe

EU shipping companies might react to this increase in costs by raising prices in order to keep their profits as stable as possible. However, they will not be able to raise prices in the EU, as our previous analysis of elasticities has shown that the net increase in costs cannot be passed through forward to the EU market. Instead, European ship-owning companies would have to raise their prices for their services in non-European markets. Consider, for example, a Danish shipping line that does business in China and a Chinese shipping line that has some of its operations in Europe, assuming that the Danish shipping line has a larger proportion of its total business in Europe than the Chinese one. If the EU introduces a tax on maritime shipping emissions within the EU, the Danish company will suffer a decline in profits, even after deducting the proportion of costs that it can pass onto consumers in the EU, because the structure of elasticities of shipping demand and supply in Europe will prevent a full pass-through of the costs. Also the profits of the Chinese company will decrease. However, it will face a smaller increase in costs in proportion to its total worldwide shipping costs than the Danish company because the Chinese company has a smaller proportion of its total business in Europe. Due to this difference, the Danish company will need to recoup a relatively bigger profit loss than the Chinese firm.\footnote{In the long-run, this profit loss may be recouped. Under a Pigouvian emission tax, the EU shipping company faces a stronger incentive to reduce emissions than its non-EU peer. If it adopts emission-reduction measures to a greater extent than its non-EU peer, it will not only have a lower tax liability, but it will also incur lower fuel cost. Through this incentivised extra investment in emission reduction measures the EU shipping company may benefit from a cost advantage in the medium term.} As both firms cannot recoup this profit loss from price changes in the EU itself (since net profit losses already prevail after all efficient price adjustments in the EU have been made), they will need to raise prices outside of the EU. The Danish company will need to raise prices by more than the Chinese company will. Thus the former would then lose competitiveness against the latter, not in the EU market, but in the international competition.
So, the prices of EU ship-owning companies outside the EU would be raised relative to the prices of non-EU ship-owning companies outside the EU, leading to a loss of competitiveness for the Europeans. The same effect applies not only to ship-owning companies but also shipping companies. The size of the effect will vary for different industry segments and different ship types and cargo types, depending on the structures of the elasticities in the respective markets. Full pass-through is not realistic in any of these markets though; therefore the size of the competitiveness effects might vary and be very small, but they would always be there.

This competitiveness effect arises for all unilateral emissions pricing mechanisms, not just the mechanism proposed in this article but also the mechanisms that have been suggested in the literature before. But even though all proposed mechanisms would encounter the mentioned indirect competitiveness effect, the size of that effect would not be the same for all the mechanisms proposed in the literature. The relative sizes of these effects depend on the geographical scope over which the tax base is defined. This is because the relative market shares of European versus non-European ship-owning companies and shipping companies in the relevant markets are different.

Proposals for unilateral maritime taxes that put the tax liability on the ship recommended a comparatively small geographical coverage for the tax. In order for the taxing state to have jurisdiction for charging the ship, these proposals recommend that only the emissions released by the last ship calling at a European port would be taxed. When the supply chain for cargo includes several ships through transhipment, the emissions released before the last transhipment port are excluded from taxation.

Different to these proposals, our mechanism taxes the emissions per piece of cargo, not per ship, which enabled us to overcome the extraterritoriality problem with taxation further upstream than the last transhipment port. And this extension of the tax base would also impact the degree of indirect competitiveness effects suffered by European shipping companies.

12.4 Relative size of the competitiveness effects between alternative mechanisms

For the comparison, we assume that the closer one gets to the EU, the larger is the market share of EU shipping firms relative to non-EU shipping firms.

A given market share of the last leg of all journeys to Europe (e.g. the transport of a container from Singapore to Rotterdam), is held by EU shipping firms. That portion should be higher than the portion of EU shipping firms in the total journeys toward the EU, which includes markets like feeder traffic from origin countries to overseas transshipment ports (e.g. transports of containers destined for the EU from Manila to
Singapore) where European shipping companies play a much smaller role. As a result, a tax on emissions arising from the last leg of voyages to the EU would have its cost effects more concentrated on EU shipping companies than a tax on the total voyages to the EU where also overseas shipping companies get more affected. Following the same logic on indirect competitiveness effects as in the preceding section, the loss to the competitiveness of EU shipping firms would be smaller with the tax on the total voyage that we suggest in this paper than with the alternative proposal to only tax the last inbound leg.

Concluding, the competitiveness effects of a unilateral maritime tax, that are already estimated to be low, would likely be even lower with our mechanism. This in turn means that a country with important ship-owning companies has a smaller disincentive to oppose the tax, particularly relative to the gains that such scheme offers.

Part IV

Conclusion

Maritime emissions are projected to rise by 50-300% by 2050 (IMO 2014) despite the availability of technical and operational measures that could reduce GHG emissions by 60-75% per ton-kilometer by 2050 (Sims et al. 2014, European Commission 2013). Yet, to date, these technical measures have not been pursued because implicit tax subsidies for maritime fuels considerably weaken incentives to reduce emissions. To provide the needed incentives, maritime emissions would need to be priced, but the introduction of such emissions pricing is plagued by problems of tax competition, legal constraints on extraterritorial action, data unavailability over emissions, and concerns for competitiveness and distortions of trade patterns. The predominant view on the literature is therefore that for overcoming these problems an international agreement would be required (e.g. IMF and World Bank 2011). Such an international agreement has, however, not been forthcoming despite decades of negotiations. Since there does not appear to be a functionable outside option that a coalition of early movers could embark upon even without an international agreement, climate action in this sector can be easily blocked. All countries know that their agreement would be required for a pricing scheme for international maritime emissions to go forward. Countries with a lower urge for climate action in this sector can then benefit by just strategically blocking negotiations in order to receive rewards for giving up their hold up.

This gridlock in negotiations may be broken, however, if there does—counter the common wisdom—exist a credible mechanism for a coalition of the willing to price mar-
itime emissions also in the absence of an international agreement. This paper develops such a mechanism and tests it for its economic, legal and political feasibility.

References