GLOBAL SOLIDARITY LEVIES TO FINANCE THE LOW-CARBON TRANSITION:
FROM THEORY TO A PRACTICAL NEGOTIATION TOOL

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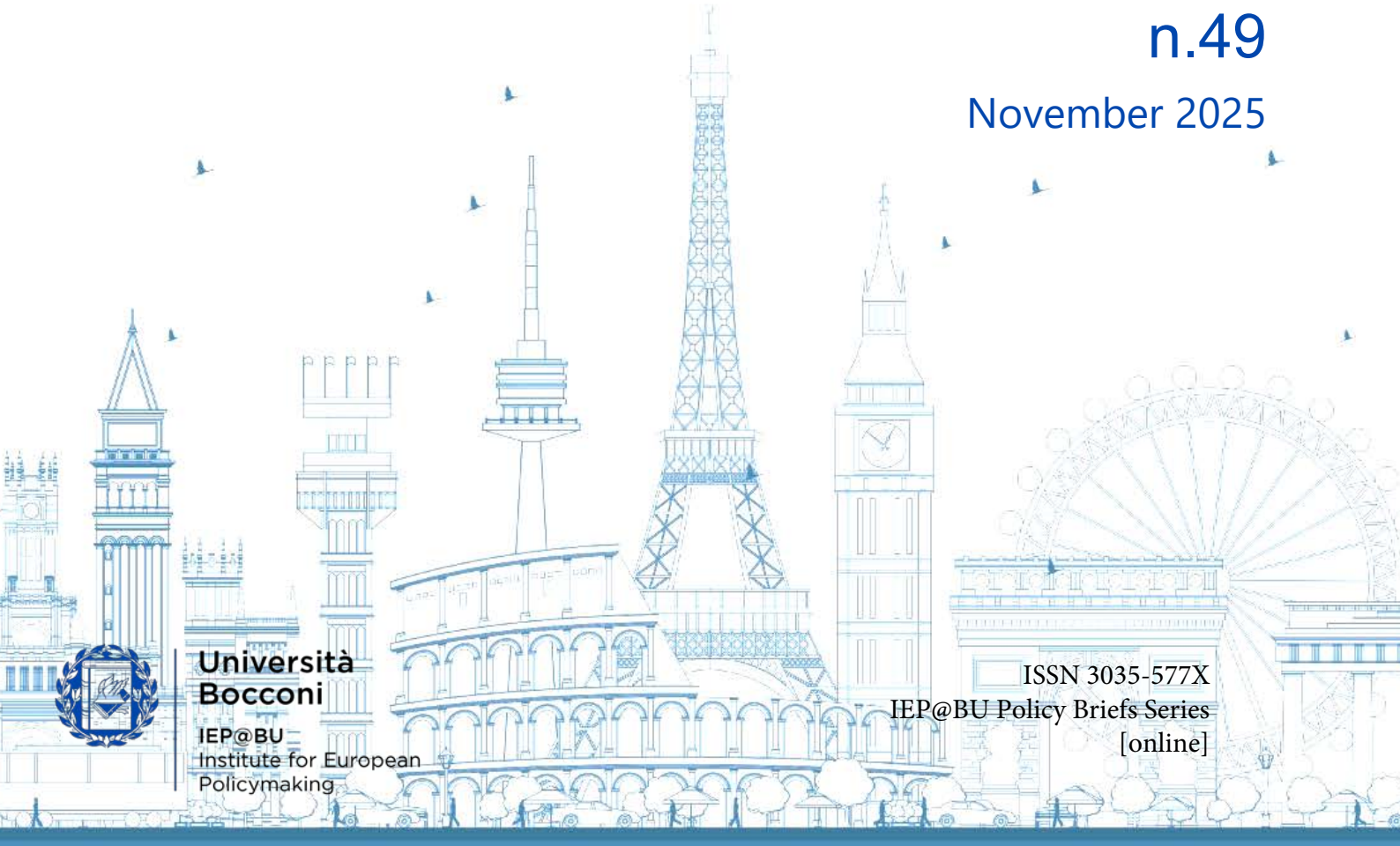
IEP@BU Policy Brief
n.49
November 2025



Università Bocconi
IEP@BU
Institute for European Policymaking

ISSN 3035-577X
IEP@BU Policy Briefs Series
[online]

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Acknowledgments:

We thank: Friederike Roder, Brice Roinsard and Laurence Tubiana for their support; Silvia Colombo for her feedback; Leonard Weber for his valuable research assistance; the European Climate Foundation (ECF) for funding the initial literature review and data collection that made this report possible.

Highlights

- The provision of climate finance from developed to developing countries is a pivotal issue in international climate negotiations. At COP29 in 2024, countries agreed that developing economies – excluding China – require USD 1.3 trillion annually by 2035 in external climate finance to meet climate mitigation needs. It is increasingly recognized that traditional solutions – relying on approaches such as global carbon pricing and official development assistance (ODA) – will not suffice to reach this target at the speed needed, due to various political economy constraints and a context of weakened multilateralism.
- In this context where innovative financing is essential, this policy brief focuses on one potential avenue: Global Solidarity Levies (GSLs). GSLs are internationally coordinated but nationally administered taxes, earmarked for financing global public goods such as climate mitigation and adaptation, especially in vulnerable developing countries. As such, they could generate revenues on their own and, if spent wisely, leverage additional private capital – thereby forming part of a broader, comprehensive strategy to achieve the USD 1.3 trillion target. GSLs are increasingly discussed in international climate negotiations following the creation in 2024 of a Coalition for Solidarity Levies, which comprises 14 countries.
- To support negotiations around GSLs, we developed a simulator[1] that estimates the revenues that could be generated from three technically and politically feasible levies linked to high-emission sectors: (i) maritime shipping, based on the fuel used; and international aviation, based on (ii) fuel used and (iii) air passenger tickets.
- The simulator will enable users – including international climate negotiators – to test combinations of participating countries, tax rates and demand responses (how activities may shrink after taxation), based on publicly available data and transparent assumptions.
- Our own simulations indicate that GSLs implemented worldwide on maritime shipping and aviation could raise significant revenues: from USD 100-150 billion per year under conservative assumptions, and up to at least USD 400 billion under relatively ambitious scenarios. These amounts represent between 10% and 30% of the USD 1.3 trillion annual target.
- In today's fractured geopolitical landscape, smaller coalitions can also remain impactful. For instance, EU member states could generate significant funds – USD 41 billion under moderate assumptions and up to USD 140 billion under more ambitious scenarios – representing over 10% of the USD 1.3 trillion target.
- Beyond a technical tool, the simulator is a negotiation instrument. By quantifying who contributes, who benefits, and by how much – while factoring in potential leakages due to loss of competitiveness – it strengthens coalition-building and credibility in climate finance discussions. Future work could extend the simulator to include additional levies, such as financial transaction, cryptocurrency, wealth, or fossil-fuel production taxes.

[1] A simplified version of the simulator (only for aviation) is available here: https://solidaritylevies.org/simulator/.
A more detailed version of the simulator (covering aviation and maritime, and financial transaction levies) with access to all underlying data and demand responses, is available here:
https://docs.google.com/spreadsheets/d/1tBrByrtBXkKt90xafdojeEzwIbj32aZ0/edit?usp=sharing&ouid=102989737934683895397&rtpof=true&sd=true

How to finance the transition in developing countries – the role of global solidarity levies

The provision of climate finance from developed to developing countries is a pivotal issue in international climate negotiations, often determining the success or failure of COPs. This imperative is grounded in the principle of Common but Differentiated Responsibilities, a cornerstone of the UN Framework Convention on Climate Change (UNFCCC), which acknowledges the historical emissions of industrialized nations and obliges them to lead in funding climate action in the most vulnerable regions.

A key outcome of COP29 in Baku (in 2024) was that developed countries agreed to take the lead in contributing at least USD 300 billion per year by 2035 for climate mitigation, adaptation and related support to developing countries, up from the prior USD 100 billion annual goal. In doing so, the decision taken at COP29 also acknowledged a broader external climate-finance need of USD 1.3 trillion per year by 2035 (from all public and private sources) for developing countries, excluding China (Bhattacharya et al., 2024).

The new climate finance goal agreed at COP29 leaves an estimated USD 1 trillion annual gap between what is needed (USD 1.3 trillion) and what has been pledged in public funds (USD 300 billion) by 2035. How to close this gap will dominate the agenda at COP30 in Belém (10-21 November 2025)**,** with negotiations centering on how to mobilize large-scale private, public and multilateral capital.

While much of this gap could, in principle, be filled by private investment – provided supportive public policies such as effective carbon pricing and the redirection of fossil-fuel subsidies – additional sources of finance will be essential: Public and concessional funds remain critical to support activities that are not commercially viable, to overcome investors' hesitations vis-a-vis developing countries, and to meet the scale and pace of investment required. Yet, public funding provided through Official Development Assistance (ODA) is declining in the current context of weakened multilateralism and high debt levels in developed economies. Recent discussions – including the emerging "Baku-to-Belém Roadmap" linking the last COP with the forthcoming one – highlight a growing consensus that bridging the gap will require systemic financial reform rather than incremental funding commitments.

Against this backdrop, this policy brief focuses on a promising avenue to raise additional revenues: Global Solidarity Levies (GSLs). GSLs are internationally coordinated but nationally administered taxes, earmarked for financing global public goods such as climate mitigation and adaptation, especially in vulnerable developing countries. Unlike proposals for a single global tax – which would require supranational authority and remain politically unattainable – GSLs operate within national sovereignty, with revenues collected domestically but committed to shared international objectives. They bridge the gap between voluntary aid and binding regulation (e.g. carbon taxation), which have so far led international climate negotiations, and they enable coalitions of willing countries to lead through ad hoc fiscal mechanisms.

Moreover, even though our purpose here is not to discuss how GSLs should be allocated and spent, it is important to acknowledge that they can generate revenues on their own and also leverage additional private capital if spent wisely. As such, they should be understood as part of a broader and more comprehensive strategy to achieve the USD 1.3 trillion target mentioned above (Pereira da Silva, 2025). For instance, the Green Climate Fund – a fund established within the framework of the UNFCCC to assist developing countries with climate mitigation and adaptation – could use them in special purpose vehicles as junior tranches to absorb potential losses in risky projects.

GSLs are becoming increasingly discussed in international climate negotiations following the creation in 2024 (during COP29) of a Coalition for Solidarity Levies, now comprising 14 countries[2] committed to "support solidarity levies as part of the solution to close the climate and development finance gap" (GSLTF, 2024). The Coalition is backed by the Global Solidarity Levies Task Force, established after COP28 (in 2023) and co-chaired by Barbados, Kenya, and France, with participation from a high-level expert group, key partner organizations[3], and a secretariat hosted by the European Climate Foundation (ECF).

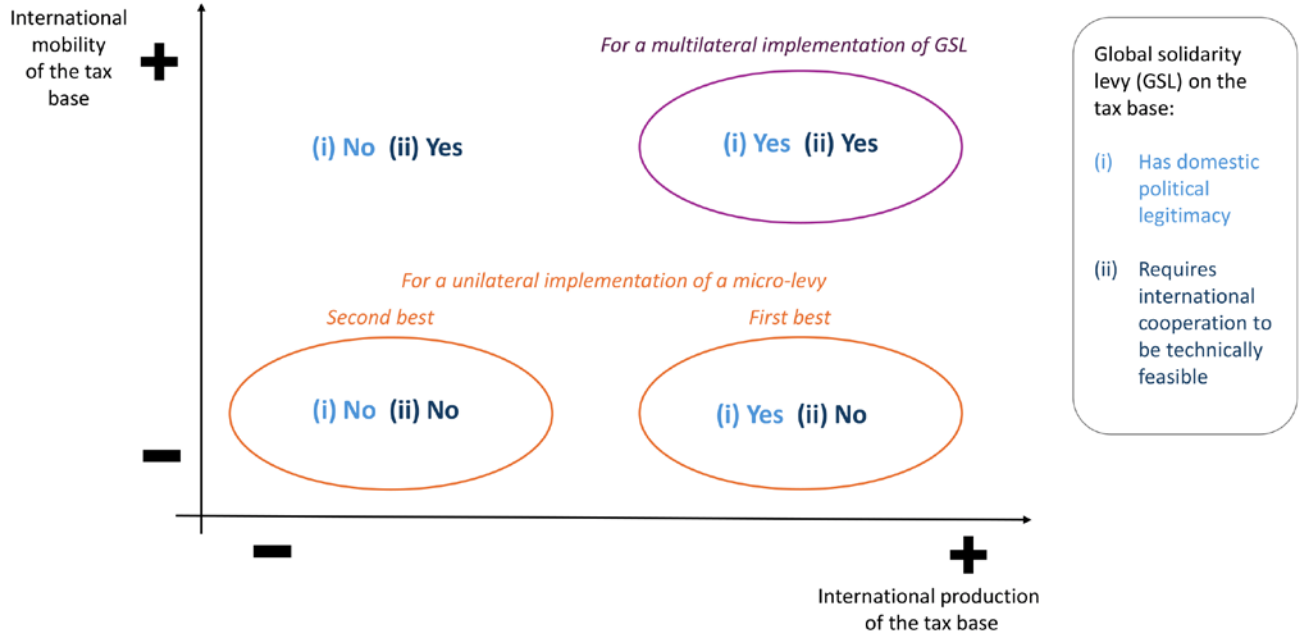
The Coalition and Task Force are exploring a wide range of potential levies, including those on fossil-fuel extraction ("climate damage tax"), aviation and maritime transport**,** luxury consumption**,** windfall profits, digital activities, financial transactions and high net-worth wealth. Importantly, some levies have been implemented in the past, albeit not to fund the low-carbon transition. A frequently cited precedent is the airline ticket solidarity levy, first introduced by France in 2006 and later adopted by several countries.

The case for focusing on global solidarity levies targeting aviation and maritime shipping

While GSL could be applied to multiple activities – e.g. all those listed above – we argue that they are most relevant and politically feasible when they meet two key conditions (see Figure 1, and in particular the top right corner). First, the international character of the tax base matters: the more value is produced internationally (e.g. maritime shipping or aviation), the more legitimate it appears for national governments to allocate revenues toward global purposes. Conversely, levying domestic activities for international redistribution – such as tobacco consumption – can face strong political resistance. Second, the mobility of the tax base shapes feasibility: highly mobile tax bases – such as those generated from financial transactions, or income earned by wealthy households – require international coordination to prevent avoidance or relocation, whereas largely immobile domestic bases – e.g. the income of most citizens working within a country – can be taxed unilaterally with lower risk of flight.

[2]These countries members of the Coalition are: Barbados, France, Kenya, Antigua & Barbuda, Colombia, Denmark, Djibouti, Fiji, Marshall Islands, Senegal, Sierra Leone, Somalia, Spain, and Zambia.
[3]Key partner organizations include the IMF, World Bank, UN, UNCTAD, OECD, G20, G24, European Commission, African Union, Coalition of Finance Ministers, and others.

Figure 1 - Preferred tax bases for unilateral vs multilateral Global Solidarity Levies

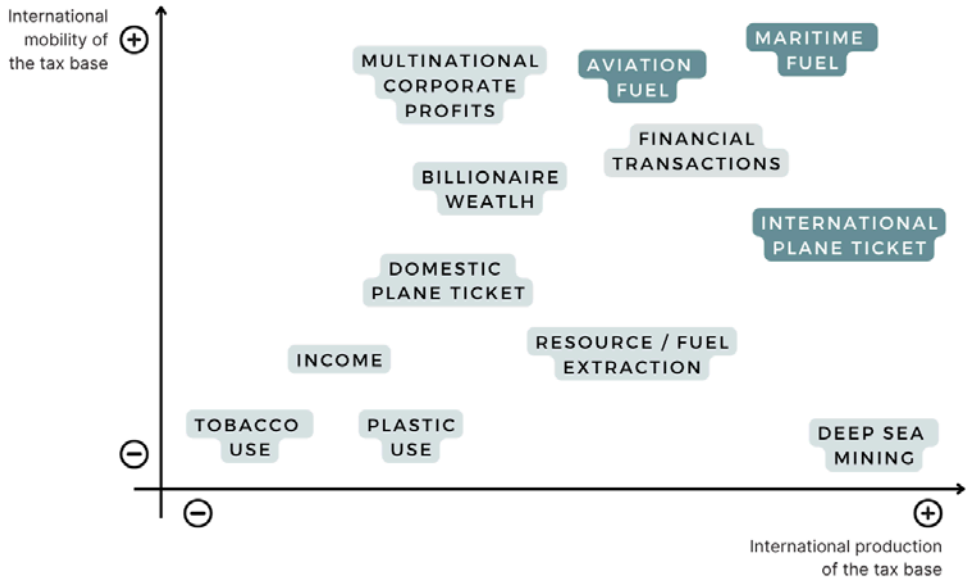


Combining these dimensions helps identify appropriate targets for GSLs (Figure 2). Highly domestic and immobile activities (e.g., citizen income, tobacco, plastics) are feasible for unilateral taxation but offer limited global leverage. Highly international activities (e.g., international aviation, maritime shipping, cross-border financial transactions) are most suitable for coordinated levies.

Finally, a third criterion for environmentally focused GSLs is emissions intensity: the more polluting an activity, the stronger the justification for taxing it in line with a polluter-pays principle. By this logic, among the three most relevant levies listed in the previous paragraph – international aviation, maritime shipping, cross-border financial transactions – aviation and shipping are the most relevant targets (Figure 2). Indeed, these activities warrant an 'environmental' GSL for the following reasons:

- International aviation is among the most carbon-intensive transport modes, emitting significantly more per passenger-kilometer than rail. In 2023, it accounted for 2.5% of global energy-related CO_2 emissions, with additional climate impacts from non-CO_2 gases (IEA, 2025). Despite this, international flights remain largely untaxed: fuel is exempt from excise duties, and both domestic and international aviation benefit from reduced or zero VAT (Hepburn & Müller, 2010; Keen et al., 2013; Neiva et al., 2021). Two types of levies have been explored by the international community for the aviation sector, based on respectively aviation fuel use and air passenger tickets;
- Maritime shipping contributed 2.89% of global anthropogenic GHG emissions in 2018, with projections suggesting growth to 130% of 2008 levels by 2050 (Faber et al., 2020). The sector also benefits from preferential taxation – tonnage taxes on vessels typically yield lower revenue than standard corporate taxation – creating both environmental and economic distortions (Keen et al., 2013). For maritime shipping, only fuel-based levies have been explored in the literature and policy circles.

Figure 2 - Indicative placement of various tax bases on axes of international production and mobility



Note: the activities highlighted in a darker tone correspond to those on which we consider that a GSL for environmental purposes is more justified, and on which simulations are presented in the rest of this brief.

A simulator to support future climate negotiations around global solidarity levies

To support negotiations around GSLs, we have developed a simulator[4] that models the expected proceeds of the three levies under consideration – air ticket taxes, maritime shipping charges – across various scenarios of geographical participation, tax rates, sectoral coverage, and earmarking rules.

Such a revenue simulator is not merely a technical tool, it is a political instrument of negotiation, offering a data-driven foundation for coalition-building. By illuminating who contributes, who benefits, and how much is at stake, it helps convert abstract principles of solidarity into quantifiable value propositions, making climate clubs more attractive, credible, and inclusive. For instance, each participating country can visualize the revenues it could mobilize domestically if it acts as a collector of solidarity levies as well as the net inflows it might receive from the common pool if designated as a beneficiary. This dual perspective clarifies both national interests and collective outcomes, reducing the perception of zero-sum trade-offs.

[4]A simplified version of the simulator (only for aviation) is available here: https://solidaritylevies.org/simulator/.
A more detailed version of the simulator (covering aviation and maritime, and financial transaction levies) with access to all underlying data and demand responses, is available here:
https://docs.google.com/spreadsheets/d/1tBrByrtBXkKt90xafdojeEzwIbj32aZ0/edit?usp=sharing&ouid=102989737934683895397&rtpof=true&sd=true

The methodology behind the simulator, described in a more detailed manner in Annex, works as follows:

- First, we draw from academic and grey literature as well as real world examples (e.g. the aviation levy that already exists) to estimate the range of tax rates that could be implemented for each activity. For instance, for tax rates on international shipping, we use rates which have been previously proposed by the international community to the International Maritime Organization (IMO), ranging from a low of 60 USD/t CO2 to a high of 300 USD/t CO2. Note, however, that the international negotiations to impose a levy for maritime shipping derailed in October 2025 following a campaign led by the US government (Mooney and Foster, 2025);
- We then estimate the initial tax bases to which the tax rate would apply, by compiling different datasets. For shipping, the tax base is the amount of CO2 emissions embedded in the fuel used in maritime shipping which can be attributed to the trade of each country. For the aviation fuel tax, we collected estimates of CO2 used by departing commercial flights from each country in 2019. For the ticket tax, the tax base is estimated by combining data on commercial flight departures with data on the total number of commercial passengers, as well as data on the distribution between domestic and international flights and economy and premium tickets;
- Finally, we factor in the fact that for each tax discussed, the estimated revenue strongly depends upon a demand response, or price elasticity of demand: this refers to how much a tax base might shrink in response to a tax which would effectively increase the price of the activity (for instance, taxing international flights based on passenger tickets could reduce the amount of tickets bought, thereby reducing the revenues raised through a levy). We collect different estimates of elasticities from the literature.

Potential revenues generated by GSLs are then are determined by multiplying the three elements above, i.e. the tax rate, the initial tax base, and the reduction in the tax base due to demand responses:

$$Revenues = Tax\ rate * Tax\ Base\ * \ (1 + \frac{Tax\ rate}{Price\ of\ taxed\ item})^{Price\ elasticity}$$

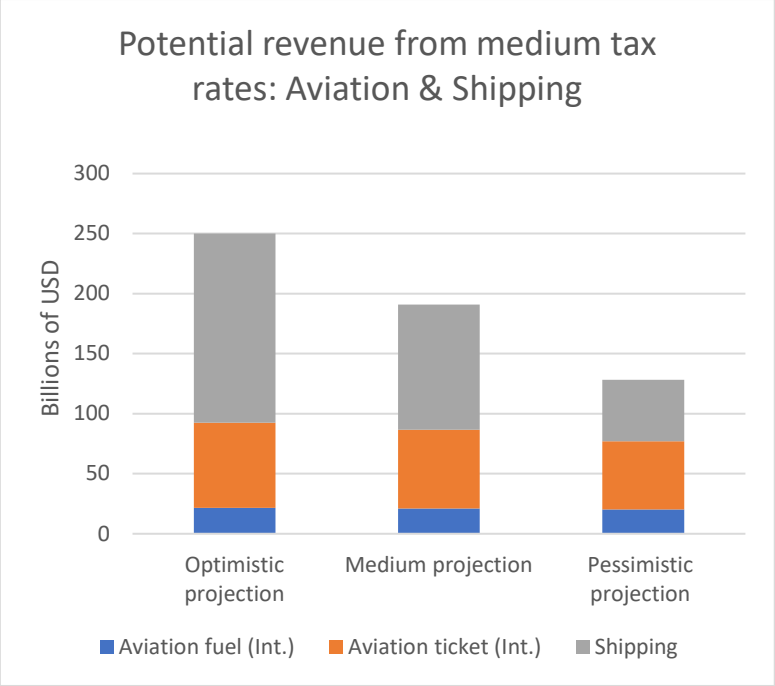
To investigate the range of revenues potential raised through GSLs, we simulated a number of high-level scenarios that combine options for: (i) the tax rates, with high, medium and low rates found in either the literature on in the real world; and (ii) assumptions about demand responses, with optimistic, central and pessimistic cases for the demand response in relation to revenues raised (optimistic meaning that demand does not react much to the taxation). The quantification of these tax rates and demand responses in also described in Annex.

Revenues potentially generated by global solidarity levies on aviation and maritime shipping

Our simulations indicate that GSLs implemented worldwide on maritime shipping and aviation (fuel and international passenger tickets) could raise significant revenues across a broad range of assumptions: conservative/pessimistic scenarios give revenues in the range of USD 100–150 billion/year, i.e. around 10% of the USD 1.3 trillion needed for developing countries – excluding China – and to be discussed at COP30; ambitious rates and optimistic assumptions of demand responses push the total above USD 400 billion, i.e. at least 30% of the USD 1.3 trillion target.

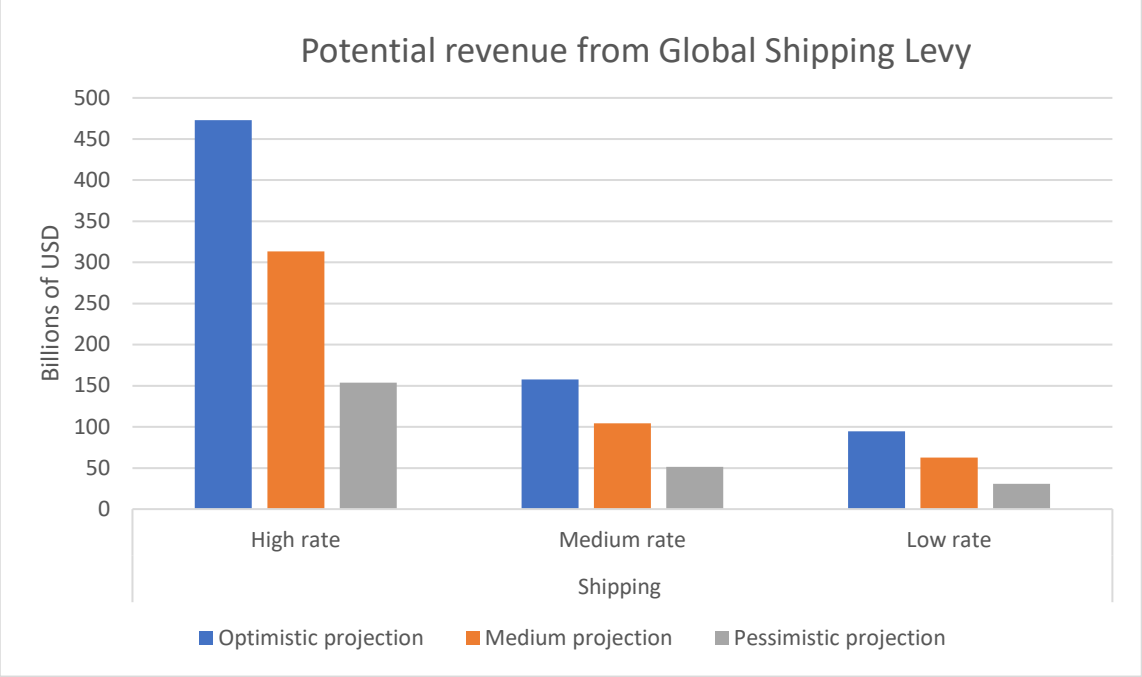
When looking only at the medium tax rates across the three levies (Figure 3), the three GSLs under consideration could raise between USD 250 billion (first bar in the Figure) and USD 128 billion (third bar) depending on the demand response, with USD 191 billion as the medium projection (second bar).

Figure 3 – Combined revenues from aviation and shipping levies with "medium" tax rates under various demand response scenarios



If we look at individual levies, we observe that the levy on international maritime shipping has the largest potential for revenue generation (Figure 4). With the medium rate of 100 USD/t CO2 (see the three bars in the "medium rate" category, in Figure 4), the initial rate set to be approved in the IMOs Net-Zero Framework, a global levy could raise between USD 51 and USD 157 billion, with USD 104 billion in the central scenario. The assumptions about demand response become particularly important when modeling higher tax rates, with the highest rate on shipping producing USD 473 billion under optimistic conditions (first blue bar in the Figure) and USD 153 billion (first grey bar) in less favorable conditions, with a central case of USD 313 billion (first orange bar). Even a relatively small levy on shipping could produce sizable revenues, with the central case for the lowest tax rate still bringing in USD 62 billion (last orange bar).

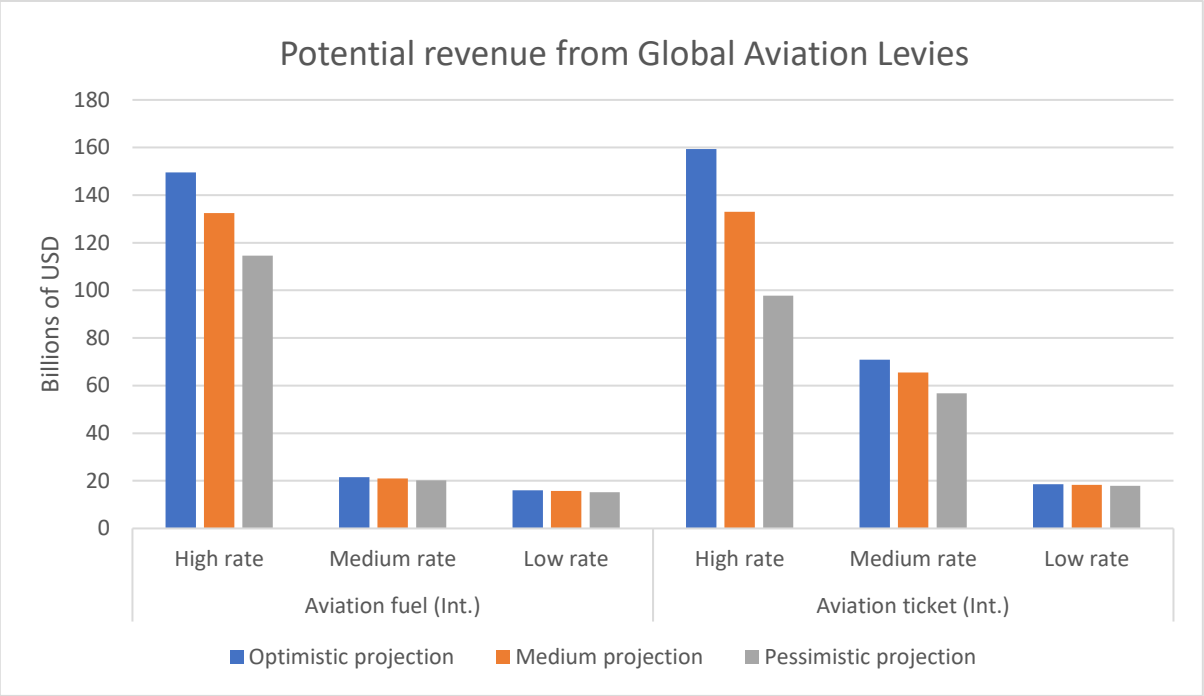
Figure 4 – Annual revenue from a global shipping fuel levy under various scenarios



The two levies on international aviation are individually smaller in magnitude (Figure 5), but could produce a similar range of revenues to the shipping levy when implemented together. As expected, the fuel tax shows a largest disparity between the high and medium tax rates, as the high rate matches the very ambitious tax currently implemented in Hong Kong. This rate, applied globally, could produce revenues ranging from USD 150 billion to USD 115 billion, with USD 132 billion as the central case (first three bars in Figure 5). The more modest rates produce closer estimates and allow little space for the effect of negative demand responses on revenues, with the optimistic, medium and pessimistic projections returning similar results of USD 21 billion for the medium rate and USD 15 billion for the low rate.

The international ticket levy meanwhile would produce sizable revenues if implemented at the rates currently in place in the UK (our high rate scenario). The most optimistic projection for this levy would produce USD 159 billion in revenue, while the central case would generate USD 133 billion and the pessimistic case USD 98 billion (see first three bars under the “Aviation ticket” category picture in Figure 5). The medium rate (next three bars), which is currently enacted in France, would produce revenues between USD 71 billion and USD 57 billion (USD 66 billion central case), and the low rate (last three bars of the Figure) would gain between USD 18 and USD 19 billion.

Figure 5 – Annual revenue from global international aviation fuel and ticket levies under various scenarios



Simulating revenues under different scenarios of coalitions of the willing – A focus on the EU

In today's fractured geopolitical landscape – marked by rising protectionism, weakened multilateralism, and intensifying trade and security tensions – full global cooperation on climate finance is increasingly elusive. As multilateral agreements stall and official development finance stagnates, coalitions of the willing or "climate clubs" have emerged as a pragmatic second-best solution to mobilize and coordinate international resources for the net-zero transition. In this context, the purpose of the simulator is precisely to enable different coalitions of the willing to form and estimate potential revenues they could generate.

For instance, if only EU member countries were to join forces, they could generate significant revenues on their own: under a scenario of high rate taxation with an optimistic projection (first bar of each levy pictured in Figure 6), they could raise a total of USD 140 billion – 34 billion for aviation fuel, 62 billion for aviation ticket, and 44 billion for shipping. This would represent more than 10% of the USD 1.3 trillion target discussed in climate negotiations. Under a milder scenario of medium rate taxation and medium projection of demand response (fifth bar of each levy picture in Figure 6), this amount would fall to USD 41 billion – 4.8 billion for aviation fuel, 25.4 billion for aviation ticket, and 10.9 billion for shipping – which would still represent a significant contribution to international climate finance.

Figure 6 – Revenues potentially generated – across various scenarios – if only EU member countries formed a coalition raising levies on maritime shipping and aviation

It is nevertheless essential to recognize the political and competitiveness risks of moving ahead unilaterally or within limited "climate clubs." For instance, if EU carriers or shipping firms face higher effective taxes than their US or Asian counterparts, the resulting perception that green fiscal measures penalize EU industries could undermine both public support and policy coherence – much as seen in the debates around the Green Deal. This being said: (i) our focus on aviation and maritime shipping is precisely justified by the fact that these activities are less prone than others to leakages, as discussed above; (ii) recent experiences, such as the French aviation levy, indicate that demand for air travel has not been impacted by a minor levy, such as the ones envisioned under our medium rate scenarios. Yet, coordinated implementation and clear communication that these measures advance fair global competition and environmental integrity will be key to maintaining legitimacy and effectiveness.

More broadly, for coalitions of the willing to function effectively, potential members must perceive not only that the benefits of joining outweigh the costs, but also that internal fairness (e.g. based on countries' income) and differentiated responsibilities (e.g. based on historical CO2 emissions) matter. This is where GSLs play a key role: they can be used to fund compensation mechanisms, support just transition strategies in lower-income countries, and ensure that membership is not only beneficial to rich nations but inclusive and equitable.

Moreover, while the first version of the simulator covers levies on maritime shipping fuel, aviation fuel use and air passenger tickets, future work could expand the simulator to examine other potential solidarity levies, including financial transaction levies, levies on cryptocurrencies, wealth levies, and levies on fossil fuel production.

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Annex – Methodology of the simulator

1. Initial tax bases

The initial tax bases within the simulator are fixed across each scenario. For shipping, the tax base is the amount of CO2 emissions imbedded in the fuel used in maritime shipping which can be attributed to the trade of each country. The emission projections from shipping are produced by Dequiedt et al. (2024) who use trade data to attribute emissions from shipping to the country level, accounting for a hypothetical carbon tax on shipping of 40 USD/tCO2.

For the aviation fuel tax, an estimate of CO2 used by departing commercial flights from each country in 2019 is provided by Graver et al. (2020). For the ticket tax, the tax base is estimated by combining data on commercial flight departures from Graver et al. (2020) with data on the total number of commercial passengers (World Bank, 2025), and data on the distribution between domestic and international flights and economy and premium tickets from (Kellogg and Zheng, 2024). The simulator includes data on domestic and international flights, but the results presented here focus on international aviation.

Finally, the calculation of revenue from the aviation taxes requires an estimate of the price of each taxed item: tickets and jet fuel. As average airline ticket prices are not readily available at the country level, we used an estimate based on price data published for the United Kingdom's Office for National Statistics (ONS, 2023), which provides price data for economy tickets on domestic, European and long-haul flights. To approximate the average global price of an international economy ticket, we used the average of the European and long-haul rates. We then assumed that a premium ticket was twice the price of an economy ticket. This approach is certainly limited, but it should provide a 'close enough' estimate to approximate the expected demand reduction in response to the introduction of a levy on air tickets. The price of jet fuel was taken from the Jet Fuel Monitor in February 2025.

2. Tax rates

Each simulated tax rate for the international aviation taxes was based on an existing national tax rate, as shown in Table 1. For the fuel tax, this included a relative low of Canada's rate of 35 USD/t CO2, a medium rate reflecting Japan's fuel tax at 47 USD/t CO2 and an extreme high rate matching Hong Kong's current jet fuel tax of 332 USD/t CO2 (Hong Kong C&ED, 2025). The rates for aviation ticket taxes were taken from the current Solidarity Air Passenger Levy rate, the newly increased (2025) French ticket tax, and the existing UK ticket tax. For tax rates on international shipping, we instead used rates which had been previously proposed to the IMO, ranging from a low of 60 USD/t CO2 to a high of 300 USD/t CO2.

Table 1 – Tax rates used in scenario analysis

	Scenario	Rate	Units	Source
Aviation fuel (Int.)	High rate	332	USD/t CO2	Hong Kong fuel tax
	Medium rate	47	USD/t CO2	Japan fuel tax
	Low rate	35	USD/t CO2	Canada fuel tax
"Aviation ticket (Int.) Economy "	High rate	104	€	UK
	Medium rate	40	€	France
	Low rate	7.51	€	Solidarity Air Passenger Levy
Aviation ticket (Int.)	High rate	228.8	€	UK
	Medium rate	120	€	France
	Low rate	63.07	€	Solidarity Air Passenger Levy
Shipping	High rate	300	USD/t CO2	Marshall Islands & Solomon Islands Proposal High
	Medium rate	100	USD/t CO2	Marshall Islands & Solomon Islands Proposal Low
	Low rate	60	USD/t CO2	Japan proposal

3. Demand elasticities

Elasticities for the aviation levies are treated directly, with estimates from the literature providing a range of options for the user. For shipping, the response of the shipping sector the introduction of a carbon price is included directly in the estimation of the tax base by Dequiedt et al. (2024). This study provides a range of estimates of the responsiveness of shipping levels to the implementation of a carbon tax, with minimum, maximum and mean scenarios showing the range of possibilities. For our purposes, this allows us to treat the demand response indirectly, with our scenarios simulating an optimistic case in regard to revenue considering the maximum scenario and so forth. A similar approach, using the same dataset, is applied by Fabre et al. (2025) to estimate revenues from a global shipping levy. The indirect treatment is limited for scenarios in our simulator with tax rates significantly higher than 40 USD/tCO2, as the response to increasing tax rates will not be captured.

A similar approach was used with the choice of elasticities, with high, medium and low options taken from the literature in order to produce optimistic, central and pessimistic cases with regards to the amount of revenue raised. These specific elasticities used for the aviation taxes are shown in Table 2, while the shipping elasticities were represented indirectly by following the estimates of Dequiedt et al. (2024) who similarly show a high, medium and low case with respect to revenue.

Table 2 – Elasticities used in the scenarios

	Scenario	Elasticity	Source
Aviation fuel (Int.)	Optimistic	-0,035	Fukui and Miyoshi 2017
	Central	-0,166	-
	Pessimistic	-0,218	-
Aviation ticket (Int.) Economy	Optimistic	-0,56	Chassin (2013)
	Central	-1,04	-
	Pessimistic	-1,7	-
Aviation ticket (Int.) Premium	Optimistic	-0,2	-
	Central	-0,27	-
	Pessimistic	-0,48	-