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Théo Aphecetche

Abstract

This paper examines the fiscal implications of the global transition to climate neutrality, focusing on government expenditures, revenues, and the need for a comprehensive fiscal strategy within country-level transition plans. The paper analyses the impact of climate change and policy responses on public finances, highlighting the potential for decreased public revenues and increased expenditures due to climate-related damages and the implementation of mitigation policies. While carbon pricing strategies can initially boost revenues, their long-term success in reducing emissions may lead to lower fiscal income. The paper explores the necessity of investments to support the economic transformation towards a net-zero emission future and discusses the varying degrees of fiscal impact across different regions and policy mixes. The paper stresses the importance of broadening the tax base and incorporating innovative financing strategies to ensure fiscal sustainability during the transition. Through continuous assessment and international coordination, particularly within the G20, the paper suggests approaches to minimise the fiscal risks associated with a disorderly climate transition and to enhance the effectiveness of climate action for the collective global good.

JEL Classification: E6, H2

Keywords: Green Transition, Fiscal Sustainability, Carbon Pricing, Nationally Determined Contributions, Country-level Transition Plans, Climate Mitigation

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INTRODUCTION

Climate change shows that there is a big difference in how countries are responsible for causing it, what is needed to fix it, and how much they are affected by it. While estimates of the economic costs of climate change consistently reveal an upward trajectory, there are important uncertainties surrounding these estimates due the complexities of the specific climate models as well as of the cost estimation methods used.[1] The impact of climate change is unevenly distributed, but it affects all nations across the board[2].

Globally, Fouré et al. (2023) estimated – under a Net-Zero Emission Ambition (NZE) scenario[3] – a slowdown of economic growth from the transition to around 0.2 percentage points per year between 2019 and 2050, leading to a 5.6% loss in global gross domestic product (GDP) in 2050 compared to a *business-as-usual* scenario[4]. In the EU, the transition costs to a net-zero emissions economy appear relatively muted compared to the cost of inaction. Although it will differ across sectors[5], the impact of climate and energy policies on real GDP is projected to be limited at aggregate level - the lower bounds of the estimates are between -0.4% by 2030 and -0.6% to -1.3 % by 2050 depending on the model variant used. The cost of transition in the EU can be relatively modest, as GDP is around 0.6% below the baseline by 2050 if carbon pricing revenues are used to reduce distortionary taxes and / or subsidise clean energy.[6]

Looking into the wider fiscal implications of the green transition, we note that the debate on the fiscal repercussions of moving towards a climate-neutral society is chiefly driven by measures aimed at minimising carbon emissions (climate mitigation), rather than the anticipated costs linked to escalating temperatures, rising sea levels, and more regular extreme weather conditions as well as to measures to adapt to them (climate adaptation). Various channels exist through which climate mitigation and adaptation efforts might affect public budgets, spanning from the immediate to the long-term horizon. First, the revenue dimension encompasses the fiscal effects of economic tools that are designed to influence market dynamics by altering costs and prices or by dispensing subsidies and financing to steer technological and behavioural changes. Second, the expenditure dimension pertains to those economic tools that have a direct impact on government spending. This aspect runs in parallel to the revenue dimension, as climate strategies can lead to either an increase or decrease in public expenditure. Third, the regulatory dimension, though less direct than tax-based approaches, is nonetheless significant. Regulations designed for climate mitigation can have substantial effects on the economy without directly contributing to fiscal income through taxation. These measures can redirect the activities of market participants and industries, potentially reducing the reliance on fossil fuels and thus impacting fossil fuel tax revenues. It is important to recognise that while regulations shape the economic environment and can drive the transition toward a carbon neutral economy, they do so without the immediate fiscal benefit of generating new revenue streams. As such, the combination of these three

[1] "There are two major challenges when building a reliable model of the earth's climate system. The first is how well scientists understand and can mathematically simulate the basic physics of the climate system, such as cloud formation, wind patterns, and ocean currents. The second is computation, because even a simplified version of an entire planet's climate requires an enormous amount of computing power "- What are the biggest challenges and innovations for new climate models? Ask MIT Climate, MIT Climate Portal, April 2024.

[2] European Commission. (2024).

[3] Such a scenario reflects the ambition to achieve net-zero carbon dioxide emissions globally by mid-century, i.e., where carbon emissions do not exceed carbon sequestration.

[4] Fouré et al. (2023).

[5] The impact is expected to be yet more pronounced at sectoral level, with, for example, a negative impact expected in sectors being phased out, such as those linked to fossil fuels, or where products will need to be decarbonised, which implies significant technological change in the value chain, such as in the energy-intensive or automobile sectors.

[6] Varga et al. (2021).

channels can lead to deviations of fiscal outcomes from expectations or forecast made during the budget formulation and constitute as such a fiscal cost.

Ensuring that public finances remain sustainable in the transition is key to achieve net-zero greenhouse gas emission globally by mid-century. However, a meaningful discussion of the fiscal implications of climate change, and its related policies appear to be missing. Here, it is also crucial to consider the impact of climate mitigation on fossil fuel subsidies. The transition may necessitate a significant reduction or complete phase-out of these subsidies, which has implications for both government expenditures and market dynamics. The G20 is currently exploring practical solutions on how to reset climate finance to secure that green capital flows can be directed where they are most direly needed, notably in Low Income and Emerging Market Economies by reforming the International Financial Architecture and building the most relevant country level Transition Plans[7] to ensure the most effective climate action.

This paper examines the fiscal implications of the global transition to climate neutrality, with a focus on government expenditures, revenues, and the need for a comprehensive fiscal strategy within country-level transition plans. The paper analyses the fiscal effects of climate mitigation policies, such as carbon pricing and investments in green technologies, and their potential to influence public budgets. It is important to note that this study does not aim to be all-encompassing. The scope of our analysis is specifically centred on the fiscal strategies for the green transition, rather than providing a detailed account of the direct budgetary implications of climate impacts. The paper seeks to contribute to the ongoing dialogue on fiscal sustainability in the context of climate change by highlighting key areas of fiscal policy that are critical for supporting the transition to a net-zero emissions future. This paper will then first investigate the change in net public revenues in the transition towards net climate neutrality, and then dive into possible policy implications, including possible options to broaden the tax base, both domestically and internationally. In conclusion, the paper will identify possible room for more cooperation among G20 countries as addressing climate change is a truly common endeavour to preserve a genuine global public good.

THE IMPACT OF CLIMATE CHANGE, AND RELATED CLIMATE POLICIES ON GOVERNMENT EXPENDITURES AND REVENUES

Climate change can affect government expenditures and revenues in many ways. Climate change can decrease public revenues through economic downturns from frequent adverse weather events and, in the long term, the erosion of fiscal revenue sources, while also increasing public expenditures for rebuilding damaged assets and infrastructure. As regards falls in revenues, for example, the European Investment Bank's 2023 Investment Survey showed that two out of three European firms are already facing damages and losses due to climate change. Public expenditures can also be negatively impacted by adverse weather events. Some of these costs may stem from explicit liabilities while others arise implicitly.[8] There may be explicit commitments to bear the costs of climate losses and damages stemming from legal obligations, but implicit costs can also become significant as governments often act as insurer of last resort. Climate-related disasters generally cause an upward pressure on public expenditures to cover for rebuilding damaged assets and infrastructure. For example, past economic losses in the EU from weather and climate-related extreme

[7] The country-level transition plan serves as a comprehensive framework for a nation's shift towards climate neutrality, encompassing economic, social, and environmental strategies. It provides a detailed roadmap for achieving long-term sustainable development goals. The Nationally Determined Contributions (NDCs), on the other hand, are targeted commitments within the international climate change framework, specifically the Paris Agreement, reflecting the country's efforts to reduce greenhouse gas emissions and adapt to climate impacts. The NDCs are overarching component of the broader transition plan and represents the country's formal pledge to the global community, articulating specific climate-related objectives and actions. Consequently, the transition plan supports and amplifies the NDCs, ensuring that national efforts are aligned with international climate goals and commitments, while the NDC helps to focus the transition plan on measurable and internationally accountable climate actions.

[8] Radu Diana (2021).

events amount to € 34 billion per year (0.21% of EU GDP) over the last five years.[9] Looking at macro-level, conservative estimates show that the current trend in global warming could result in an additional annual loss in the EU of at least € 170 billion[10] (1.36% of EU GDP).[11]

On the other hand, well-designed climate mitigation policies and in particular carbon pricing can both steer forward the green transition and generate necessary funds for the transition. Many nations within the G20 are already implementing various forms of carbon pricing strategies at different governmental levels.[12] Notably, in eight countries —Canada, France, Japan, Korea, Mexico, South Africa, Germany, and the United Kingdom (UK) — these schemes contribute to encompass over half of each nation's total greenhouse gas emissions (GHG). Besides, Canada requires that all its provinces and territories enforce a baseline carbon pricing policy, which can be fulfilled through either a carbon tax or an Emission Trading System (ETS). For the European Union countries, the EU emissions trading systems that currently target power and centralised heat generation, industrial sectors, aviation and maritime transport, around 40% of total GHG, contributes to this large coverage. Similarly, the UK has an ETS of similar coverage. From 2027, the second EU ETS for buildings, road transport and further industry sectors will contribute to an EU wide increase of coverage of more than 70% of total GHG. Japan and South Africa impose carbon levies on fuel supplies at an intermediate stage of the distribution, whereas Korea's ETS extends to power, industry, waste management, building operations, and public services. The revenue generated can be substantial. For example, in the EU, the EU Emissions Trading System (ETS) generated EUR 38 billion revenues in 2022.[13] These revenues are expected to increase and, from 2027, also the second ETS for buildings, road transport and further industry sectors are expected to generate additional revenues, with a peak of revenues projected for 2035.[14]

Public support is also critical to foster the necessary transformation of the economy and ensure a fair transition. Significant investments will be necessary to achieve a net-zero emissions ambition over the coming decades. The level of investment required will vary between countries depending on the current greenhouse gas emission intensity of their energy mix and industry. For the EU, the European Commission estimated that for the period 2031-2050, there will be annual energy system investment needs above 3% of GDP (excluding transport), which is in the order of an additional 1.5 percentage points of GDP compared to the average energy system investment in the previous decade (2011- 2020)[15]. There is no precise estimate of the public share of this investment. Nonetheless, public support will be required both in the form of direct investment to decarbonise public assets and to catalyse private investment in near-zero carbon solutions, and to provide targeted support to address distributional concerns linked to the transition. Several major economies have shifted towards fiscal policies aimed at fostering green investments.[16] These policies include direct government funding for clean energy projects and the offering of green subsidies or tax incentives to stimulate private sector investment in low-carbon technologies (LCTs). China has also increased its green public investments and has offered subsidies for solar energy deployment, which has been a significant focus of the Made in China 2025 strategy over the past ten years. More recently, the United States passed the Inflation Reduction Act of 2022, which is the most extensive federal climate legislation to date in the country, with a projected expenditure of around 400 USD billion over the next decade. This act aims to boost clean electricity and transmission, cleaner modes of transportation, and energy-efficient home renovations through various subsidies and tax incentives. As for the European Union, in addition to its carbon pricing framework, it applies a climate

[9] European Environment Agency. (2023a).

[10] The economic consequences were estimated in terms of welfare (consumption) changes based on direct damage estimates from the different impact categories. This includes damage to capital stock, sectoral productivity reduction, and changes in consumption. Welfare loss is in general larger than the direct damages because it accounts for indirect effects in the rest of the sectors of the economy (e.g. agricultural yield losses impacting the agro-food industry).

[11] Joint Research Center – European Commission (2022).

[12] Black, et al (2024).

[13] European Environment Agency (2023b).

[14] European Commission (2024).

[15] Ibid.

[16] Black, et al (2024).

mainstreaming of at least 30% of its multiannual budget and has unrolled a post-COVID Investment Plan known as the Recovery and Resilience Facility, with a great focus on green transition, with climate expenditure amounting to EUR 275 billion or over 40% of the total Recovery and Resilience plans' allocations. Besides, the EU has introduced the Green Deal Industrial Plan[17], which includes a relaxation of state aid regulations and accelerated permitting to accelerate private investments in renewable energy and other net-zero industries in the ensuing years. Other nations like Canada, Japan, and Korea are either implementing or contemplating policies that align with these expenditure-based measures, with the goal of promoting the transition towards a low-carbon economy.[18]

As the world progresses towards achieving climate neutrality, governments should consider the public finance impact of different mitigation strategies, taking also into account a long-term slight reduction in related net public revenues by 2050, while also considering the impacts of structural changes. When reaching carbon neutrality, globally, we can indeed expect net public revenues to slightly decrease in 2050 (-1.8% of no-action scenario)[19]. Some climate transition measures could lead to the erosion or dilution of tax bases through second-round effects on public revenues. For example, some transition measures are aiming to reduce the use of fossil fuels, reducing public revenues taken from excise taxes on petrol and diesel if they are successful. Other measures reduce taxes or public revenues for certain purchases, such as fossil-free cars, low consumption construction and building renovations. If not substituted by other revenues sources, this could lower potential output, leading to a deterioration of public balances and higher public debt levels.[20] Anticipating such a decrease, and moving forward in the transition, governments will need to ensure effective economy-wide carbon pricing instruments and put in place fiscal policies that can increase public revenues or reduce public expenditures. Such choices should also be made taking into consideration structural changes, such as ageing populations and the related erosion of the tax base, increased healthcare costs, technological disruptions affecting labour markets and tax bases, the need for substantial investment in education and infrastructure, as well as addressing the growing demands for social services and the challenges posed by globalisation and income inequality. These factors collectively require a comprehensive fiscal approach to ensure budget sustainability while pursuing environmental goals**.** The latest projections published by the European Commission estimate that the total cost of ageing in the EU will increase by 1.4 percentage points of GDP between 2019 and 2030, and 2.5 pps by 2050 compared to 2019 or more understandably, increase costs by 24-25.4% of GDP and 26.5% in 2050[21]. Overall, in the EU, additional annual investment needs in social infrastructure, such as affordable housing, health and long-term care, education, and life-long training was estimated in 2021 to be EUR 192 bn in the context of social sustainability[22]. Considering the erosion of real income due to higher inflation since then, the investment gap may have increased.

The impact of the transition to climate neutrality will vary across regions with every region projected to experience a decrease in net public revenues, with the degree of impact depending on a country's characteristics and policy mix. G20 Members had already acknowledged in 2023 that pathways, risks, costs, and opportunities will differ across countries based on their relative levels of development, challenges, and other factors such as socioeconomic and environmental contexts.[23] While the degree of the impact depends on the country characteristics and policy mix, it is

[17] The Green Deal Industrial Plan is a cleantech plan by the European Commission to help make Europe a centre for innovations and investments and to enhance the competitiveness of Europe's net-zero industry. The plan aims to accelerate the transition to climate neutrality by 2050, by creating a more supportive environment for scaling up the EU's manufacturing capacity for the net-zero technologies and products. The plan is based on four pillars: a predictable and simplified regulatory environment, speeding up access to finance, enhancing skills, and open trade for resilient supply chains.

[18] Black, et al (2024).

[19] Fouré et al (2023).

[20] The EU Independent Fiscal Institution (2022).

[21] European Commission (2021b).

[22] European Commission (2021a).

[23] G20 (2023).

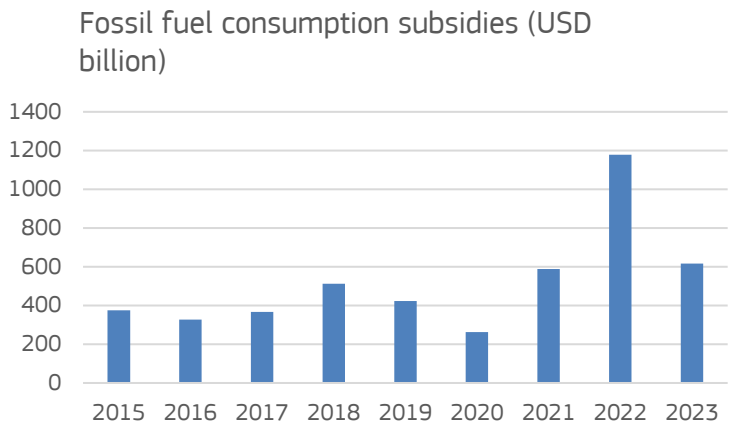
essential to recall that in the OECD scenarios net public revenues of every region are impacted negatively, with changes in net public revenues as percentage of a business-as-usual scenario GDP ranging from -0.7% to -3.4%.[24] A closer look into dependence towards fossil-fuels, and policy choices as per announced Nationally Determined Contributions - allows for a more nuanced picture[25]. Countries with an economic structure specialised in fossil-fuel production activities (i.e., Middle East) are more at risk in the long-run both in terms of economic impacts and public finance, while countries with large budgetary fossil-fuel support (i.e., Africa) can reduce or redirect public spending through its removal. Regions where investment subsidy-related instruments – as opposed to carbon pricing – constitute the largest part of the mitigation effort (i.e., North and South America) suffer from the largest negative change in net public revenue. In regions where carbon pricing with its related fiscal revenues plays a significant role (i.e., Asia & Oceania, Europe), the net effects on public finances are primarily driven by the direct cost of households' subsidies and the magnitude of indirect effects of all instruments.

THE NEED TO INCLUDE A FISCAL STRATEGY IN COUNTRY-LEVEL TRANSITION PLANS AND THE ROLE OF THE G20

The choice of policy instruments in the transition will have significant fiscal implications. Comprehensive climate policy packages can combine carbon pricing, removal of fossil fuel support, reforms of energy markets, and policies that stimulate investments by firms and households to reduce and decarbonise energy production and use, such as deployment of low carbon energy mix, buildings refurbishment and vehicle zero emission requirements. Overall, such policy packages should target all sources of greenhouse gas emissions. However, the mix of policy instruments chosen matters greatly in terms of the fiscal implication of the transition.

While carbon taxes and emission trading generate revenues and phasing out fossil fuels support decreases public expenditure (see graph 1), additional subsidies to low-carbon alternatives increase public expenditures. Removing fossil fuel subsidies would reduce emissions and yield benefits such as improved public revenue, macroeconomic and sustainability performance[26]. At the same time subsidy removal can have adverse distributional impacts, especially on the most economically vulnerable groups which, in some cases can be mitigated by measures such as redistributing revenue saved, all of which depend on national circumstances.[27] For example, it is important to keep in mind that the greater the success of a carbon tax at constant level in reducing emissions, the greater the decline in revenues from that carbon tax will be. A successful carbon tax will therefore provide a boost to public

Graph 1: **Overview of global fossil fuel consumption subsidies**



Source: IEA.

[24] Fouré, et al (2023).

[25] Nationally determined contributions (NDCs) are at the heart of the Paris Agreement and the achievement of its long-term goals. NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change.

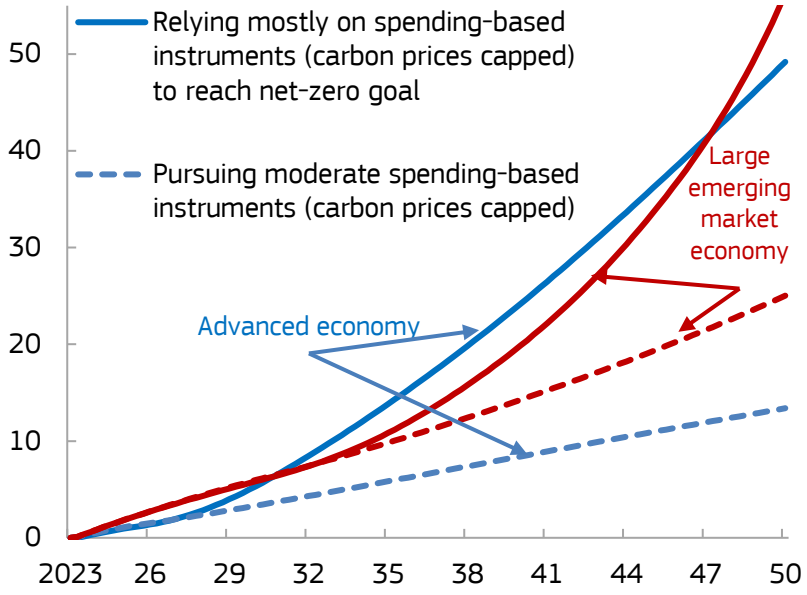
[26] IPCC. (2022).

[27] Ibid.

finance which decreases over time, albeit one that is likely to coincide with the greatest demand for public investment in the climate transition.[28] Policies that decrease energy demand can decrease public revenues from energy taxes if not countered by increased rates or shifts in the tax base. For example, when decarbonising road transport by shifting to electric vehicles will progressively erode the existing tax bases of motor fuel excises.

It is also essential to maintain a whole-of-government approach when designing country-level transition plans, and to understand how the various instruments can reinforce each other. For example, the intensification of energy efficiency efforts benefits a wider use of renewables as it favours the greener and more efficient technologies of heating and electricity generation (e.g., more heat pumps in the place of gas boilers).[29] Public revenue from the use of fossil-fuels would decrease both due to a depleted demand related to energy efficiency improvements, and due to better availability of renewable energy even in the case of overall growing demand. Such consideration in the policy-design should also – whenever possible - consider possible international spillovers as a lack of coordination could possibly aggravate the negative global fiscal impacts of the transition.

Graph 2: **Illustrative Debt Dynamic When Expenditure-Based Climate Policies are Expanded (% of GDP)**



Source: IMF.

Elevated public debt levels across most countries are complicating climate challenges at the current juncture, where fiscal adjustments are necessary over the medium term to rebuild fiscal buffers. While estimates by the International Energy Agency suggest that achieving net-zero emissions by 2050 will require investment in clean energy to reach USD 4.5 trillion per year by 2030[30], fiscal policy continues to struggle with legacies of high debt and deficits[31]. Under the assumption that the level of taxation is fixed, fiscal constraints often leave limited resources to achieve climate goals in many instances, especially in Low Income and Emerging Market Economies, which are already struggling to finance their growth and development priorities. Relying largely on expenditure-based measures to achieve net-zero emissions by mid-century would raise public debt-to-GDP ratios sharply and put debt sustainability at risk if not financed by additional revenues. IMF simulations[32] reveal two alternative debt dynamics. First, a proactive escalation in green investments and subsidies aimed at net-zero emissions (the solid line in Graph 2), which would dramatically increase the debt-to-GDP ratio by 45 percentage points by 2050, potentially leading to unsustainable debt levels. Second, a more cautious increase in green spending to control debt growth (the dashed line in Graph 2). The second approach, while fiscally more conservative, would only cut emissions by 40 percent by 2050, failing to meet environmental targets. Both strategies face the risk of reduced fuel tax revenues as the economy shifts towards clean energy, with the risk

[28] The network of EU Independent Fiscal institutions. (2022).

[29] Su, Y. & Gao, X. (2023).

[30] IEA. (2023).

[31] IMF. (2024).

[32] IMF. (2023).

being more pronounced under the aggressive investment strategy and may require exploring innovative sources of financing.

When designing country-level transition plans, governments must navigate complex government expenditure, revenue, and debt dynamics. Governments need to be aware of the following dynamics when designing country-level transition plans. Firstly, the revenues from carbon pricing tend to increase once established and if strengthened in line with agreed global climate objective. Secondly, as CO2 emissions—the base for carbon taxation—diminish throughout a successful transition, the revenues from carbon pricing are expected from a certain moment to wane over time as the magnitude of the emissions reduction surpasses the escalation in pricing. Thirdly, while some tax revenues (e.g., on electricity use) might increase, net public revenues from other sources, like fossil fuel taxes, would be expected to decrease significantly because of carbon pricing or other decarbonisation policies like subsidies or regulations. It should be clear that the outcome will depend on the pace of the decarbonisation, including the level of carbon prices, regulations or tax rates, and the development of the related energy, transport, and environmental tax policies. With unchanged policies, revenues from fossil fuel taxes can be expected to fall, which implies that the funds available to governments to support other initiatives – such as carbon sequestration[33] or ensuring a just transition – could be less than if the revenues from carbon pricing are analysed in isolation. This possibility should be factored into any plans for reallocating carbon price revenues. Overall, when designing country-level transition plans, a genuine financing strategy considering the above-mentioned dynamics of decarbonisation policies, both direct (carbon pricing/taxes, subsidies, regulations) and indirect (fossil fuel taxes, possibly polluting vehicle taxation etc.) should be envisaged. Ministers of Finance in cooperation with Climate and Environment Ministers play a crucial role in developing and implementing Nationally Determined Contributions, which are key to achieving the goals of the Paris Agreement. Finance Ministers are responsible for putting in place sound macroeconomic and fiscal policies, as well as robust financial management. This includes planning, revision, and alignment with budget cycles. The ability of government to mitigate the fiscal risk depends largely on the quality of available information about the impact of policy measures. Indeed, it remains difficult to understand the link between government policies, their cost and impact on the economy and environment – largely due to limited information and scientific knowledge. Similarly, it is difficult to measure rigorously ex-ante and ex-post impacts. However, stronger political will and support could lead to a better prioritisation of the development of tools that can capture and forecast linkages between inputs (i.e., fiscal policy and financial resources deployed) and outputs (i.e. their environmental impacts).[34] A comprehensive fiscal risks analysis can help governments strengthen the resilience of public finances and optimise the fiscal policy response in the case of risks occurrence, including by adjusting the tax base.[35]

The G20 can play a key role in fostering coordination of climate policies and providing guidance on how to best ensure fiscal sustainability in the transition. Without consensus, there is a heightened risk of triggering an economically destabilising and chaotic transition. In many countries, there is currently no political consensus, especially among G20 countries, about the policies needed for implementing the climate transition. The lack of consensus about the most effective climate mitigation policies, which often translate into delayed or insufficiently ambitious policies, creates risk of an economically damaging and disorderly transition, which could be passed down to economic agents (businesses and households) and lead to action that is late, disruptive, sudden and/or unanticipated. The sudden and brutal policy shift would then affect policy commitments, financial incentives, regulations, and immediate needs. A mechanical increase in the cost of public finance could follow. Other important costs might be overlooked or ignored resulting in excessive current spending and a loss of public revenues. Political economy pressures may also lead to the overall portfolio of measures being skewed towards political attractive choices. This would lead to a higher overall economic and budgetary cost of the transition. The G20 could provide guidance on how to best ensure fiscal sustainability, including how to best recycle revenue from carbon pricing as well as identifying innovative sources of financing in view

[33] Carbon sequestration is the process of storing carbon dioxide that has been collected and removed from the atmosphere, in solid or liquid form.

[34] Pojar (2023).

[35] The network of EU Independent Fiscal institutions. (2022).

of the erosion of fossil-fuel-based tax bases, including by broadening the tax base, and exploring untapped potential from levies at international level, notably to support Low Income and Emerging Market Economies in the transition.

REFORMING THE TAX REGIMES TO STEER THE TRANSITION, BOTH AT DOMESTIC AND INTERNATIONAL LEVEL

As society navigates through a period of rapid innovation, demographic shifts, and climate change, it becomes imperative to revamp tax regimes to ensure their sustainability and to facilitate the transition. Current labour and environmental taxation regimes have lagged these societal changes. To address the fiscal challenges inherent in the green transition, tax systems must be strategically restructured to not only generate necessary revenue but also drive the shift towards a more sustainable, circular, and low-carbon economy.

The following tax regime adjustments have potential implication for the green transition[36]:

1. Carbon pricing instruments:

Carbon pricing, such as **carbon taxes** or **emission trading systems**, can be pivotal in transitioning to a low-carbon economy. These measures can generate substantial short-term revenue, which can be used to fund green initiatives or alleviate the tax burden on other sectors. By taxing carbon emissions directly, they create strong financial incentives for businesses and consumers to invest in renewable energy and energy-efficient technologies.

Broadening the tax base to include a wider range of carbon-intensive products, such as transportation fuels, can further incentivise the reduction of greenhouse gas emissions.

Carbon border adjustments can prevent carbon leakage for high carbon intensity sectors by levelling the playing field for domestic producers competing with imports from countries with less stringent climate policies. It ensures equal treatment of domestic and imported goods by applying a similar charge to carbon emitted during the production of domestically produced and of imported carbon-intensive goods. It can incentivise producers in third countries to decarbonise.

2. Transportation sector reform:

Implementing **distance-based levies** that reflect the environmental impact and congestion costs of different vehicle types can accelerate the adoption of zero-emission vehicles. As traditional fuel tax revenues decline with the phase-out of internal combustion engines, these levies can provide a stable funding source for sustainable transportation infrastructure.

3. Resource taxes:

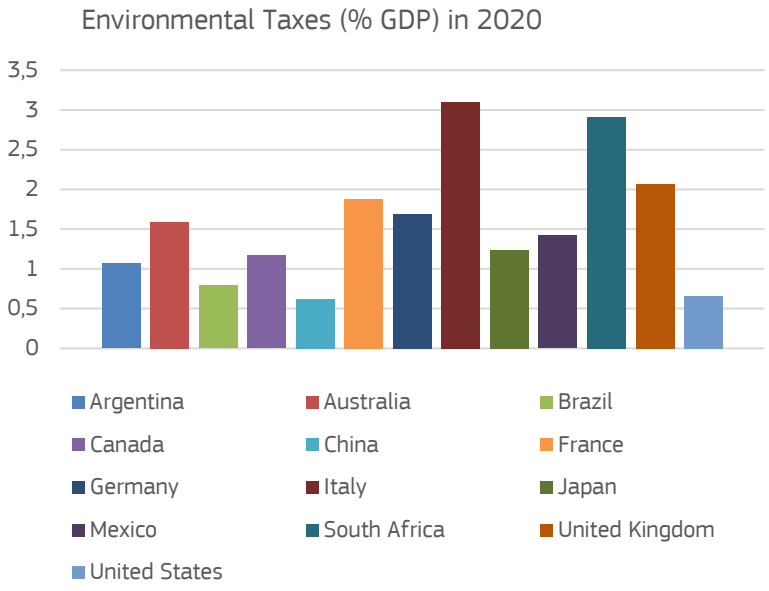
Taxes on the extraction and use of natural resources can incentivise resource efficiency, promote recycling, and support the transition to a circular economy. By making unsustainable resource use more expensive, these taxes encourage the preservation of ecosystems and efficient resource management.

Beyond environmental taxes, fiscal sustainability can also be pursued through alternative measures, although their revenue potential may be less significant when compared to traditional sources such as social security contributions. Examples include (i) taxes on automation, such as a 'robot tax,' (ii) digital services taxation, and (iii) taxes on financial transactions. However, the expected revenue from these alternatives is relatively modest compared to the existing tax revenue, including social security contributions (see Graph 3). Other notable strategies involve supporting pension schemes through consumption and wealth taxes, such as land value taxes, which could broaden the tax base while minimally affecting economic competitiveness and the propensity to replace labour with capital.

[36] European Environment Agency. (2020).

[37] IEA (2024).

International taxation can also provide additional financial resources to fund global public goods like the support for just transitions, particularly in climate vulnerable and Low Income and Emerging Market Economies. It is estimated that emerging markets and developing countries (EMDCs- other than China) will need to invest USD2.4 trillion annually by 2030.[37] This will require mobilising the right finance at the correct scale and pace to support these countries in realising the investment required to transition to net zero resilient economies to deliver their climate and development goals. Currently, more than three-quarters of global energy investment is financed by commercial sources[38]. Around 25% comes from public finance[39] and 1% from development finance institutions (DFIs)[40].[41] Despite its small overall share, development finance plays a crucial role in mobilising commercial finance, particularly for clean energy investment in emerging and developing economies. Public climate finance, including international climate finance remains critical to support vulnerable countries and communities, especially those more exposed to the impacts of climate change. In 2022, developed countries achieved to provide collectively USD 100 billion goal in climate finance to address the needs of developing countries in the context of meaningful mitigation action and transparency of implementation, with USD 115.9 billion provided and mobilised.[42] While it is key to engage in deliberations on the New Collective Quantified Goal on Climate Finance (NCQG) under the Paris Agreement, the core of public finance should be provided and mobilised from a broader and dynamic base of contributors to meet the much larger investment needs. Agreement on International taxation can contribute to secure additional, predictable, and adequate financial resources to help developing and vulnerable countries transition to a climate-neutral economy. Among the options envisaged to mobilise at scale resource for the transition, the following appear the most promising:



Source: IMF.

- **Financial Transaction Tax**: a 0.1% tax on the trading of stocks and bonds could deliver up to 418 billion USD per year on a global level.[43]

[37] IEA (2024).
[38] "Commercial finance" includes equity investments (including cash and savings) made by private enterprises and households, alongside debt from commercial banks and financial institutions. It also includes some finance from public financial institutions, such as state-owned banks, sovereign wealth funds and pension funds, although this includes a degree of state-directed lending, especially in emerging economies with strong industrial policies.
[39] "Public finance" includes public equity stakes in private corporations and state-owned enterprises, state subsidies and tax incentives, as well as finance from some state-owned financial institutions, such as export credit agencies, as well as central banks.
[40] Development Finance also comes from development finance institutions (DFIs) that have an explicit development mandate. DFIs can be domestic (as in the case of BNDES in Brazil and PTSMI in Indonesia) or international, and the latter can be bilateral (such as the Agence Française de Développement, Germany's KfW, and the Japan International Cooperation Agency), or multilateral (such as the World Bank, the Asian Development Bank or the African Development Bank).
[41] IEA (2024).
[42] OECD (2024).
[43] Pekanov, et al (2019).

- **Levy on aviation**: an aviation levy could raise up to 150 billion USD per year on a global scale.[44]
- **Levy on maritime shipping**: a levy of 150 USD / ton of CO2 would raise up to 80 billion per year[45]

Spearheaded by France and Kenya, a Taskforce "Global Solidarity Levy" to scale up development and climate action was established in March 2024. It will notably focus on the above-mentioned taxation options, plus Fossil Fuel Levy, and International Carbon Price, that have already been implemented or being considered in some countries. The Task Force aims to promote international agreements at COP30 in 2025.

CONCLUSION

While the impacts of climate change and policies to mitigate it are expected to affect public finance negatively, there is a differentiated impact of policies to mitigate climate change. Instruments like carbon pricing can in the short to medium term have positive fiscal impacts, unlike regulations or subsidies. In the longer term, the emission reduction success of carbon pricing policies could lead to a vanishing of the positive fiscal impacts. In addition, all decarbonisation policies can be expected to have indirect negative impacts on fuel tax revenues, which can lead ceteris paribus to overall negative fiscal impacts. The broader fiscal implications of climate change are vast and multifaceted. There remain areas that would benefit from further research, such as the long-term fiscal strategies for adaptation. As we move forward, it is crucial for policymakers to integrate robust fiscal planning into their climate transition strategies, ensuring that the path to climate neutrality is both environmentally and economically sustainable. Regular and continuous assessment of the climate transition's impact on public finances could contribute to a cost-efficient climate transition. A reassessment of the measures that aim to facilitate the climate transition can help optimise the policy package, allowing for the right balance between greenhouse gas emission reduction, public finances, and other impacts. As the climate transition poses significant, though not exceptional risks to fiscal sustainability in the long run, country-level transition plans should be underpinned by a financing strategy, based on a detailed analysis of direct and indirect fiscal implications of climate change policies. In parallel to this fiscal exercise conducted at domestic level, it is essential to ensure greater coordination of climate mitigation policies at global level. Indeed, to mitigate effectively the fiscal risks linked to a disorderly green transition[46], the G20 should lead the way, and agree on a menu of policy options, identifying the most effective climate policies, strengthen the coordination of its climate policies, and ensure their interoperability. Discussions in the G20 should also allow for progress in understanding how to best ensure fiscal sustainability, including how to best recycle revenue from carbon pricing as well as identifying innovative sources of financing in view of the erosion of fossil-fuel-based tax bases. Finance Ministers should play their role in defining Nationally Determined Contributions, in cooperation with Climate and Environment Ministers. Finally, to address the fiscal challenges inherent in the green transition, Finance Ministers should also engage in discussions about reforming tax systems both domestically, and possibly at international level to not only generate necessary revenue but also drive the shift towards a climate-neutral economy.

[44] Hirsh, et all (2023).
[45] Wemaëre, et al (2023).
[46] Failure to coordinate climate policy across sectors and/or a delay to climate action.

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