

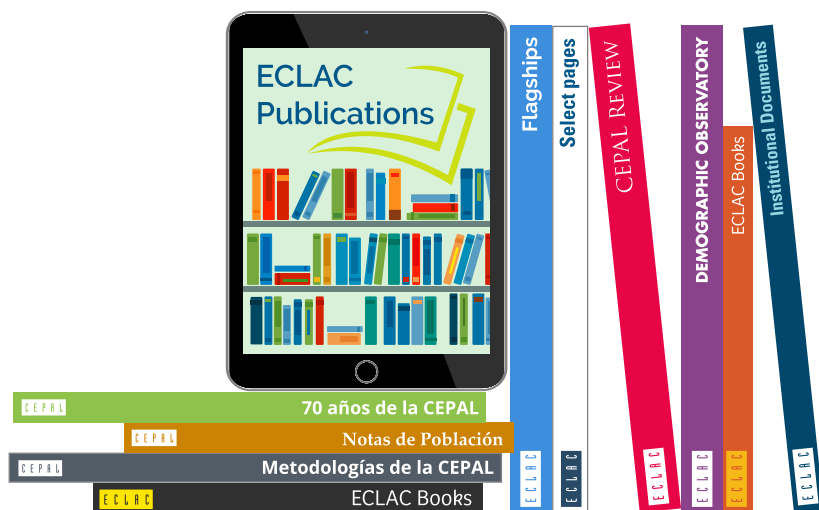
# Fiscal Panorama of Latin America and the Caribbean

2024

Fiscal policy for  
addressing the challenges  
of climate change



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# Fiscal Panorama of Latin America and the Caribbean

2024

Fiscal policy for  
addressing the challenges  
of climate change



**José Manuel Salazar-Xirinachs**

Executive Secretary

**Javier Medina Vásquez**

Deputy Executive Secretary a.i.

**Daniel Titelman**

Chief, Economic Development Division

**Sally Shaw**

Chief, Documents and Publications Division

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## Foreword

In 2023, trends in public finances in Latin American and Caribbean countries were shaped by a context of weakening global economic activity, higher financing costs and declining capital flows to emerging markets. In the region, the slowdown in economic activity maintained the low-growth trend that has marked the last decade.

As discussed in chapter I of this report, fiscal deficits widened and the primary balance returned to a deficit in Latin America. This is explained by the slowdown in aggregate demand and falling prices of non-renewable natural resources, which weighed negatively on public revenues, while the level of public spending stabilized after two years of cutbacks. In the Caribbean, however, the fiscal position improved, as primary surpluses increased on the back of the better performance of service-exporting countries, reflecting the recovery in international tourism.

A common denominator in most of the countries was a rise in interest payments, in particular those related to external public debt, as a result of higher international interest rates. This has led to what the Economic Commission for Latin America and the Caribbean (ECLAC) has termed development distress, in which the burden of interest payments on debt service—ranging from 3 to as much as 5 percentage points of GDP—reduces the availability of resources for spending and investment that are key to economic and social development, and this is compounded by the fact that public investment has been used as the adjustment variable in this situation.

Today, there is growing and widespread recognition of the key role that the public sector must play in guiding development towards a more productive, sustainable and inclusive model, and in contributing actively to climate change adaptation and mitigation measures. ECLAC has posited that climate change will lead to severe microfinancial shocks, with implications for fiscal policy management.

This report analyses two significant elements of the relationship between climate change and fiscal policy. Chapter II looks at the investment needed to address climate change and foster sustainable development, and shows that these needs are high. In that regard, carbon taxes are a key tool for incentivizing changes in consumption and production patterns and generating fiscal resources for climate action. The estimates presented indicate that a carbon tax has the potential to raise significant revenue. However, to leverage its effect, the price of carbon would need to be high, which could incur high economic and social costs. Dedicating the revenues collected to financing investment and transfers to vulnerable households could increase economic growth rates. However, this accelerated growth would be insufficient to offset the negative effect of climate shocks on the medium-term GDP trend. This suggests that the carbon tax is an instrument that should be considered in conjunction with other measures to increase climate investment.

Also analysed in the report is the quantification of public sector climate spending. This measurement is vital for the effective management of resources and the evaluation of progress in the implementation of adaptation and mitigation policies. It could also serve as important input in international discussions on climate finance. In that regard, chapter III examines regional experience in the classification and measurement of spending and public investment on climate change matters. The chapter shows that cross-cutting climate expenditure was less than 1% of GDP in most countries, and the public investment component stood at between 0.1% and 0.8% of GDP. These figures highlight that substantial efforts will have to be made for the region to close climate investment gaps.

Boosting sustainable and inclusive growth requires major transformations in the development model to close the persistent structural gaps in productivity and those related to productive, social and environmental heterogeneity. To this end, ECLAC has proposed a set of 15 sectors related to industry, services and environmental sustainability for driving growth, productivity and employment.<sup>1</sup>

A necessary condition for the success of these major transformations is their adequate financing, which requires fiscal space and a framework for the sustainability of public finances. In turn, expanding fiscal space calls for measures, on the revenue side, to increase the level of tax collection as well as its progressiveness and capacity to reduce inequalities and, on the expenditure side, to ensure a more efficient use of resources. It will also be necessary to strengthen the fiscal institutional framework to prevent tax evasion and avoidance and illicit financial flows. Public spending and investment must help to improve the management of the economic cycle and strategically allocate public resources to boost economic growth in a sustained, inclusive and sustainable manner. Thus, fiscal policy can play a more active role in driving the major transformations in development models that will enable the region to build a more productive, inclusive and sustainable future.

**José Manuel Salazar-Xirinachs**

Executive Secretary  
Economic Commission for Latin America  
and the Caribbean (ECLAC)

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<sup>1</sup> J. M. Salazar-Xirinachs, "Rethinking, reimagining and transforming: the 'whats' and the 'hows' for moving towards a more productive, inclusive and sustainable development model", *CEPAL Review*, No. 141 (LC/PUB.2023/29-P), Santiago, Economic Commission for Latin America and the Caribbean (ECLAC).



CHAPTER

# Public finance trends in 2023

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## Introduction

- A. Government revenues fall as a result of declining tax receipts
- B. Primary public expenditure stabilized in Latin America, but pressures on interest payments increased
- C. Fiscal deficits widened in Latin America as revenues declined, while the primary surplus increased in the Caribbean
- D. Public debt increased in Latin America, while continuing to trend down in the Caribbean
- E. Subnational governments adhered to a balanced budget path in 2022

## Bibliography



## Introduction

In 2023, public finance trends in Latin America and the Caribbean were framed by faltering economic growth, a reduction in the international prices of non-renewable natural resources, an increase in financial costs and rising geopolitical tensions. In Latin America specifically, the public accounts deteriorated as public revenue flows lost momentum, with tax receipts retreating from their 2022 peak. In contrast, public expenditure remained stable following two consecutive years of cuts. Interest payments played an important role in this result, particularly those related to variable-rate external debt. As a result of these trends, the overall central government deficit widened to 3.1% of GDP in 2023, compared to 2.2% of GDP in 2022. Meanwhile, the primary balance turned negative, posting a deficit of 0.4% of GDP in 2023, following the previous year's 0.3% of GDP surplus.

Central government gross public debt increased during the year to the equivalent of 55.0% of GDP in December 2023. Although the denominator effect of higher nominal growth rates served to lower debt levels between 2021 and 2022, the slackening of activity and higher financial costs in 2023 have diluted this effect in several countries.

The Caribbean was not immune to the macroeconomic fluctuations that weighed on public accounts across the region. Public income in this subregion also declined, owing mainly to a reduction in revenues from non-renewable natural resources. Nonetheless, tax receipts strengthened in service-exporting countries as international tourism returned to normal. At the same time, public spending continued to trend down in the wake of smaller outlays on programmes related to the coronavirus disease (COVID-19) pandemic and anti-inflationary measures adopted in 2022. The countries are facing significant pressures to reduce primary expenditure and thus generate the surpluses needed to control the trend of public debt. In this context, the overall balance recorded a deficit of 1.6% of GDP in 2023, compared to the previous year's 2.4% of GDP, while the primary surplus increased to 1.4% of GDP, compared to 0.3% of GDP in 2022.

At the same time, the level of debt in the Caribbean declined, as the central government's gross public debt fell by 5.4 percentage points from its end-2022 level to 70.5% of GDP in December 2023. While this reduction has restored the public debt to its pre-pandemic level, it remains high, not only relative to Latin American countries but also compared to other regions with similar income levels.

Among subnational governments, the fiscal accounts adhered to a balanced budget path. In 2022, the latest year for which statistics are available, intermediate governments (States and provinces) and local governments recorded global and primary surpluses, reflecting robust flows of tax receipts and less reliance on government transfers to finance public spending. At the same time, capital outlays picked up, following their reduction during the pandemic. In this context, subnational public debt declined.

The current macrofinancial environment, characterized by sluggish growth and higher financial costs, has made fiscal policy management in Latin America and the Caribbean more complex. The countries have limited fiscal headroom and face increasing pressures to contain public spending in order to control public debt trends. The high level of public debt and rising interest rates have highlighted the constraints on development imposed by interest payments (ECLAC, 2023a). In several countries, these expenses are equivalent to half of social spending on education and health, and they far exceed public investment outlays.

Compounding this complex fiscal scenario, structural challenges hamper the achievement of productive, sustainable and inclusive development. Potential economic growth is slowing, as a result of weak underlying fundamentals, such as low levels of

investment and productivity (ECLAC, 2023b). The region does not have a sufficient stock of productive capital to foster economic development. Moreover, the development gaps that characterize the region —inequality, poverty and informality, among others— take a heavy economic and social toll. There is also the threat posed by climate change in a context of high vulnerability.

To meet these challenges, an active fiscal policy will be needed to lay foundations to boost growth and productive development, respond to social needs and create economies that are resilient to climate change. Making this agenda viable will require a fiscal sustainability framework based on strengthening public revenues. In the short term, there are major opportunities for reducing tax evasion and reconsidering tax expenditures to generate additional resources. In the medium term, fiscal compacts need to be forged to strengthen income, property and wealth taxes. These efforts should be accompanied by measures to attract private investment (ECLAC, 2023c).

At the same time, increased demands on public spending make it crucial to adopt a strategic perspective. Public sector endeavours should prioritize policies and projects with high economic and social returns that foster productive development and combat climate change. In this regard, the Economic Commission for Latin America and the Caribbean (ECLAC) has identified the following group of driving or galvanizing sectors for the region: the pharmaceutical and life sciences industry; the medical device industry; advanced manufacturing; export of modern or information and communications technology (ICT)-enabled services; the care society; labour-intensive services; e-government; the energy transition; electromobility; the circular economy; the bioeconomy; agriculture for food security; sustainable water management; and, sustainable tourism (Salazar-Xirinachs and Llinás, 2024).

## A. Government revenues fall as a result of declining tax receipts

In Latin America, public revenues were lower in 2023 in the wake of lacklustre growth and a fall in commodity prices. Overall, total central government revenue averaged 18.6% of GDP, compared to 19.2% of GDP in 2022 (see figure I.1). Tax revenues retreated to 15.9% of GDP from their peak of 16.2% of GDP in 2022. Income from other sources —nontax income, capital income and grants— also declined, especially in Ecuador and Mexico. The performance of total revenue in Latin America is explained by trends in South America, where tax revenues contracted by 0.7 percentage points of GDP, owing to steep falls in Argentina, Chile and Peru that outweighed an increase in Colombia. In contrast, tax revenues grew in Central America, the Dominican Republic and Mexico. In addition to these year-on-year variations, the countries face structural challenges such as high levels of tax evasion (see box I.1).

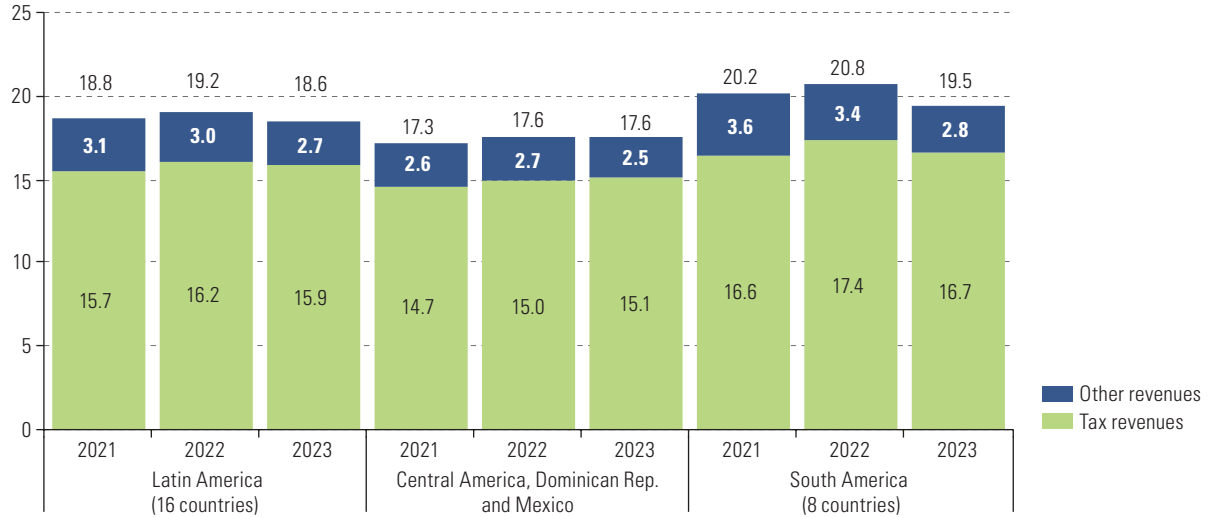
Although most countries saw positive revenue growth in 2023, this was outpaced by GDP, so tax revenues declined in relative terms. In Latin America as a whole, revenue growth averaged just 0.3%. However, as shown in figure I.2, there were large variations, with both increases and decreases. The main driver of this phenomenon was income tax, which played a central role in the revenue growth recorded in Colombia, the Dominican Republic and Panama. In contrast, there were sharp falls in Argentina, Chile and Peru. Value added tax (VAT) made a smaller contribution, although it also played a role in the growth of tax revenue in Chile, Nicaragua and Peru. The trends during the year also reflected changes in tax expenditures, the review of which is a pending task in the region.

**Figure I.1**

Latin America (16 countries): total central government revenues, by component, 2021–2023  
(Percentages of GDP and percentage points of GDP)

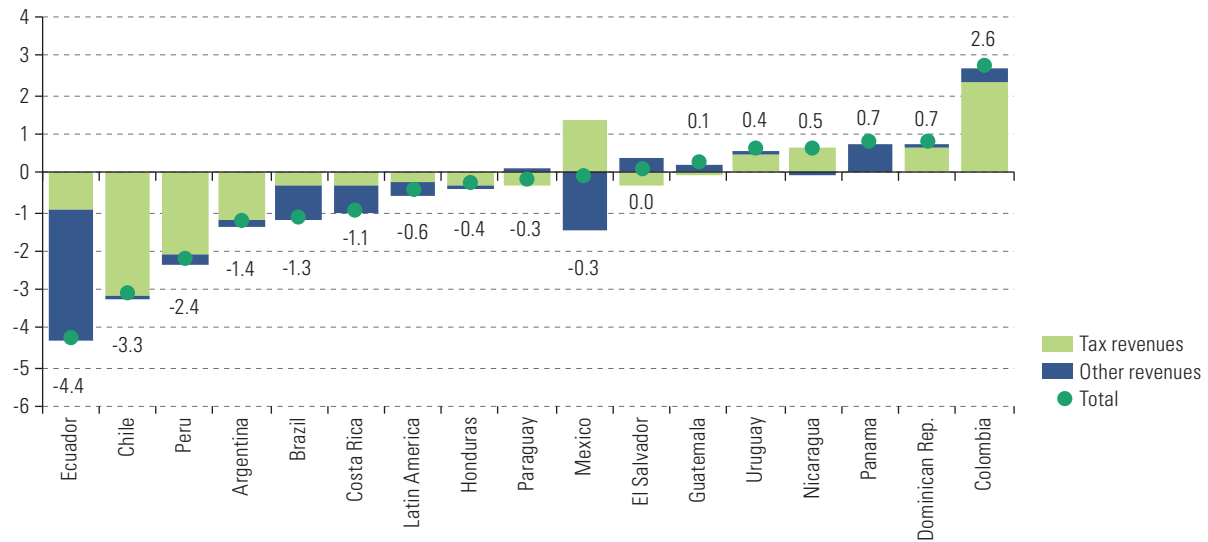
**A. Composition of total central government revenue, 2021–2023**

(Percentages of GDP)



**B. Year-on-year variation in total revenue, by component, 2022–2023**

(Percentage points of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

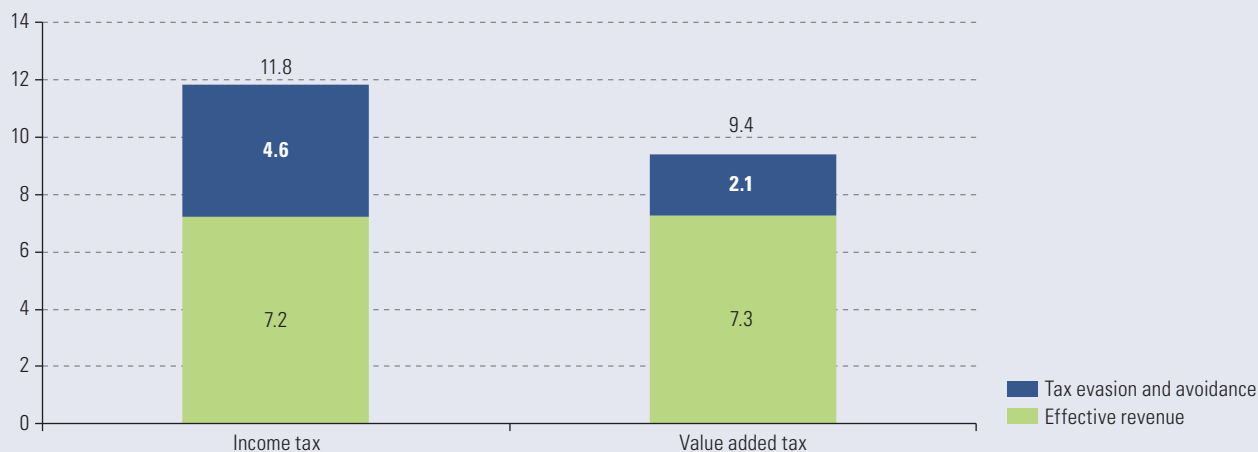
**Note:** Simple averages. The individual figures may not add up to the corresponding total because of rounding. The figures for Argentina, Mexico and Peru refer to the national public administration, the federal public sector and general government, respectively.

## Box I.1

## Tax evasion in Latin America

According to the latest estimations made by the Economic Commission for Latin America and the Caribbean (ECLAC), tax evasion and avoidance in Latin America cost US\$ 433 billion in 2023, equivalent to 6.7% of GDP. This consists partly of corporate and personal income tax evasion, which represented 4.6% of GDP (see figure). Such a high level of evasion and avoidance not only reduces the revenue obtained from this tax, but also diminishes its redistributive capacity and its role as an automatic stabilizer of the economy. In addition, the non-payment of value added tax (VAT) was equivalent to 2.1% of GDP. It is important to note that revenue losses pose a major challenge in terms of the capacity of fiscal policy to respond to macroeconomic shocks and mobilize domestic resources to finance sustainable development.

Latin America (17 countries):<sup>a</sup> evasion and avoidance of income tax and value added tax (VAT), 2023  
(Percentages of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC).

**Note:** The estimations are based on national surveys of evasion and avoidance of income tax and VAT. The figures represent a weighted average based on GDP in dollars at current prices. It is important to note that these data are not comparable with those reported in *Fiscal Panorama 2022*, because of variations in the number of countries included to construct the Latin American average, and also in the estimations made by each country from one year to another, owing to changes in methodologies or the availability of statistical information.

<sup>a</sup> In the case of VAT, the countries included are Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay. In the case of income tax, the countries are Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Peru and Uruguay.

The tax and customs administrations have stepped up their actions to reduce evasion. In the case of indirect taxes, progress has been made with electronic invoicing, which has been implemented in all Latin American countries, except for the Bolivarian Republic of Venezuela, Cuba, Haiti and Nicaragua (Gómez Sabaini and Morán, 2020). The control and detection of anomalies has also been strengthened by using ICTs. For example, in Colombia data intelligence identified 75 new taxpayers, with operations totalling some 99 trillion pesos (about US\$ 33.36 billion) in 2018 (DIAN, 2021). Moreover, several countries, including Chile and Mexico, have launched actions aimed at strengthening the analysis and control of specific taxes and relevant sectors of the economy (SII, 2023; SAT, 2024).

The countries have also implemented strategies to facilitate voluntary tax compliance, including suggested returns for income tax and VAT. For example, Ecuador uses a pre-prepared income tax return based on third-party data on wage income, income from capital and fees (CIAT, 2019). Also relevant is the integrated management of services, digitalization and simplification of procedures, as well as assistance and collaboration strategies (AFIP, 2021). The dissemination of tax laws, regulations and procedures is also important. In Guatemala, one objective of the multi-year work plan of the Superintendency of Tax Administration is the dissemination of tax regulations through various mass media (SAT, 2024). Lastly, the measures applied especially during the coronavirus disease (COVID-19) pandemic included payment facilities and arrears write-offs.

These measures have led to substantive reductions in tax evasion and better taxpayer compliance. In Peru, efforts to combat tax evasion led to the VAT compliance gap narrowing from 37.4% in 2017 to 30.3% in 2021 (Ministry of the Economy and Finance of Peru, 2023). Moreover, evasion and avoidance of corporate income tax decreased from 51.5% to 40.5% in the same period. There was also a reduction in the arrears rate, a 30% increase in the registered taxpayer base between 2017 and 2022, made possible by digital tools, and a 25.8 percentage-point increase in the coverage of sales invoiced electronically between 2018 and 2022.

In Mexico, audit adjustment and collection efficiency actions undertaken in 2023 generated 757,155 billion pesos, equivalent to 2.4% of GDP (SAT, 2024). Of this total, 33.6% resulted from actions to make tax collection more efficient, based on identifying inconsistencies in the fulfilment of tax obligations and active enforcement, while 66.3% stemmed from strategies to reduce tax evasion and avoidance, such as the large-scale taxpayer audit programme for and foreign trade audit measures. Initiatives to improve taxpayer service were also launched to encourage voluntary tax compliance.



National efforts have been complemented by global-scope initiatives to reduce cross-border evasion. The countries have made progress in implementing the measures agreed upon in 2015 as part of the initial stage of the Base Erosion and Profit Shifting (BEPS) project of the Organisation for Economic Co-operation and Development (OECD) and the Group of 20 (G20). Several countries are also participating in multilateral actions to close evasion loopholes, including as part of the Multilateral Competent Authority Agreement on Automatic Exchange of Financial Account Information (ECLAC, 2020). Another example is the authorized economic operator programme, in which several of the region's countries are participating. This fosters compliance with tax and customs obligations by certifying firms that maintain standards that guarantee the security of their commercial processes and operations.

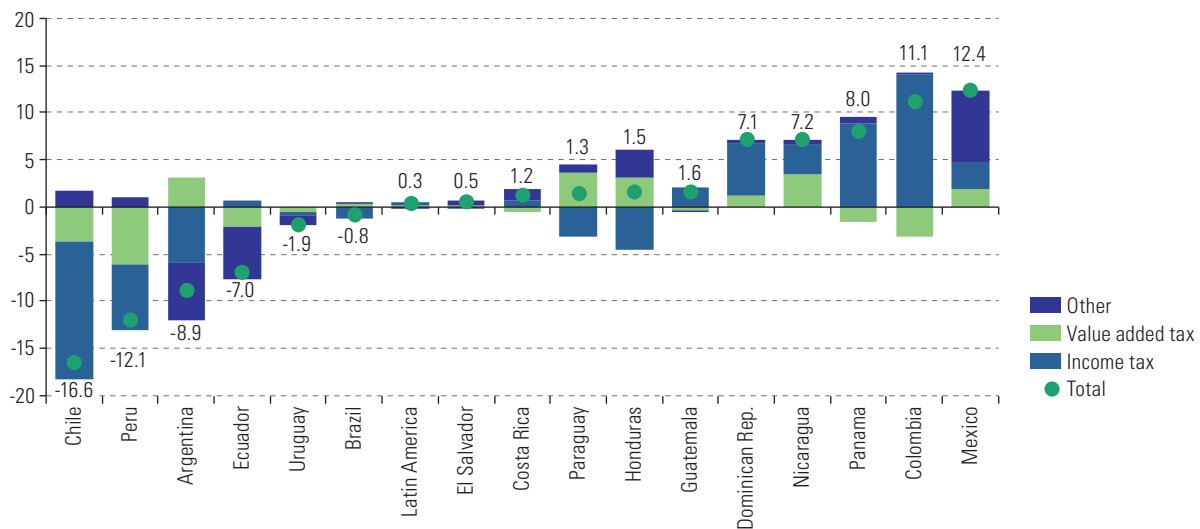
These international efforts have intensified, as exemplified by the agreements reached under the OECD-led Inclusive Framework on BEPS. The countries have participated actively in formulating the "two pillar" solution that seeks to ensure that the largest multinational companies are taxed in the jurisdictions where they generate profits and to establish a global minimum rate of corporate income tax. Nonetheless, there is a growing demand from developing countries for more inclusive and effective international tax cooperation. In response, the United Nations General Assembly launched a dialogue process to implement an international tax cooperation mechanism under United Nations auspices.

Latin America and the Caribbean have a unique opportunity to participate in the formulation of an international tax framework that responds to the region's specific concerns; and the Regional Tax Cooperation Platform for Latin America and the Caribbean has been set up for the purpose of harmonizing regional positions on key cross-border tax issues and serve as a mechanism for technical exchange on common fiscal issues to guide the formulation tax policy.

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Federal Administration of Public Revenues (AFIP), *Plan Estratégico 2021-2025*, 2021; ECLAC, *Fiscal Panorama of Latin America and the Caribbean, 2020* (LC/PUB.2020/6-P), Santiago, 2020; Inter-American Center of Tax Administrations (CIAT), "Declaraciones tributarias pre-elaboradas", *Documentos de Trabajo*, May 2019; Directorate of Customs and National Taxes of Colombia (DIAN), "Informe de recaudo, lucha contra la evasión y el contrabando: octubre 2021"; Ministry of Economy and Finance of Peru, *Marco Macroeconómico Multianual 2024-2027*, 2023; J. C. Gómez Sabaini and D. Morán, "Estrategias para abordar la evasión tributaria en América Latina y el Caribe: avances en su medición y panorama de las medidas recientes para reducir su magnitud", *Macroeconomics of Development series*, No. 215 (LC/TS.2020/125), Santiago, ECLAC, 2020; Tax Administration Service (SAT) of Mexico (SAT), *Informe Tributario y de Gestión: Cuarto trimestre 2023, 2024* and Internal Revenue Service of Chile (SII), *Plan Gestión de Cumplimiento Tributario 2023*, Santiago, 2023.

**Figure I.2**

Latin America (16 countries): year-on-year variation in tax revenue,<sup>a</sup> by tax, and contributions made thereto by each tax, 2022–2023  
(Percentages and percentage points)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** The figures for Argentina, Mexico and Peru refer to the national public administration, the federal public sector and general government, respectively.

<sup>a</sup> Does not include social contributions.

In some countries, other taxes also made significant contributions to revenue growth. In Argentina, receipts from export duties contracted, owing to the impact of the drought that damaged soybean production and exports (OPC, 2024a). In Ecuador, several tax rates were lowered: the foreign exchange outflow tax; the special consumption tax applicable to tobacco, firearms, aircraft, alcohol, soft and carbonated beverages, and plastic bags; and VAT on tourism services during certain national holidays (Ministry of

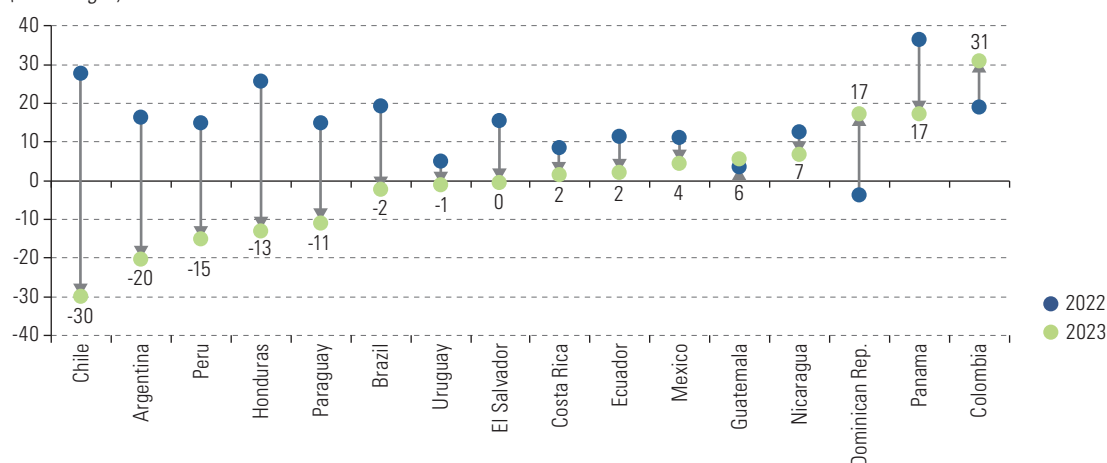
Economy and Finance of Ecuador, 2024).<sup>1</sup> In Mexico, tax revenue was boosted by the special tax on production and services on gasoline and diesel, the revenue from which turned positive, having posted a deficit in the previous year (SHCP, 2024).<sup>2</sup>

Income tax receipts have slackened generally, with few exceptions (see figure I.3). The factors driving this trend include the elevated base of comparison with 2022, when several countries took in record receipts from the annual income-tax operation. In contrast, the equivalent operation in 2023 generated lower revenues, partly owing to an increase in refunds or the use of credit balances in cases where the tax calculated was less than the on-account payments made in the previous year (DIPRES, 2024; Ministry of the Economy and Finance of Peru, 2024). This pattern was particularly evident in countries that produce non-renewable natural resources, such as Brazil and Peru, where the fall in international commodity prices eroded profits and, hence, reduced the flow of corporate income tax receipts (National Treasury, 2024). At the same time, payments on account slackened in several countries in 2023, mirroring the slowdown in economic activity.

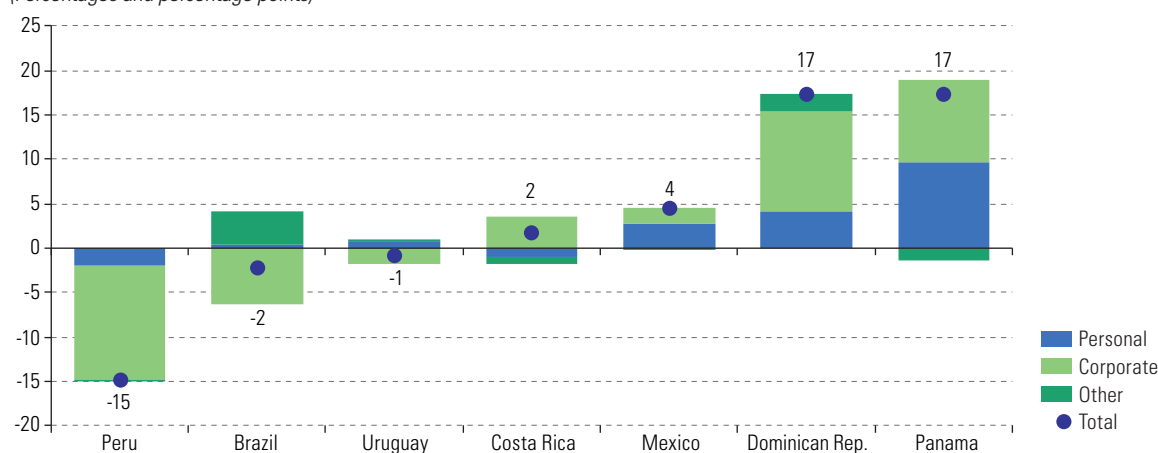
**Figure I.3**

Latin America (16 countries): year-on-year variation in central government income tax revenue, 2022–2023  
(Percentages and percentage points)

**A. Real year-over-year variation in income tax receipts**  
(Percentages)



**B. Variation in income tax revenue and contribution made thereto, by component**  
(Percentages and percentage points)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** The individual figures may not add up to the corresponding total because of rounding. The figures for Argentina, Mexico and Peru refer to the national public administration, the federal public sector and general government, respectively.

<sup>1</sup> Through Executive Decrees Nos. 643, 644 and 645.

<sup>2</sup> IEPS on gasoline and diesel acts as a negative tax (subsidy) when hydrocarbon prices rise above those established by decree.

Alongside these trends, several temporary effects have had repercussions on income tax revenue. In Argentina, the previous year provided a high base of comparison, when a special advance payment on corporate income tax had been collected, and several measures were adopted to reduce the tax burden on workers (OPC, 2024a). In Ecuador, tax withholding from individuals decreased in the second half of the year, following an increase in the maximum income-tax deductible personal expense included in the Strengthening of the Family Economy Organic Act, of June 2023 (Government of Ecuador, 2023). By contrast, in the Dominican Republic, corporate income tax revenue increased sharply, partly because a group of financial entities made an advance payment of this tax, equivalent to 0.4% of GDP, under an agreement with the Government (Ministry of Finance of the Dominican Republic, 2024). If this payment is excluded, corporate income tax revenue would be up by 5% instead of 22%, and total income tax revenue would have increased by 9% instead of 17%.

In Colombia, the flow of income tax receipts gathered pace mainly as a result of the structural tax reform approved in late 2022.<sup>3</sup> In the case of corporate income tax, the general rate was raised from 31% to 35%, and surcharges were levied on: financial institutions (5 percentage points between 2023 and 2027); the extractive sector (progressive, of 0, 10 or 15 percentage points, depending on the product and average price, on a permanent basis); and taxpayers that generate hydroelectric energy (3 percentage points between 2023 and 2026). In addition, royalty payments were made non-deductible for calculating the tax, although the Constitutional Court later ruled against this amendment in November 2023.<sup>4</sup> Nonetheless, withholdings made during the year had already assumed the non-deductibility of royalties, which boosted receipts from the tax in 2023, but will result in lower payments in the annual returns filed in 2024 (Ministry of Finance and Public Credit of Colombia, 2024a).

In the case of VAT, trends in the region are conflicting. In most countries, VAT receipts faltered during the year as a result of the slackening of domestic demand (ECLAC, 2023b; DIPRES, 2024; Central Reserve Bank of Peru, 2024). The economic activity slowdown also generated a deceleration or contraction in the value of imports, which led to a significant reduction in the corresponding VAT revenue (see figure I.4). This result is also explained by reduction in prices of imported fuels and, in some cases, by the appreciation of the national currency (Central Bank of Costa Rica, 2024; Central Reserve Bank of Peru, 2024).

In contrast, VAT receipts gathered pace in countries such as Honduras, Mexico and Nicaragua, driven mainly by an increase in domestic transactions (Ministry of Finance of Nicaragua, 2023; SEFIN, 2024; SHCP, 2024). In the case of Nicaragua, receipts were boosted further by an increase in revenue from VAT charged on imports, as foreign purchases of non-durable consumer goods, transport equipment, and capital goods all grew. In Argentina, however, the increase in VAT revenue is explained primarily by private consumption being brought forward in an inflationary environment. Brazil posted the largest increase in the VAT growth rate, which turned positive again following a significant contraction in 2022. This improvement is explained by the buoyancy of domestic sales of goods and services, together with the reversal of tax relief measures for gasoline and diesel purchases (Federal Revenue of Brazil, 2024).

<sup>3</sup> Act No. 2277 of 2022, adopting a tax reform for equality and social justice is adopted and enacting other provisions, [online] <https://www.funcionpublica.gov.co/eva/gestornormativo/norma.php?i=199883>.

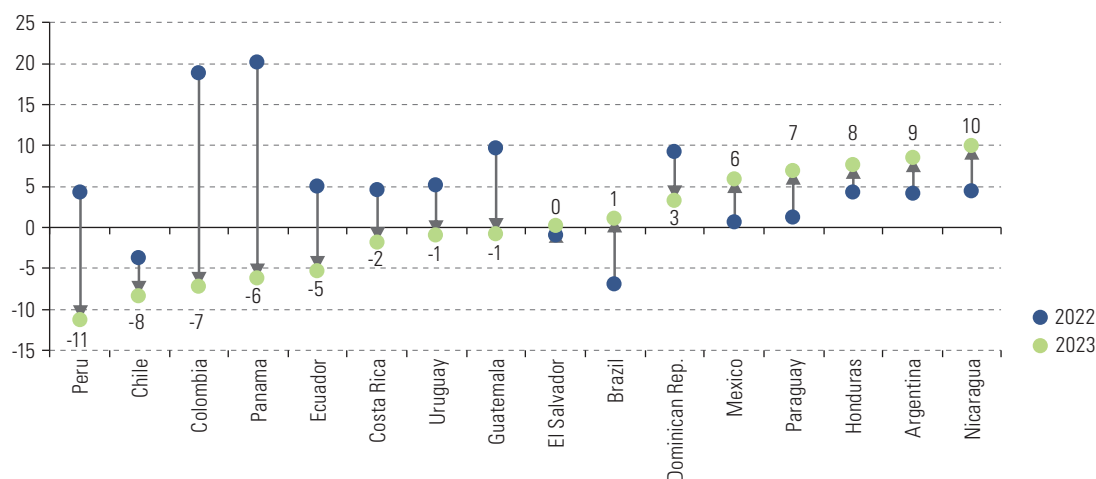
<sup>4</sup> Constitutional Court Decision C-489 of 2023 [online] [https://www.suin-juriscol.gov.co/viewDocument.asp?id=30050350#:~:text=C%2D489%20de%202023&text=Asunto%3A%20Demanda%20de%20inconstitucionalidad%20contra,y%20se%20dictan%20otras%20disposiciones%20de%209D.&text=Bogot%C3%A1%20C%20D.%20C.%20C%20diecis%C3%A9is%20\(16,dos%20mil%20veintitr%C3%A9s%20\(2023\)\)](https://www.suin-juriscol.gov.co/viewDocument.asp?id=30050350#:~:text=C%2D489%20de%202023&text=Asunto%3A%20Demanda%20de%20inconstitucionalidad%20contra,y%20se%20dictan%20otras%20disposiciones%20de%209D.&text=Bogot%C3%A1%20C%20D.%20C.%20C%20diecis%C3%A9is%20(16,dos%20mil%20veintitr%C3%A9s%20(2023))).

**Figure I.4**

Latin America (16 countries): year-on-year variation in central government value added tax revenues, 2022 and 2023  
(Percentages and percentage points)

**A. Real year-on-year variation in VAT receipts, 2022 and 2023**

(Percentages)

**B. Variation in VAT revenue and contribution made thereto, by domestic goods and services and imports, 2023**

(Percentages and percentage points)

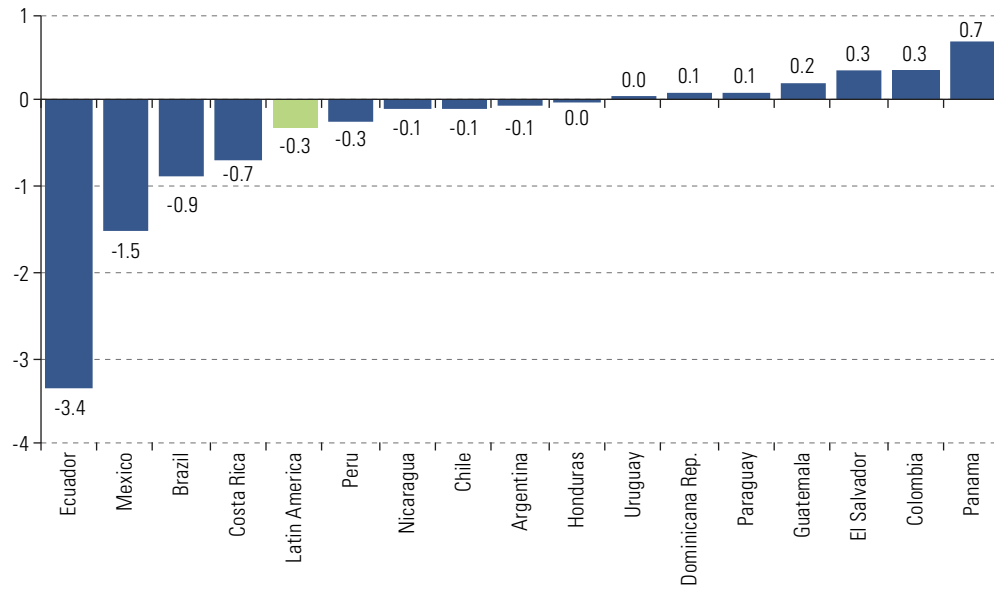


**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** The individual figures may not add up to the corresponding total because of rounding. The figures for Argentina, Mexico and Peru refer to the national public administration, the federal public sector and general government, respectively.

Revenues from other sources —non-tax income, capital income and grants— declined, with sharp falls in countries that produce non-renewable natural resources (see figure I.5). This reflected the reduction in international benchmark prices for oil such as Brent (-17%) and West Texas Intermediate (-18%). In Ecuador, the reduction in oil revenues reflected the increased needs of the Oil Derivatives Financing Account for imports of petroleum products (Government of Ecuador, 2024).<sup>5</sup> In Mexico, the appreciation of the national currency contributed to the decrease in oil revenues (SHCP, 2024). In Brazil, royalties declined and dividend payments by State-owned enterprises, especially Petrobras, were also lower.

<sup>5</sup> The Oil Derivatives Financing Account is financed with oil revenues in the amount needed to cover imports of oil derivatives. Thus, a rise in the price of derivatives or an increase in their demand reduces the oil revenues included as resources in the general budget.



**Figure I.5**  
Latin America  
(16 countries):  
year-on-year variation in  
other central government  
revenue, 2022–2023  
(Percentage points of GDP)

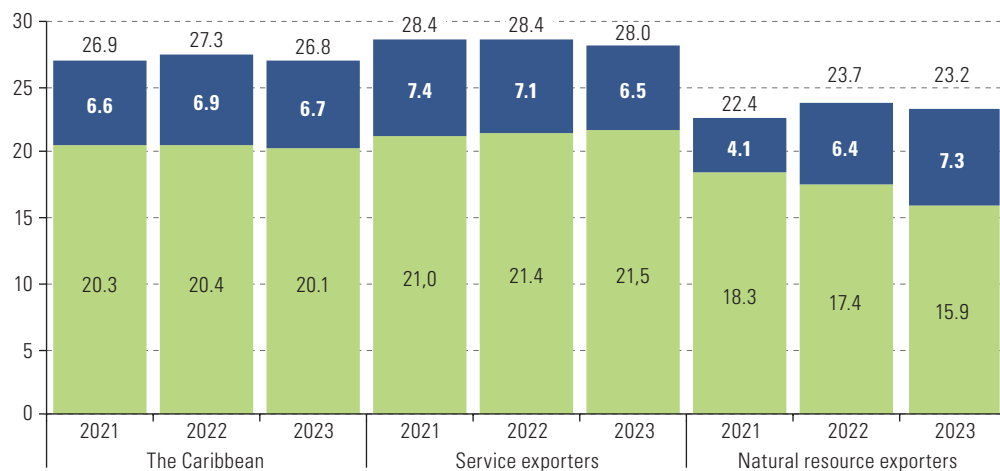
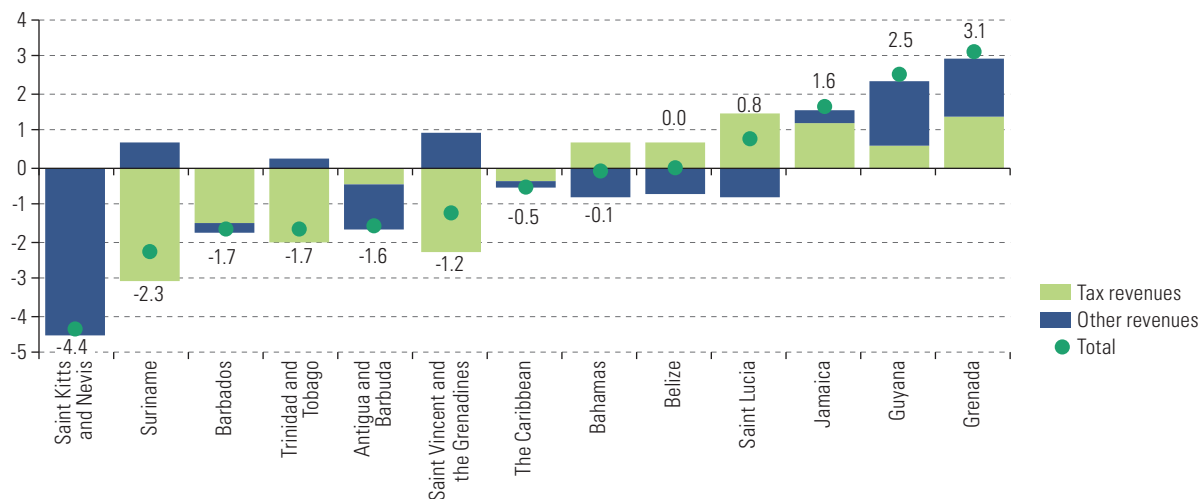
**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** The figures for Argentina, Mexico and Peru refer to the national public administration, federal public sector and general government, respectively.

In some countries the reduction in income from other sources is explained by the elevated base of comparison represented by 2022, when there were exceptional revenues inflows that were not repeated in 2023. An example is the case of Brazil which obtained receipts from the signature bonus associated with the Sepia and Atapu oilfields auction, and bonus payments for new electric power generation contracts (National Treasury, 2024). In Costa Rica, the central government received transfers from decentralized entities, equivalent to 0.4 % of GDP in 2022, as envisaged in Act No. 9524 of that year, which reformed the public sector budget structure.<sup>6</sup> In Panama, revenues from the sale of State land to the Panama Canal Authority were equivalent to 0.6% of GDP (Ministry of the Economy and Finance of Panama, 2023). In Colombia, higher dividends were paid to the Treasury by ECOPETROL in 2022 (Ministry of Finance and Public Credit of Colombia, 2024).

In the Caribbean, public revenues declined in 2023, although trends differed between groups of countries. Among the components of total income, tax revenues fell sharply (see figure I.6). This reflects the reduction in tax revenues in countries that export non-renewable natural resources, as a result of lower income tax payments by firms operating in the sector, particularly in Suriname and Trinidad and Tobago (Ministry of Finance of Trinidad and Tobago, 2023). In Guyana, however, tax revenues grew alongside the expansion of oil production. Tax revenues increased slightly in service-exporting countries, driven by those in which there was a rise in tourism-related tax receipts and by the withdrawal of tax relief measures that had been adopted in 2022, to alleviate fuel costs, (Ministry of Finance of the Bahamas, 2023; Central Bank of Belize, 2023; Government of Grenada, 2023). In addition, Grenada obtained revenue equivalent to 0.6% of GDP in November as a result of its tax amnesty.

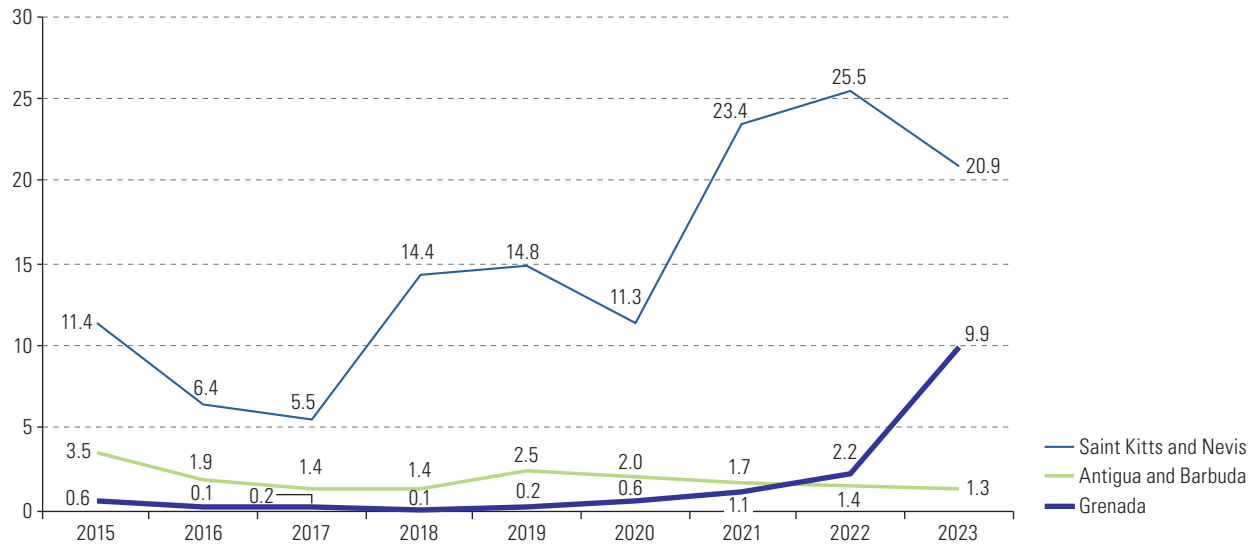
<sup>6</sup> Regulations to Act No. 9524, on strengthening budgetary control of decentralized agencies of central government [online] [https://www.pgrweb.go.cr/scij/Busqueda/Normativa/Normas/nrm\\_texto\\_completo.aspx?param1=NRTC&nValor1=1&nValor2=93372&nValor3=123927&strTipM=TC#ddown](https://www.pgrweb.go.cr/scij/Busqueda/Normativa/Normas/nrm_texto_completo.aspx?param1=NRTC&nValor1=1&nValor2=93372&nValor3=123927&strTipM=TC#ddown).

**Figure I.6**The Caribbean (12 countries): total central government revenue, 2021–2023<sup>a</sup>*(Percentages of GDP and percentage points of GDP)***A. Composition of total revenue, 2021–2023***(Percentage points of GDP)***B. Year-on-year variation in total revenue, by component, 2022–2023***(Percentage points of GDP)***Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.**Note:** Simple averages. The individual figures may not add up to the corresponding total because of rounding. The figures for Barbados and Saint Kitts and Nevis are for the non-financial public sector and federal government, respectively.<sup>a</sup> The figures for Antigua and Barbuda, Barbados, Belize, Grenada, Jamaica and Saint Lucia are official estimates.

This divergence in tax revenue trends is replicated in income from other sources (non-tax income, capital income and grants). In service-exporting countries, revenues from this item fell sharply during the year. The reduction in Saint Kitts and Nevis was due mainly to smaller receipts from the citizenship-by-investment programme (see figure I.7). In contrast, income from the equivalent programme in Grenada increased significantly, albeit tempered by a reduction in income from grants, after having received large one-off contributions in 2022. There were also reductions in grants for infrastructure projects in Belize and Saint Lucia (Central Bank of Belize, 2023; Government of Saint Lucia, 2024). Dividend income declined in several countries, such as the Bahamas and Belize (Ministry of Finance of the Bahamas, 2024). In contrast, there was an increase among countries that export non-renewable natural resources, mainly explained by Guyana, where the Government made withdrawals from the National Resource Fund.

**Figure I.7**

The Caribbean (selected countries): central government revenue from citizenship by investment programmes, 2015–2023 (Percentages of GDP)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

## B. Primary public expenditure stabilized in Latin America, but pressures on interest payments increased

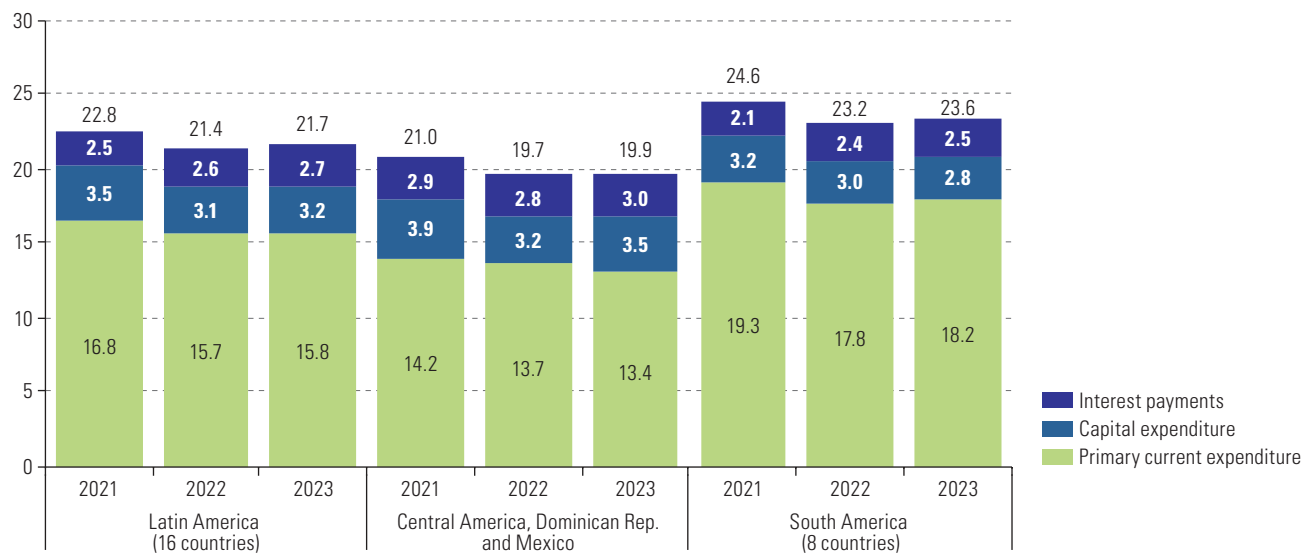
In Latin America, public spending increased slightly in 2023, with total central government expenditure averaging 21.7% of GDP, compared to 21.4% of GDP in the previous year (see figure I.8). This is explained mainly by the trend of interest payments, which increased both for the Latin American countries as a whole and for the corresponding subregions. Primary spending, consisting of primary current and capital expenditures, stabilized after a sharp fall in 2022. In this group of countries, the growth of primary expenditure rebounded, following the cuts made in 2022, with Colombia, El Salvador, Honduras and Paraguay leading the way. In Chile and Costa Rica primary expenditure stabilized, while in Argentina, Nicaragua and Peru, the reductions recorded in 2022 were repeated in 2023.

There were increases in all the main aggregates of total spending, although the year-on-year variation relative to output was marginal (see figure I.9). Nonetheless, the trends in individual countries varied, sometimes with larger movements. In the subcomponent of subsidies and current transfers, there were larger year-on-year increases and decreases, equivalent to more than 1 percentage point of GDP. The other subcomponents of primary current expenditure were less volatile at the country level. In the case of wages and salaries, the annual wage hikes agreed upon with civil service unions played a leading role (OPC, 2024a; Ministry of Economy and Finance of Ecuador, 2024; Ministry of the Economy and Finance of Peru, 2024). In the goods and services category, there were reductions in the purchase of inputs needed to address the COVID-19 pandemic and also in public investment to acquire fixed assets.

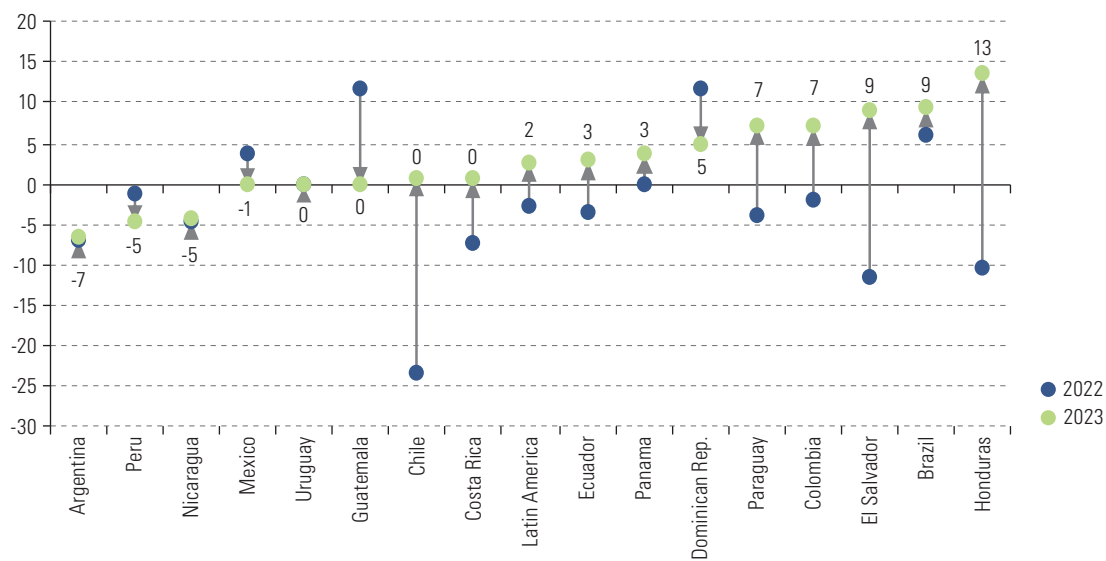
**Figure I.8**

Latin America (16 countries): total central government expenditure, by component, 2021–2023  
(Percentages of GDP and percentages)

**A. Composition of total central government expenditure, 2021–2023<sup>a</sup>**  
(Percentages of GDP)



**B. Year-on-year variation in primary expenditure, by country, 2022 and 2023**  
(Percentages)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

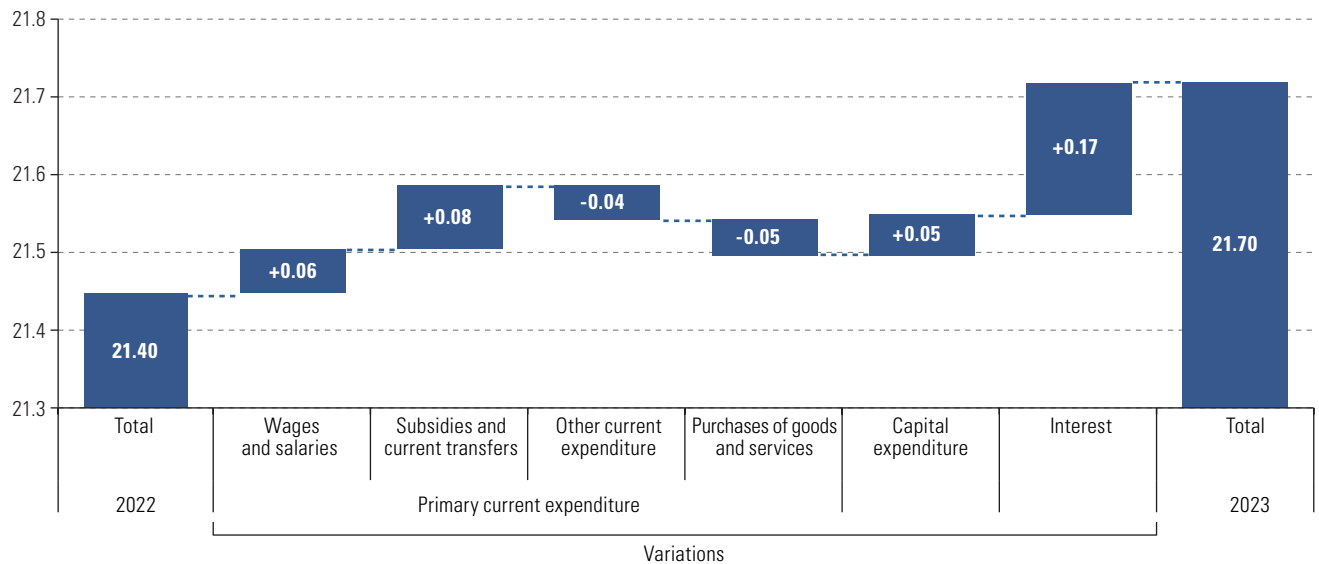
**Note:** The figures for Argentina, Mexico and Peru refer to the national public administration, federal public sector and general government, respectively.

<sup>a</sup> Simple averages.



**Figure I.9**

Latin America (16 countries):<sup>a</sup> year-on-year variation in total central government expenditure, by subcomponent, 2022–2023  
(Percentages of GDP and percentage points of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** Simple averages. The individual figures may not add up to the corresponding total because of rounding.

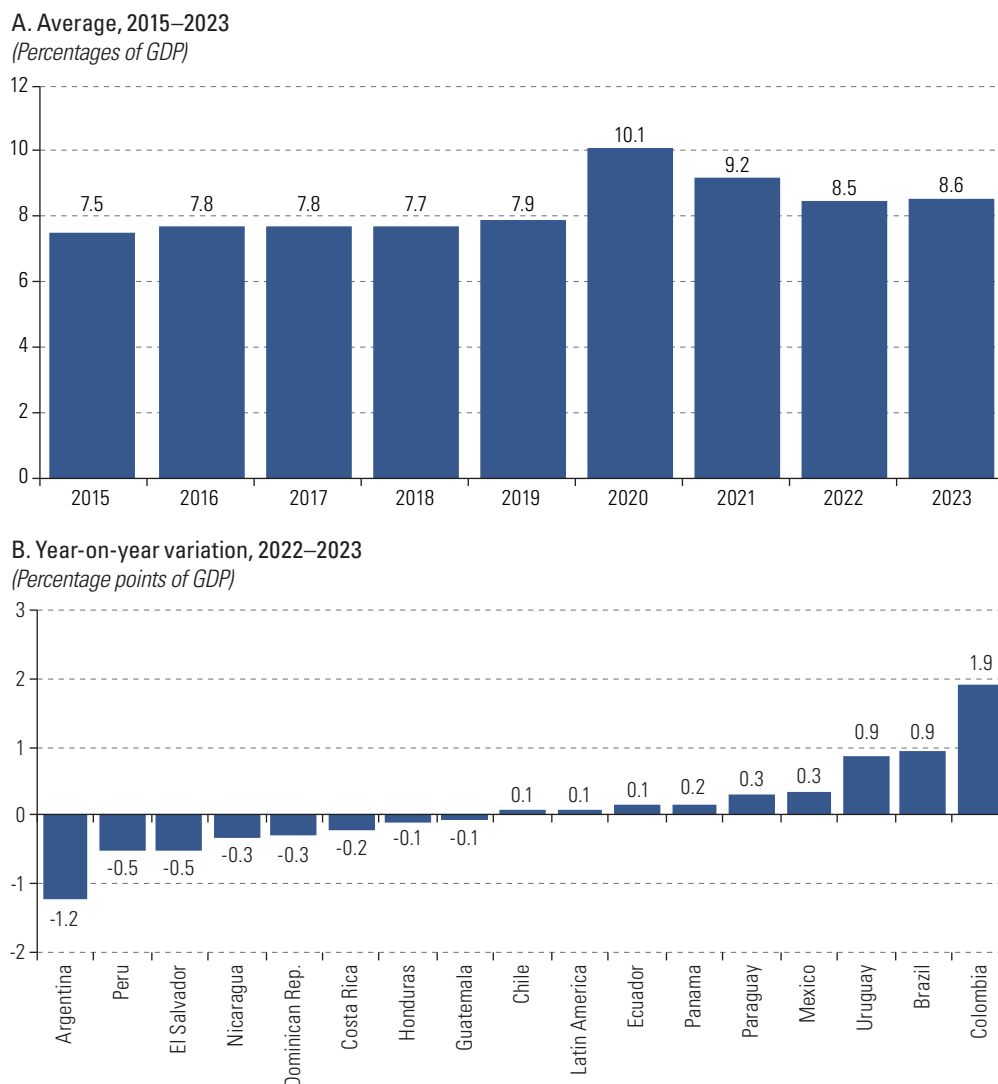
<sup>a</sup> Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay. The figures for Argentina, Mexico and Peru refer to the national public administration, the federal public sector and general government, respectively.

Outlays on subsidies and current transfers, the main subcomponent of primary current expenditure, stabilized after two consecutive years of decline. Although these items have pulled back from the peaks attained in 2020 in the wake of the COVID-19 pandemic, they remain above the average prevailing before the health crisis (see figure I.10). The relative stability on average belies a high degree of variability at the country level, which is explained largely by the behaviour of inflation in both 2022 and 2023. For example, pension expenditures increased in 2023, as a result of minimum wage hikes and annual adjustments, both determined partly on the basis of inflation in 2022, which was higher than in 2023. Expenditures associated with social programmes displayed mixed trends between the countries, with contractions in some cases resulting from the withdrawal of the anti-inflationary measures adopted in 2022 and increases in other measures that remained in force. Another key factor was the reduction in outlays for energy subsidies in several countries.

The real-terms increase in pension payments had a major impact on trends in several countries during the year. In Brazil, the growth of pension expenditure (0.4 percentage points of GDP) was driven by the hike in the minimum wage (8.9% in nominal terms in 2023) and an increase in the number of recipients, as well as by the settlement of expenses arising from court rulings (National Treasury, 2024). In Colombia, the increase (0.8 percentage points of GDP) is explained partly by larger transfers to the Colombian Pensions Administrator (Colpensiones) to finance the increase in pension payments indexed to the minimum wage (16% in nominal terms in 2023) and inflation-adjusted pensions (13.1% in nominal terms in 2023) (Ministry of Finance and Public Credit of Colombia, 2024).<sup>7</sup> In contrast, in Argentina, pension payments fell by 0.3 percentage points of GDP, mainly owing to a below-inflation increase (OPC, 2024a).

<sup>7</sup> Colpensiones, "ABC Incremento Mesada Pensional 2023" [online] <https://www.colpensiones.gov.co/publicaciones/4920/abc-incremento-mesada-pensional-2023/>.

**Figure I.10**  
Latin America  
(16 countries): central  
government expenditure  
on subsidies and current  
transfers, 2015–2023  
(Percentages of GDP and  
percentage points of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** Simple averages. The individual figures may not add up to the corresponding total because of rounding. The figures for Argentina, Mexico and Peru refer to the national public administration, the federal public sector and general government, respectively.

Trends in subsidies and current transfers for social programmes varied between the countries during the year. There were larger outlays in some cases, resulting from adjustments in the value of the benefits paid by certain programmes. Examples include Brazil, where the allowance paid through the *Bolsa Família* programme was raised (IFI, 2024); and Mexico, where the value of the Older Adult Welfare Pension was increased by 25% (SHCP, 2024).<sup>8</sup> Another factor was the renewal of certain anti-inflationary programmes adopted in 2022. In Uruguay, the *Bono Crianza* was maintained, along with the targeted subsidy for *supergás*, the social bonus to cover up to 90% of the electricity tariff for vulnerable households and certain modifications to the family allowance programme, such as elimination of the income ceiling to access

<sup>8</sup> Secretariat of Welfare of Mexico, "Pensión de personas adultas mayores aumenta a cuatro mil 800 pesos bimestrales: Ariadna Montiel" [online] <https://www.gob.mx/bienestar/prensa/pension-de-personas-adultas-mayores-aumenta-a-cuatro-mil-800-pesos-bimestrales-ariadna-montiel>; *Diario Oficial de la Federación (DOF)*, "Acuerdo por el que se emiten las Reglas de Operación del Programa Pensión para el Bienestar de las Personas Adultas Mayores, para el ejercicio fiscal 2023", Secretariat of the Interior of Mexico [online] [https://www.dof.gob.mx/nota\\_detalle.php?codigo=5676228&fecha=30/12/2022#gsc.tab=0](https://www.dof.gob.mx/nota_detalle.php?codigo=5676228&fecha=30/12/2022#gsc.tab=0).

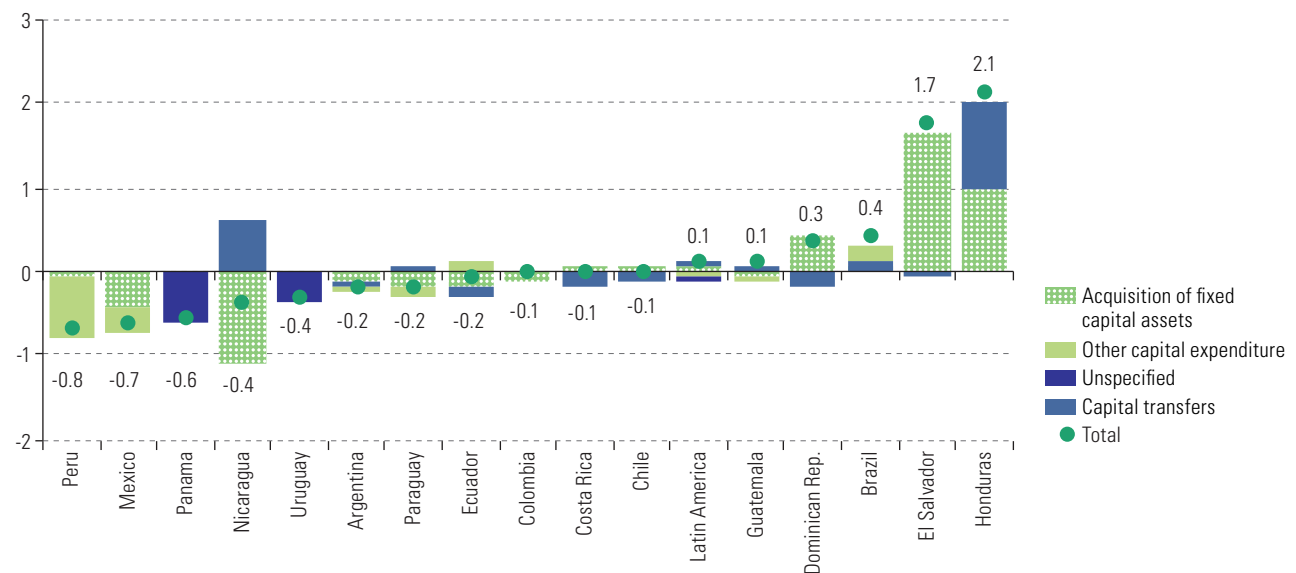
the benefit and the 70% reinforcement for children up to six years of age (Office of the President of Uruguay, 2024). In contrast, a reduction in Peru partly reflected the expiry of the last COVID-19 related programmes, which was not compensated by new transfers under the *Con Punche Perú* programme (Ministry of the Economy and Finance of Peru, 2024).

Lastly, the evolution of energy subsidies is a key factor explaining the trends observed. In 2022, there was a significant increase in expenditure on energy subsidies, reflecting the normal operation of existing programmes and the implementation of new temporary subsidies. In 2023, the fall in international energy prices, mainly in the case of oil, led to a reduction in these outlays. In El Salvador, the liquefied petroleum gas subsidy was cut (Ministry of Finance of El Salvador, 2024). In the Dominican Republic, fuel subsidy outlays were reduced from 0.6% of GDP in 2022 to 0.2% of GDP in 2023, and the electricity subsidy was cut (Ministry of Finance of the Dominican Republic, 2024). In Peru, transfers to the Fuel Price Stabilization Fund were reduced (Central Reserve Bank of Peru, 2024). In Colombia, however, there was an increase in transfers to the Fuel Price Stabilization Fund (0.4 percentage points of GDP) to settle liabilities generated by the fund's operation in 2022 (Ministry of Finance and Public Credit of Colombia, 2024).

Capital expenditures remained stable around the previous year's level. As shown in figure I.11, this is explained mainly by the buoyancy of investment in fixed assets and capital transfers in El Salvador and Honduras, which were offset by reductions in most other countries. In El Salvador, there were major outlays for the acquisition of fixed assets, explained mainly by the execution of funding for road projects that were originally budgeted for 2022 (Ministry of Finance of El Salvador, 2024). In Honduras, an increase in physical investment was accompanied by larger capital transfers to local governments, as well as transfers to the National Electric Power Company for infrastructure investment in that sector (SEFIN, 2024). In contrast, in Mexico physical investment declined, owing to a reduction in investment by *Petróleos Mexicanos* (SHCP, 2024).

**Figure I.11**

Latin America (16 countries): year-on-year variation in central government capital expenditure, by component, 2022–2023  
(Percentage points of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

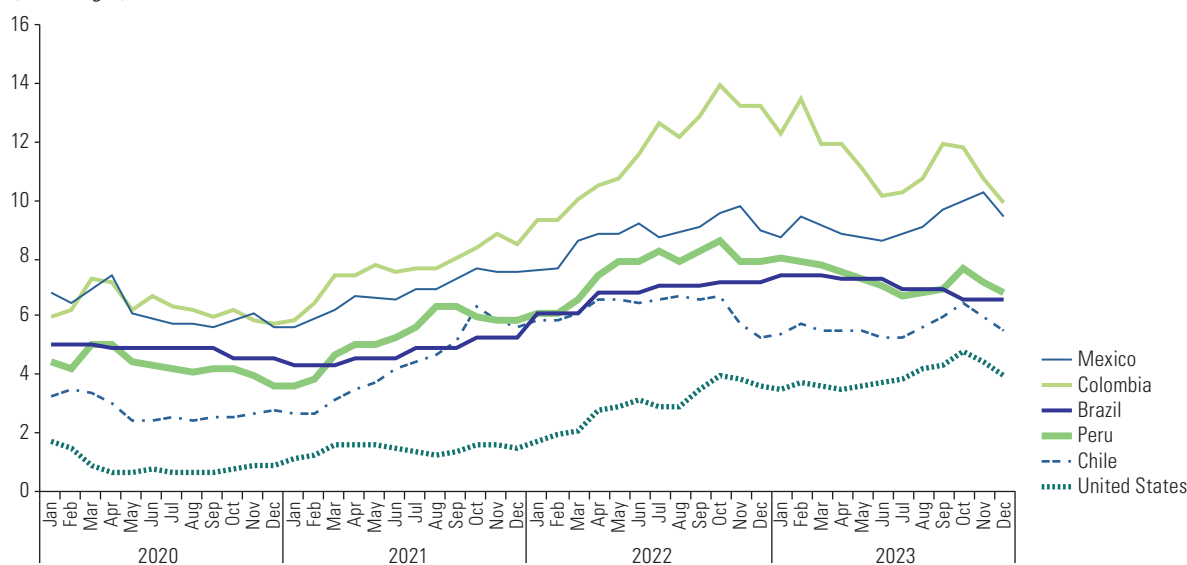
**Note:** The figures for Argentina, Mexico and Peru refer to the national public administration, federal public sector and general government, respectively.

Outlays for other capital expenditures also had an impact on results during the year. In Brazil, a capital contribution was made in December to set up a fund to finance the new *Pé-de-Meia* programme, which provides a savings incentive to encourage students to remain in school and complete their secondary education (IFI, 2024).<sup>9</sup> In contrast, the reduction in other capital expenditures in Mexico and Peru reflects a base effect produced by special capital contributions made in 2022 that were not repeated in 2023. In Mexico, the result is explained by federal government contributions to *Petróleos Mexicanos* in 2022, for purposes including debt repayment and investment in the *Olmecca-Dos Bocas* refinery (SHCP, 2024). In Peru, a special capital contribution was made to *Petróleos del Perú* (PETROPERÚ) in 2022; additionally, payments to support State credit guarantees were reduced in 2023 (Ministry of the Economy and Finance of Peru, 2024).

Interest payments were the component of total expenditure that increased by most in Latin America. Several factors contributed to this result, including the growth of debt in recent years, interest rate trends and exchange-rate movements. In particular there was a hike in the long-term interest rate in the United States, which serves as a reference rate for external debt previously contracted at variable rates, and also for new debt placements on international financial markets. Long-term interest rates on domestic debt remained high in several countries, although there was a significant downshift in Colombia. As figure I.12 illustrates, the rise in interest payments was driven by external debt, in several cases owing to the hike in international rates (Ministry of Economy and Finance of Ecuador, 2024; Ministry of Finance of Paraguay, 2024; Ministry of the Economy and Finance of Panama, 2024). In Brazil and Mexico, however, the increase is explained by higher interest payments on domestic debt, reflecting this component's larger share of total debt and the high interest rates prevailing in both countries in 2023.

**Figure I.12**  
Latin America (16 countries): interest rates on 10-year bonds and year-on-year variation in central government interest payments, 2020–2023  
(Percentages and percentage points of GDP)

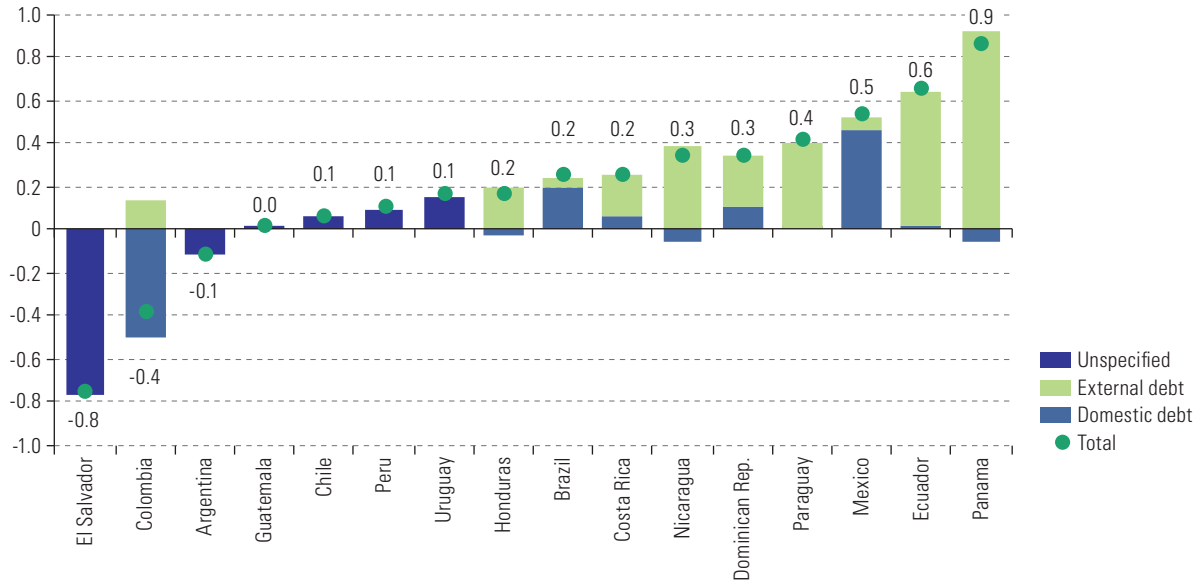
**A. Interest rates on ten-year bonds, January 2020–December**  
(Percentages)



<sup>9</sup> Ministry of Education of Brazil, press release, "Governo vai pagar poupança para 2,4 milhões de estudantes" [online] <https://www.gov.br/mec/pt-br/assuntos/noticias/2024/janeiro/governo-vai-pagar-poupanca-para-2-4-milhoes-de-estudantes>.

### B. Year-on-year variation in central government interest payments, 2022–2023

(Percentage points of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures and Organisation for Economic Co-operation and Development (OECD), OECD.stat.

**Note:** The figures for Argentina, Mexico and Peru refer to the national public administration, the federal public sector and general government, respectively.

In contrast, interest payments fell sharply in Colombia and El Salvador. In the former case, this was due mainly to lower interest outlays on inflation-linked Treasury bonds (TES) (Ministry of Finance and Public Credit of Colombia, 2024), as the country's inflation rate eased from 13.1% in late 2022 to 9.3% in December 2023. Meanwhile, interest payments on external debt increased, owing mainly to the increase in the debt stock, combined with the depreciation of the Colombian peso. In El Salvador, interest payments decreased following the adoption of a four-year grace period for the payment of interest and principal on Transitional Financing Certificates, as part of the pension-system reform that took effect in early 2023 (Ministry of Finance of El Salvador, 2024).

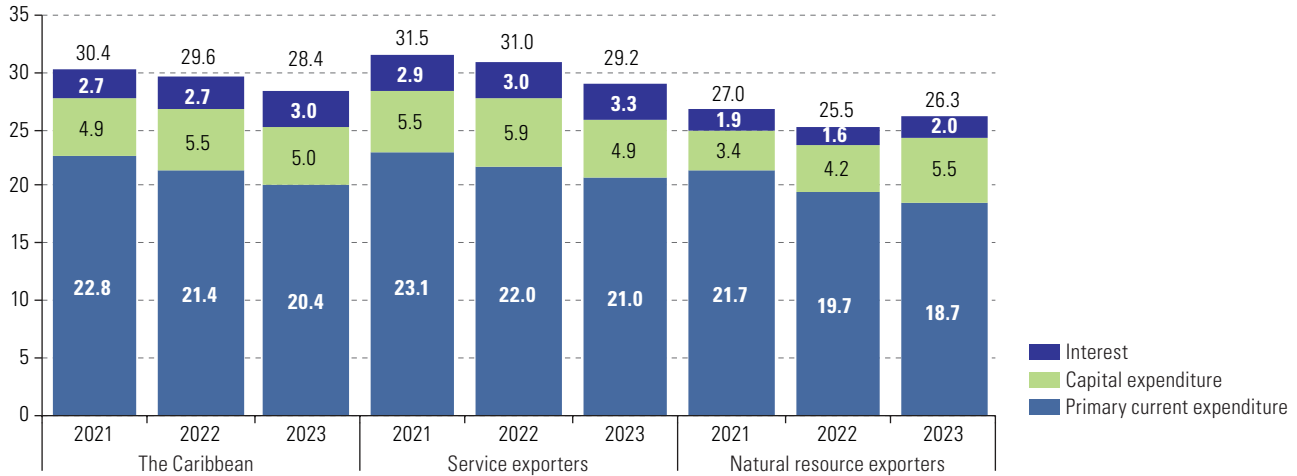
In the Caribbean, central government spending edged down to 28.4% of GDP in 2023, from the previous year's level of 29.6% of GDP (see figure I.13). Primary current expenditure decreased, as emergency programmes in response to the COVID-19 pandemic and various support measures implemented in 2022 to mitigate the rise in prices were wound down. In the Bahamas, pandemic-related outlays represented 0.1% of GDP, compared to 0.8% of GDP in 2022 (Ministry of Finance of the Bahamas, 2024). Meanwhile, capital expenditure decreased in most countries. In Saint Kitts and Nevis, the reduction is explained by a high base of comparison given that the country made land purchases in 2022. In contrast, in Guyana, withdrawals made from the Natural Resources Fund were channelled into public investment projects. Interest payments trended up during the year following the rise in international interest rates on variable rate debt, and also owing to local currency depreciations, particularly in the case of Suriname. In this country, the year-on-year variations largely reflected the robust growth of nominal GDP.

**Figure I.13**

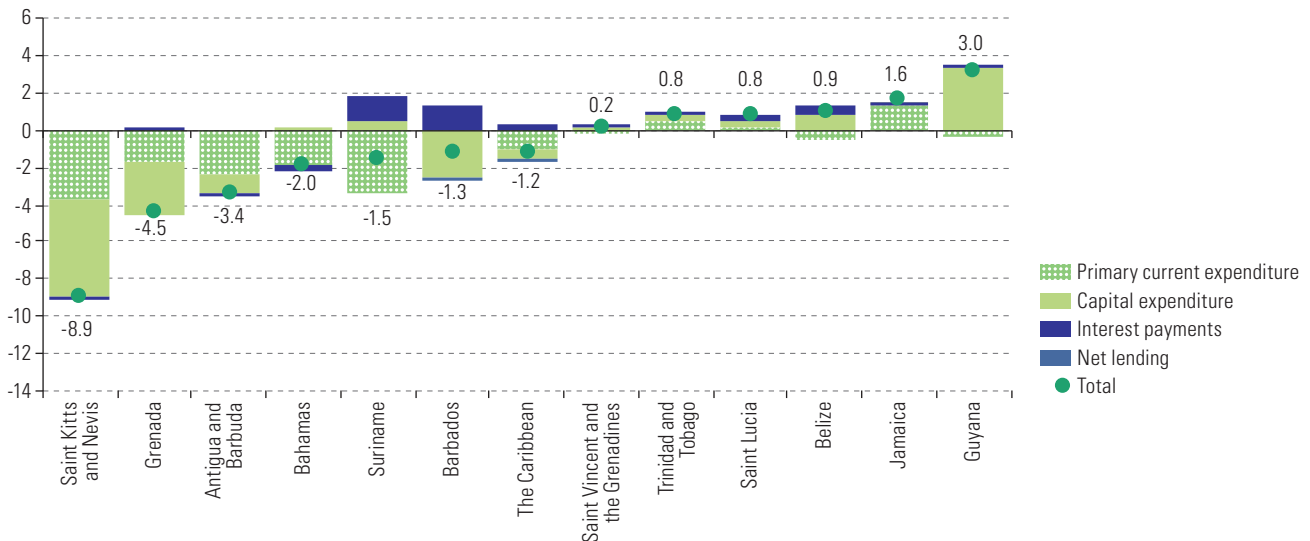
The Caribbean (12 countries): total central government expenditure, 2021–2023<sup>a</sup>  
(Percentages of GDP and percentage points of GDP)

**A. Composition of total central government expenditure, 2021–2023**

(Percentages of GDP)

**B. Year-on-year variation in total expenditure, by component, 2022–2023**

(Percentage points of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** Simple averages. The individual figures may not add up to the corresponding total because of rounding. The figures for Barbados and Saint Kitts and Nevis refer to the non-financial public sector and federal government, respectively.

<sup>a</sup> The figures for Antigua and Barbuda, Barbados, Belize, Grenada, Jamaica and Saint Lucia are official estimates.

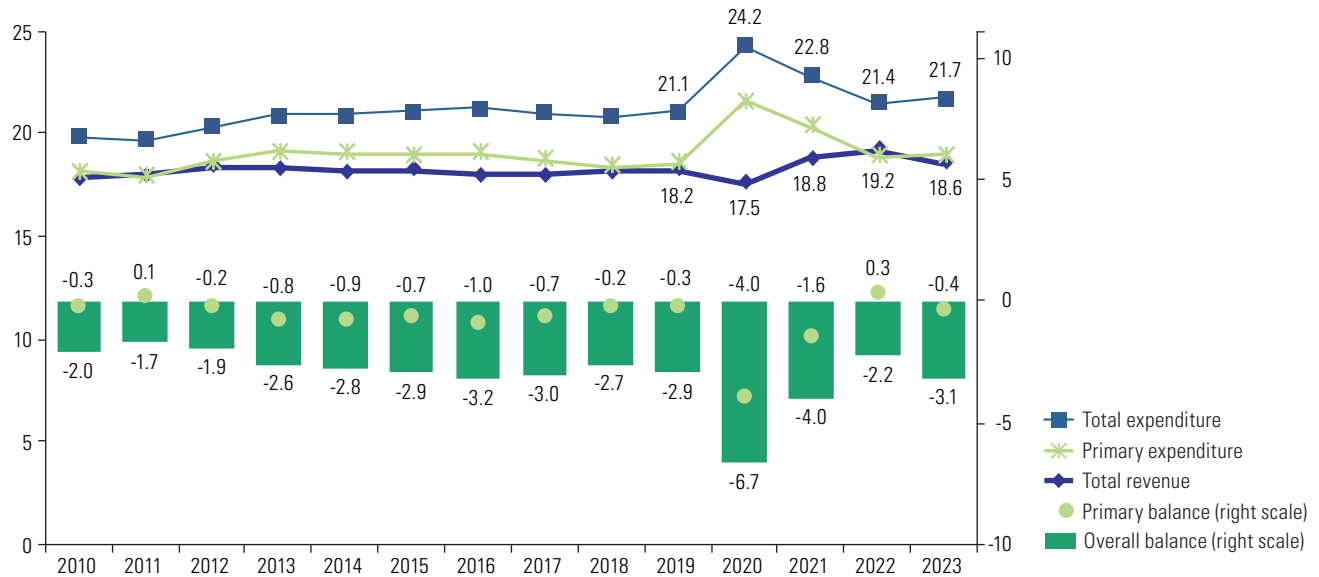
## C. Fiscal deficits widened in Latin America as revenues declined, while the primary surplus increased in the Caribbean

In Latin America, fiscal deficits widened in the wake of slower growth and reduced tax revenues. The slight increase in public spending, coupled with the reduction in public revenue, led to a worsening of the overall balance (see figure I.14). In 2023, the global central government balance posted a deficit of 3.1% of GDP, compared to

one of 2.2% of GDP in 2022 and an average deficit of 2.9% of GDP in 2015–2019. The primary balance turned negative in 2023 (with a deficit of 0.4% of GDP), after recording a surplus in the previous year (0.3% of GDP) for the first time since 2011. The primary balance has thus returned to the level prevailing before the crisis caused by the COVID-19 pandemic in 2020. In this case the deterioration in performance is explained largely by the reduction in total revenue, since primary expenditure—which excludes interest payments—remained relatively stable.

**Figure I.14**

Latin America (16 countries):<sup>a</sup> central government fiscal indicators, 2010–2023  
(Percentages of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** Simple averages. The individual figures may not add up to the corresponding total because of rounding. The figures for Argentina, Mexico and Peru refer to the national public administration, the federal public sector and general government, respectively.

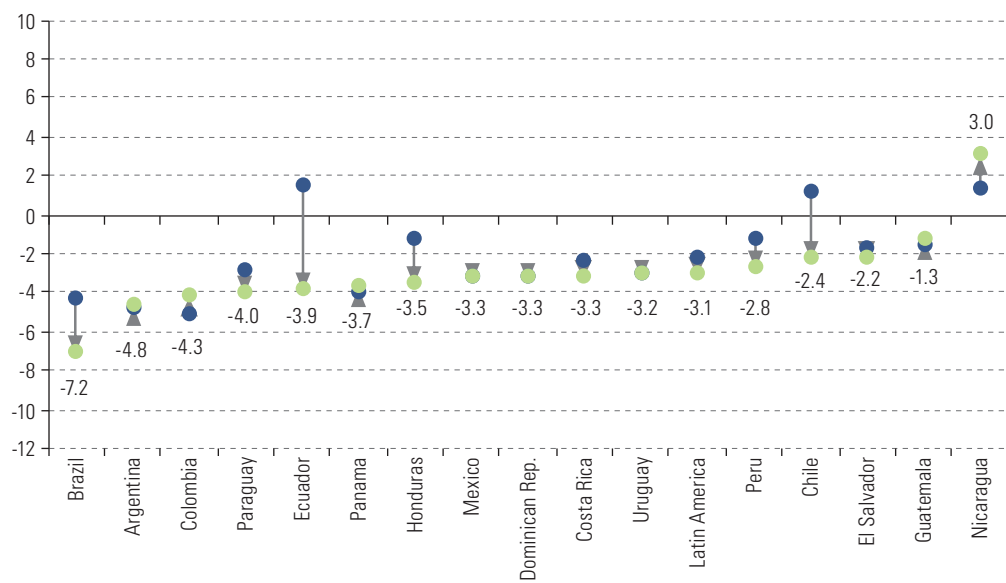
<sup>a</sup> Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay.

The trend of the fiscal deficits in Latin America as a whole was strongly influenced by a small group of countries. The overall deficit widened in Brazil, Chile, Ecuador and Honduras, which posted year-on-year variations of more than 2 percentage points of GDP (see figure I.15). At the same time, the overall deficit declined in Colombia, while Nicaragua increased its overall surplus, and the other countries saw smaller year-on-year variations. The primary balance displayed similar trends, although in some cases the overall deficit widened by more owing to higher interest payments. In 2022, some countries recorded exceptional primary surpluses, thanks to the increase in fiscal revenue obtained from non-renewable natural resources and to deep cuts in public expenditure.

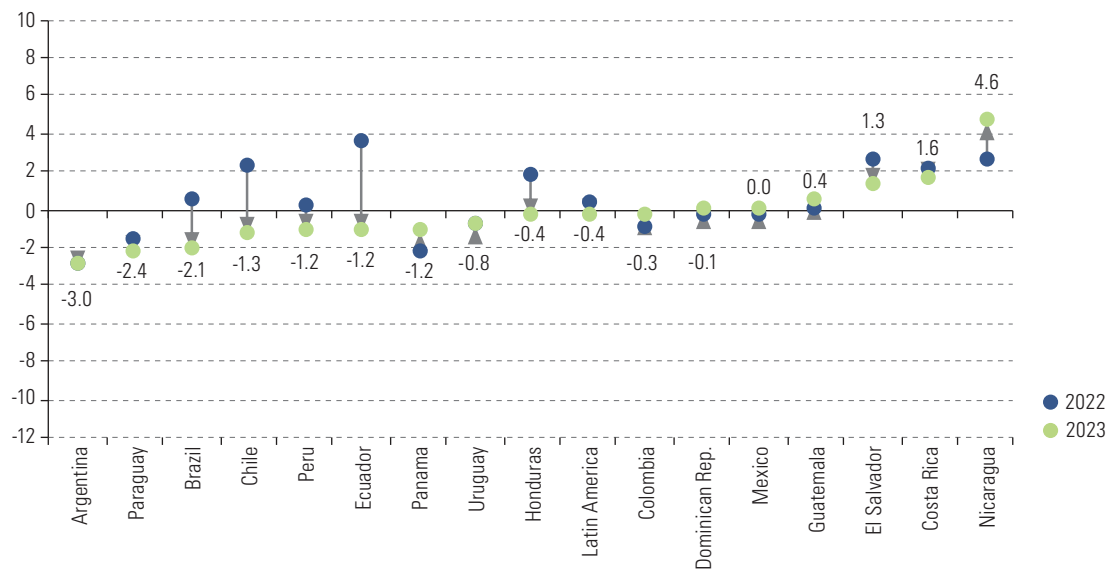
In the Caribbean, the fiscal balances trended very differently than those of Latin America. The overall balance posted a deficit of 1.6% of GDP, down from 2.4% of GDP in 2022 and an average deficit of 2.1% of GDP in 2015–2019. In this case, the reduction in total expenditure more than offset the drop in total revenue (see figure I.16). The primary surplus grew to 1.4% of GDP, compared to the previous year's 0.3% of GDP. This outweighed the reduction in the overall deficit, with rising interest payments a key factor driving the trend in the overall balance. Several countries are generating substantial primary surpluses under programmes supported by the International Monetary Fund.

**Figure I.15**  
Latin America (16 countries): global and primary central government balances, 2022–2023  
(Percentages of GDP)

### A. Overall balance



### B. Primary balance



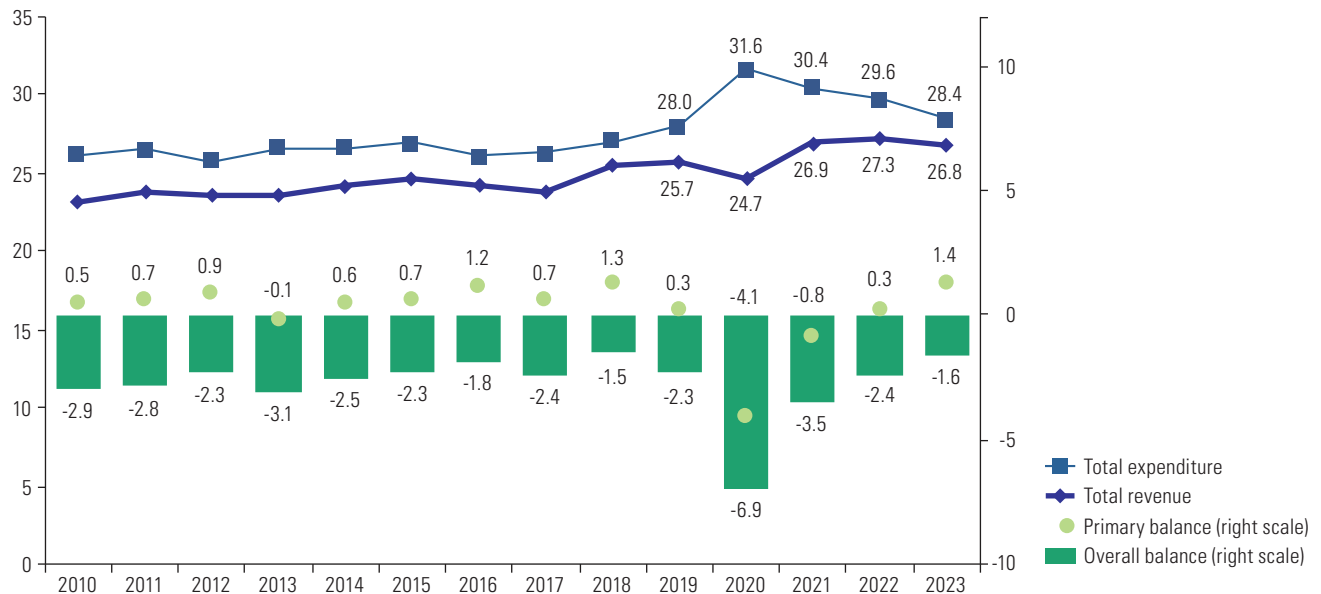
**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** The figures for Argentina, Mexico and Peru refer to the national public administration, the federal public sector and general government, respectively.



**Figure I.16**

The Caribbean (12 countries):<sup>a</sup> central government fiscal indicators, 2010–2023<sup>b</sup>  
(Percentages of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** Simple averages. The individual figures may not add up to the corresponding total because of rounding. The figures for Barbados and Saint Kitts and Nevis refer to the non-financial public sector and federal government, respectively.

<sup>a</sup> Antigua and Barbuda, the Bahamas, Barbados, Belize, Grenada, Guyana, Jamaica, Saint Kitts and Nevis, Saint Vincent and the Grenadines, Saint Lucia, Suriname, and Trinidad and Tobago.

<sup>b</sup> The figures for Antigua and Barbuda, Barbados, Belize, Grenada, Jamaica and Saint Lucia for 2023 are official estimates.

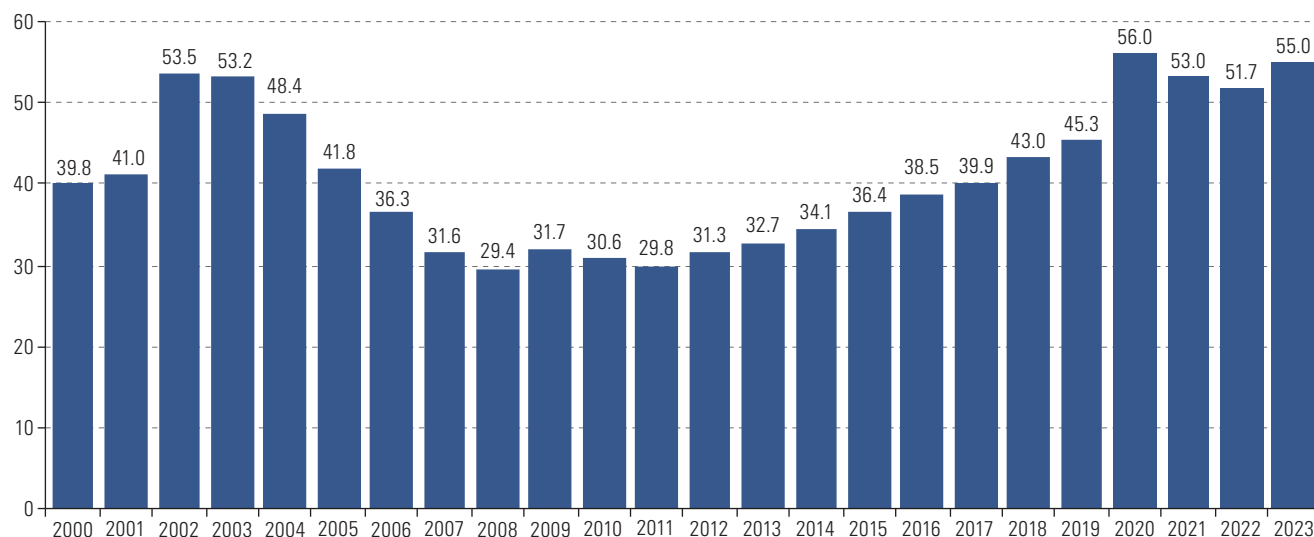
## D. Public debt increased in Latin America, while continuing to trend down in the Caribbean

The public debt in Latin America increased in 2023 against a backdrop of slacker growth and higher interest rates, accompanied by a sharp variation in exchange rates in some cases. In December 2023, central government gross public debt averaged 55.0% of GDP, 3.3 percentage points higher than at end-2022 (see figure I.17). At the subregional level, the public debt represented 62.8% of GDP in South America and 47.2% of GDP in Central America. The rise in the public debt/GDP ratio in 2020 reflected the countries' major needs for financing to defray the high costs of the pandemic. Although the region's public debt figures had improved since 2021, in 2023 some countries experienced an uptick that raised debt levels above 50% of GDP, similar to those recorded in Latin American and Caribbean countries 20 years ago.

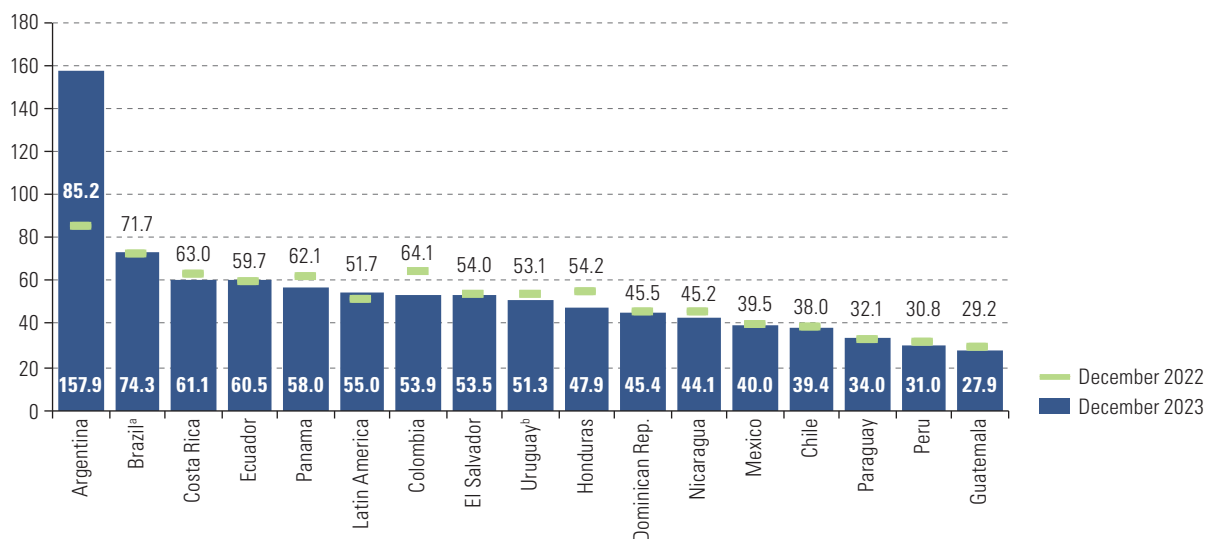
In Argentina, the debt represented more than 150% of GDP at end-2023, which had an impact on the average level of public debt in Latin America as a whole. This rise in public debt is explained by the combined effect of valuation adjustments, net debt issuance and the capitalization of interest (OPC, 2024b). The valuation adjustment accounted for 88% of the net variation in the debt in 2023, explained by a significant exchange rate adjustment that affected the stock of dollar-denominated securities, and an inflationary adjustment which had the same effect on instruments indexed to the reference stabilization coefficient.

**Figure I.17**  
Latin America (16 countries): central government gross public debt, 2000–2023  
(Percentages of GDP)

**A. Central government gross public debt, 2000–2023**



**B. Central government gross public debt by country, December 2022 and December 2023**



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

<sup>a</sup> The figures for Brazil refer to general government.

<sup>b</sup> The figures for Uruguay refer to September 2023.

Although situations in the other countries varied widely, a factor that had an impact on the trend of public debt in most cases was the slowdown in economic growth. Although the denominator effect resulting from high nominal output growth rates between 2021 and 2022 had driven debt levels down, this effect had faded by 2023 in most of the region's countries. For example, in Brazil, economic growth contributed 8.2 percentage points of GDP to the reduction in the level of debt between 2021 and 2022, which was partly offset by higher financing needs in that year, among other factors (Central Bank of Brazil, 2024). In 2023 this contribution fell back to 5.2 percentage points.

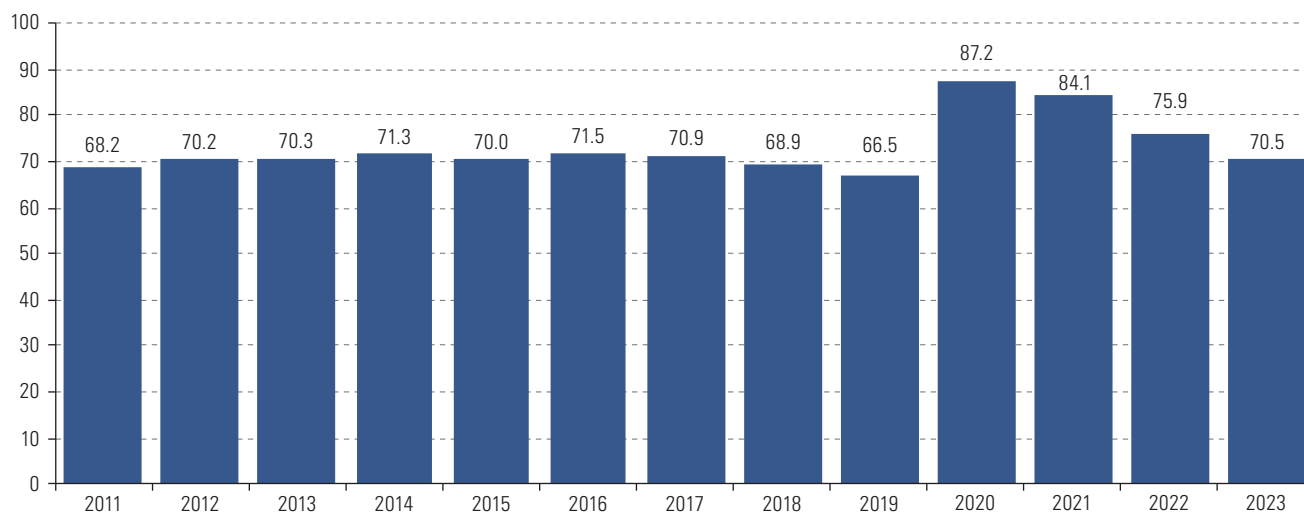
In the case of the Caribbean, the central government gross public debt represented 70.5% of GDP in December 2023, 5.4 percentage points lower than a year earlier (see figure I.18). Among countries with debt in excess of 90% of GDP, Barbados

and Suriname report levels of 115.3% and 91.6% of GDP, respectively. In contrast to Latin America, the upturn in economic growth, particularly in the service-exporting countries, generated a strong denominator effect, since public debt levels remained relatively stable in absolute terms during the year. There were reductions in Dominica, Saint Lucia and Suriname. In Guyana the public debt has been falling since 2022 owing to high rates of output growth, close to 40% in real terms in 2023, reflecting the start of offshore oil production. Despite the relative decline in the subregional average, the level of debt among Caribbean countries remains high.

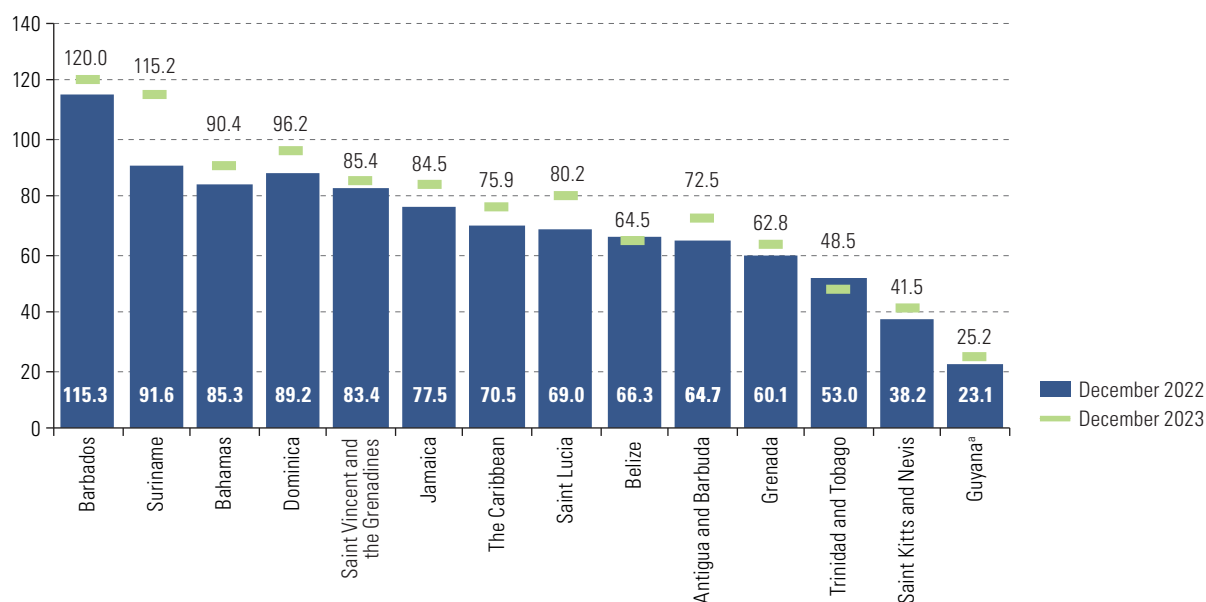
**Figure I.18**

The Caribbean (13 countries): central government gross public debt, 2011–2023  
(Percentages of GDP)

**A. Central government gross public debt, 2011–2023**



**B. Central government gross public debt by country, December 2022 and December 2023**



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

**Note:** The figures for Antigua and Barbuda, Guyana, and Saint Vincent and the Grenadines refer to those registered in June 2023; those for Jamaica and Saint Kitts and Nevis refer to those registered in September 2023.

<sup>a</sup> Public sector coverage.

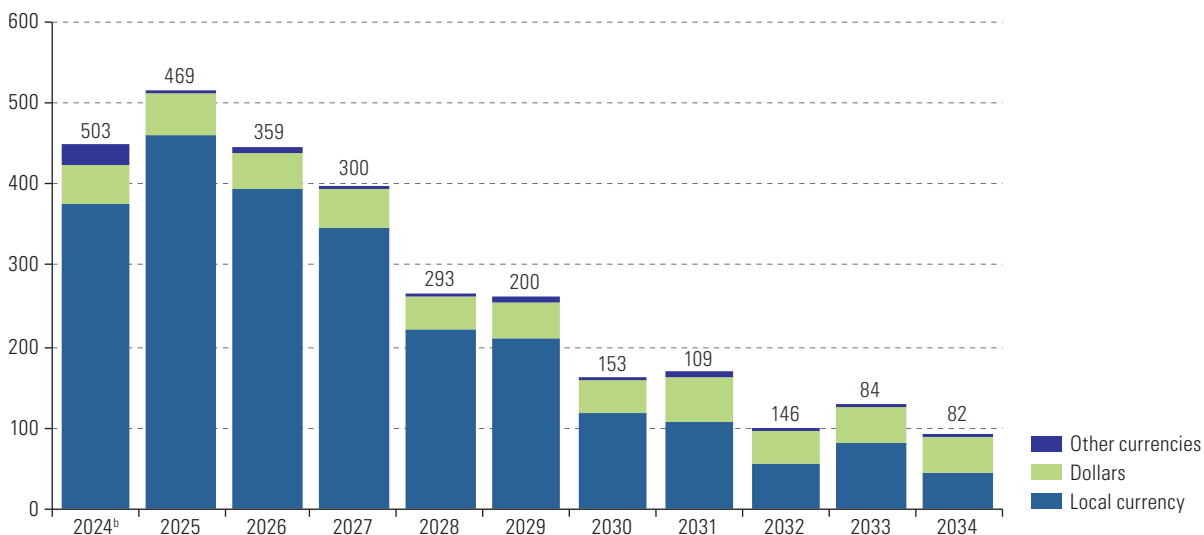
The risks associated with the accumulation of public debt also undermine the sustainability of the public finances in the medium term, mainly because of the higher cost of debt service, which erodes the fiscal balances. In this regard, various domestic and external factors affect the accumulation of public debt, such as the primary fiscal deficit, the GDP growth rate, the implicit interest rate and the exchange rate.

A highly relevant factor for the region is the deterioration of conditions on national and international financial markets, which has led to a succession of interest rate hikes. This has been compounded by local currency depreciation and potential credit rating downgrades, which have made it difficult to manage the region's public liabilities. These factors will affect not only interest payments related to the existing debt stock (insofar as countries have debt in foreign currency or with variable interest rates) but also those related to new debt issued under worse financial conditions.

Less benign conditions on financial markets will pose challenges for the region in rolling over the existing public debt. According to Bloomberg figures on sovereign debt instruments for which there is a secondary market, the Latin American countries will face credit obligations totalling US\$ 2.9 trillion —about 44.1% of regional GDP<sup>10</sup> in 2024— in principal and interest payments on the debt over the next 10 years. Most of these liabilities (80%) will be paid in local currency, while those denominated in dollars represent 17% (see figure I.19). This structure largely reflects the maturity profile of the debt in Brazil and Mexico, which jointly account for 72% of the region's debt service (representing 32% of regional GDP in 2024). If these two countries are excluded from the regional figure, cumulative public debt service in local currency would represent 47.3% of the total between 2024 and 2034, and dollar liabilities would account for 47.2%.

**Figure I.19**

Latin America (16 countries):<sup>a</sup> maturity profiles of central government gross public debt service by currency type, cumulative liabilities over the period 2024–2034 (Billions of dollars)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Bloomberg [online database] <https://www.bloomberg.com/>.

**Note:** Figures as at 22 March 2024. The figures refer to instruments for which there is a secondary market, and therefore may not coincide with official figures.

<sup>a</sup> Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Panama, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay.

<sup>b</sup> Includes the cumulative defaults of Argentina and Ecuador.

<sup>10</sup> International Monetary Fund (IMF), "World Economic Outlook database", October 2023 [online] <https://www.imf.org/en/Publications/WEO/weo-database/2023/October>.

The composition of debt service payable over the next five years varies between countries (see table I.1). In those for which information is available, 50% or more of the total debt service is denominated in foreign currencies, while variable rates are moderate. These countries could be prone to exchange-rate risks, in which depreciation of the local currency against the dollar would increase the financial cost of the debt. The same external vulnerability applies to dollarized countries such as Ecuador, El Salvador and Panama. In Brazil and Mexico, the financial risks would be associated more with potential changes in local monetary conditions, since their debt service is mostly denominated in local currency and at variable rates. In contrast, in Colombia, Costa Rica, the Dominican Republic, Paraguay, Peru and Uruguay, over 50% of debt service falling due in 2024–2028 is in local currency at fixed rates. This should reduce external risks linked to the exchange rate and foreign monetary policy interest rates.

**Table I.1**

Latin America (16 countries): structure of public debt service by country, cumulative liabilities in 2024–2028 (Billions of dollars and percentages)

Country	Debt service (Billions of dollars)			Type of currency (Percentages)			Type of rate (Percentages)			
	Total	Principal	Interest	Local currency	Dollars	Other	Fixed	Variable	Zero coupon	Other
Argentina <sup>a</sup>	220	199	21	49	39	11	28	-	34	38
Bolivia (Plurinational State of)	3	1	2	45	55	-	100	-	0	-
Brazil	975	854	121	98	2	-	36	42	22	-
Chile	13	8	5	-	66	34	100	-	-	-
Colombia	75	38	37	81	17	2	97	-	3	-
Costa Rica	32	18	14	73	27	-	93	7	0	-
Ecuador	7	3	4	-	100	-	5	-	8	87
El Salvador	3	1	2	-	100	-	100	-	-	-
Guatemala	5	3	2	17	83	-	100	-	-	-
Honduras	1	1	0	-	100	-	100	-	-	-
Mexico	603	451	151	94	4	1	40	42	17	-
Panama	18	10	9	-	100	-	99	-	1	-
Paraguay	5	3	2	48	52	-	70	2	28	-
Peru	26	12	14	62	32	6	100	0	-	-
Dominican Republic	53	34	19	72	27	1	99	-	1	-
Uruguay	19	12	7	70	29	1	72	-	26	2

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of information from Bloomberg [online database] <https://www.bloomberg.com/>.

**Note:** Figures as at 22 March 2024. The figures refer to instruments for which there is a secondary market, and so may not match official figures.

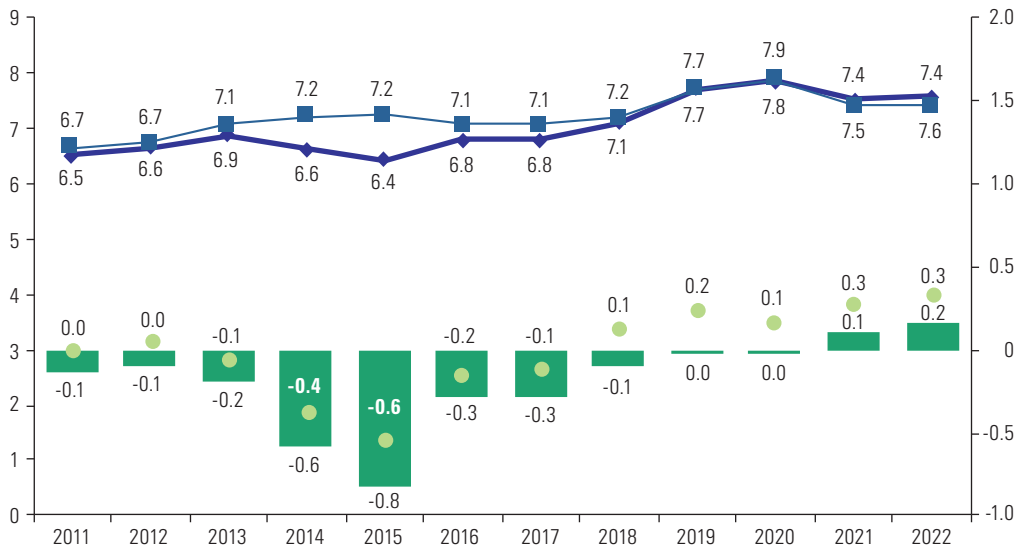
<sup>a</sup> Including accumulated arrears.

## E. Subnational governments adhered to a balanced budget path in 2022

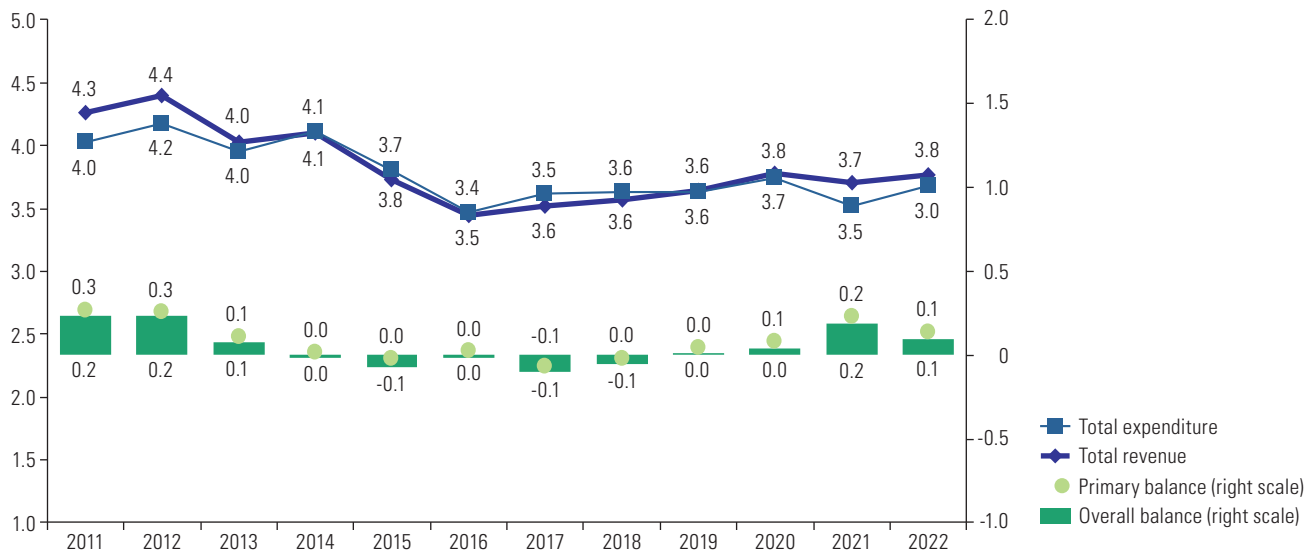
In 2022, the fiscal accounts of Latin America's subnational governments adhered to a balanced budget path. In the case of intermediate governments (States and provinces), the previous year's fiscal surpluses strengthened (see figure I.20). In contrast, the fiscal balances of local governments deteriorated slightly, although they remain in surplus. This year-on-year variation is due to the recovery of public spending, driven by higher capital expenditures.

**Figure I.20**  
Latin America (13 countries):<sup>a</sup> fiscal indicators of intermediate and local governments, 2011–2022  
(Percentages of GDP)

### A. Intermediate governments



### B. Local governments



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

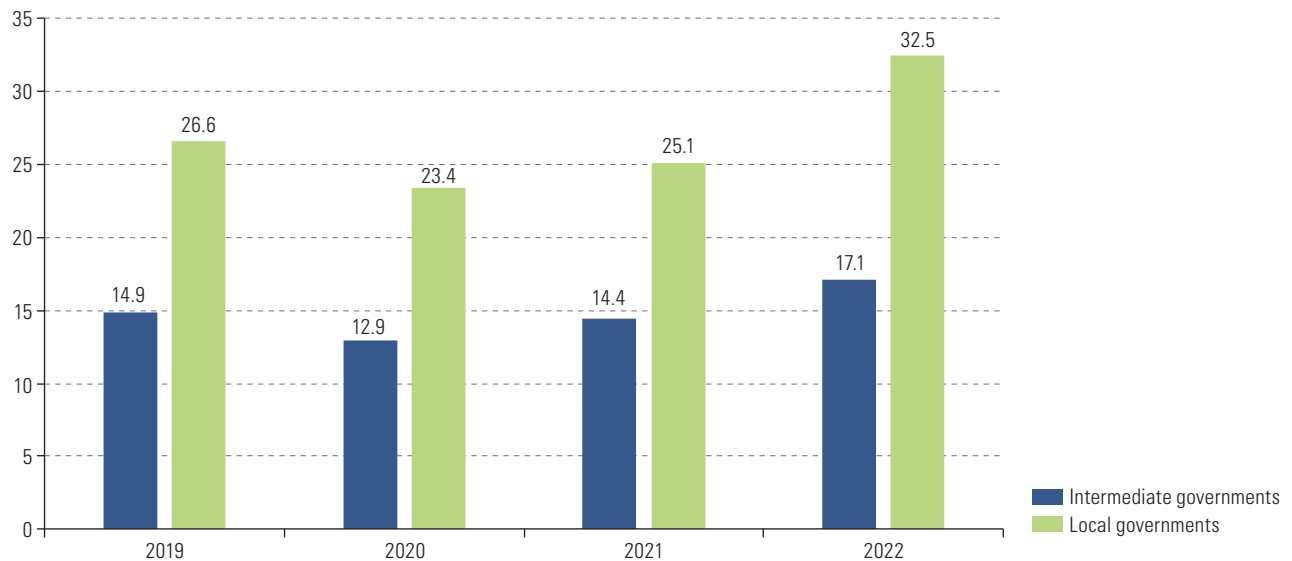
<sup>a</sup> Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Peru and the Plurinational State of Bolivia.

Having made substantial adjustments to maintain levels of current expenditure on health care and recovery from poverty during the pandemic, the subnational governments have since retargeted their spending priorities towards public investment. The pandemic posed major challenges in terms of expenditure adjustments to maintain, and even increase, the flow of resources in crucial areas such as health, economic recovery and transfers to the poorest households. This entailed an opportunity cost, manifested in the smaller share of capital spending in the structures of intermediate and local government expenditure—specifically in 2020, the year in which the health crisis broke out (see figure I.21). Subsequently, the average figures reflect a clear effort by both levels of

government, not only to regain pre-pandemic levels, but even to exceed them, as can be seen at the end of 2022. As Radics and others (2022) have noted, public investment needs to be promoted as a strategic tool, not only for local development but also to secure adequate infrastructure to meet present and future challenges, especially those related to climate change (see box I.2).

**Figure I.21**

Latin America (13 countries):<sup>a</sup> share of intermediate and local government in total capital expenditure, 2019–2022  
(Percentages of total spending)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC) based on official figures.

<sup>a</sup> Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Peru and the Plurinational State of Bolivia.

Climate change has posed a series of fundamental challenges for all countries around the world. For national and subnational governments specifically, the challenges entail adopting measures to mitigate the effects of climate change through policies to reduce greenhouse gas emissions. There has also been a tendency to adopt adaptation measures that enable governments to confront and reduce the socioeconomic impacts of climate change.

In terms of mitigation challenges, subnational governments have been forced to alter the structure of their expenditure, mainly in the electric power, transport and infrastructure sectors. Subnational governments often have a significant participation in the electric power industry in the generation and distribution segments, mainly through State-owned enterprises. Accordingly, they are required to organize mechanisms to redirect investment decisions that allow for an efficient, but at the same time equitable, transition to clean energy production. In the transport sector, the trend is towards the electrification of transport systems, encouragement of the use of public transport, and the introduction of incentives to foster the use of low- or zero-emission vehicles (such as bicycles). In terms of infrastructure, governments retain significant spending responsibilities in relation to housing construction, and they have been forced to introduce new standards for the use of materials and energy sources. For example, member countries of the Organisation for Economic Co-operation and Development (OECD) spend about 0.4% of GDP on "green infrastructure", which, according to recent trends, should be allocated to the three aforementioned sectors (De Mello and Ter Minassian, 2023).

Subnational governments have become even more involved in adaptation measures, mainly because the effects of climate change are felt more at the local level. The measures in question tend to involve taxation, land-use planning and expenditure, aimed at the

### Box I.2

The fiscal challenges facing subnational governments in adapting to climate change and mitigating its effects

following: steering land-use location decisions through subsidies, regulation and tariffs; supporting farmers in situations of drought; strengthening the electricity grid to cope with extreme weather; new investments to improve the resilience of road, port and bridge infrastructure; and, lastly, immediate attention, recovery and prevention measures targeting the population sectors that suffer most natural disasters (which are also the least protected). In OECD countries, most of the subnational investments in environmental protection are made by local governments (De Mello and Ter Minassian, 2023).

In Latin America, subnational governments have also acquired skills and developed mitigation and adaptation measures. Radics and others (2022) highlight the role of subnational governments in land-use planning and management, drinking water supply, solid waste management, and transit and transportation. These authors note that adaptation responsibilities correspond to resilient public investments and adaptive recovery. However, a number of challenges have been identified, especially in the development and use of taxation powers, the redesign of transfer systems from non-renewable natural resources that encourage expenditure on environmental protection, as well as access to climate finance, mainly through the issuance of green bonds.

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of De Mello and T. Ter-Minassian, "Decarbonisation and intergovernmental fiscal relations: Policy challenges and reform options", *OECD Working Papers on Fiscal Federalism*, No. 43, Paris, OECD Publishing, 2023 and A. Radics and others, *Panorama de las relaciones fiscales entre niveles de gobierno de países de América Latina y el Caribe* (LC/TS.2022/4), Inter-American Development Bank (IDB)/ Economic Commission for Latin America and the Caribbean (ECLAC), 2022

In Brazil, both local and State governments gave a substantial boost to public investment, which is increasingly less reliant on federal government transfers and credit operations (National Treasury, 2023). A significant public investment drive can also be discerned in the case of Colombia, although this may be associated with more granular accounting (now produced by the Decentralization and Fiscal Strengthening Directorate of the National Planning Department), which makes it possible to identify infrastructure expenditures and non-financial assets that previously were not reported separately.<sup>11</sup> Lastly, investment has also been boosted in Peru, financed mainly by transfers and credit operations, according to information in the Public Account of the Republic, published in the Economic Transparency Portal of the Ministry of the Economy and Finance.<sup>12</sup>

Although the heavy dependency of subnational governments nationwide was revealed in their response to the challenges of the pandemic, both levels of government have since reduced their reliance on intergovernmental transfers (vertical imbalance) to finance public expenditure (see figure I.22). During the pandemic, the region's local and intermediate governments attained levels of vertical imbalance equivalent to about 60% of their total revenue. By 2022, this dependency had decreased slightly, which indicates incipient efforts to increase internally generated revenues at both levels of government. As noted above, the pandemic required intergovernmental coordination mechanisms to be strengthened to face future crises, mobilizing own resources by exploiting available tax bases, and reconfiguring transfer systems which, it is worth remembering, lack offsetting criteria.

In general, the share of tax revenues in the income of both local and intermediate governments across the region remained stable. This would indicate that, given the (albeit marginal) reduction in the share of transfers, the region's own revenues were

<sup>11</sup> For further information see [online]: [https://www.dnp.gov.co/LaEntidad/\\_subdireccion-general-descentralizacion-desarrollo-territorial/direccion-descentralizacion-fortalecimiento-fiscal/Paginas/informacion-fiscal-y-financiera.aspx](https://www.dnp.gov.co/LaEntidad/_subdireccion-general-descentralizacion-desarrollo-territorial/direccion-descentralizacion-fortalecimiento-fiscal/Paginas/informacion-fiscal-y-financiera.aspx).

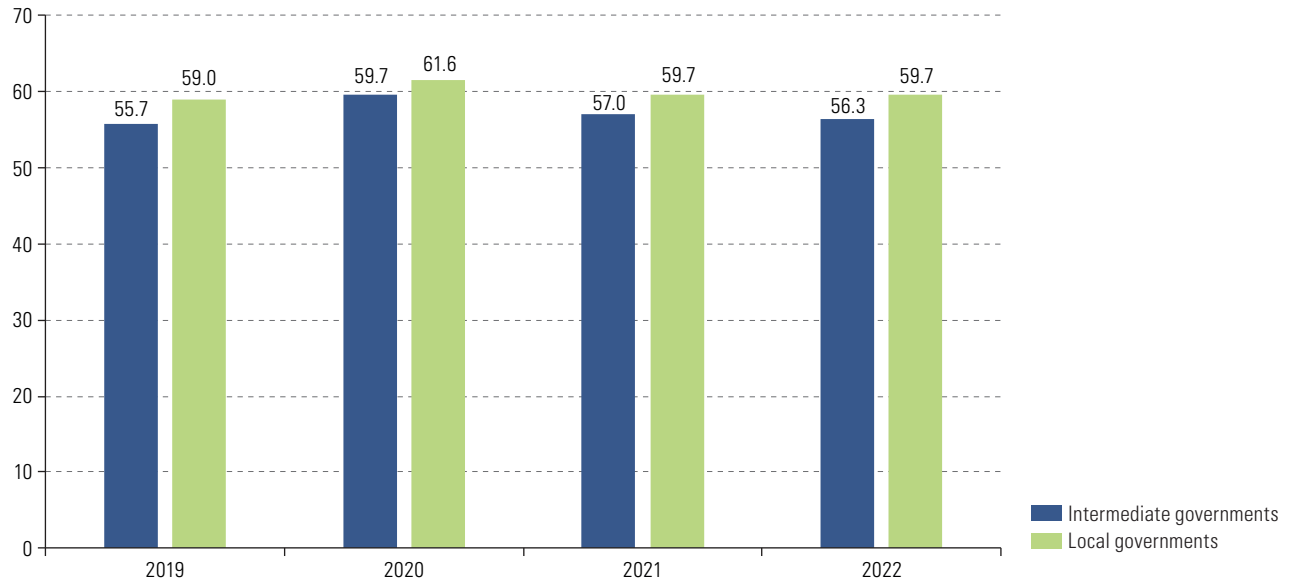
<sup>12</sup> For further information see [online]: [https://www.mef.gob.pe/es/?option=com\\_content&language=es-ES&Itemid=100996&lang=es-ES&view=article&id=594](https://www.mef.gob.pe/es/?option=com_content&language=es-ES&Itemid=100996&lang=es-ES&view=article&id=594).



strengthened by non-tax income. In the Argentine provinces, revenues from royalties increased; and Brazil's State and local governments also saw their capital income grow. Only Peru's regional governments became more reliant on transfers, through the "Ordinary resources" accounting category. These are obtained mainly from national tax revenues and other items; and they represent freely disposable funds available to finance the budgetary appropriations approved for each level of government in the annual budget law.

**Figure I.22**

Latin America (13 countries):<sup>a</sup> vertical imbalance of intermediate and local governments, 2019–2022  
(Percentages of total revenue)



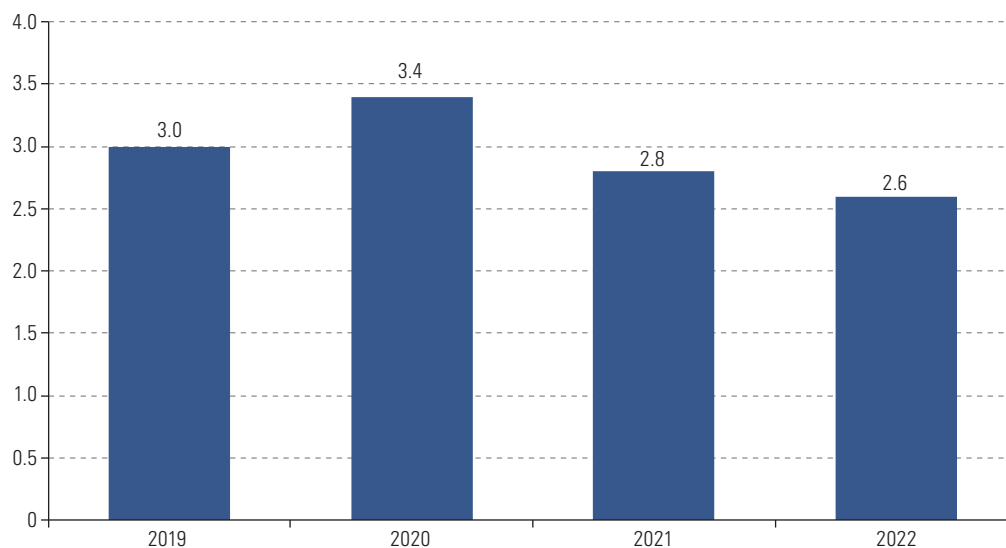
**Source:** Economic Commission for Latin America and the Caribbean (ECLAC) on the basis of official figures.

**Note:** The concept of "vertical imbalance" arose to explain the gap between the decentralization of spending responsibilities that are supported by intergovernmental transfers (mainly from the central government) to subnational governments (intermediate and local), and the capacity of these levels of government to generate their own resources. The concept is generally used to measure the extent to which these governments rely on central government funding and is measured as the share of intergovernmental transfers in total subnational income.

<sup>a</sup> Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Mexico, Panama, Peru and the Plurinational State of Bolivia.

The budget balance achieved in the two years following the pandemic has been accompanied by a gradual reduction in subnational public debt. After the subnational governments were forced to assume additional financial obligations to expand fiscal space to meet the needs arising from the pandemic, the debt stock of local and intermediate governments has declined in the last two years (see figure I.23). This can be explained by several factors. In the case of the Argentine provinces, the reductions correspond to the high growth rate of nominal GDP. In the Plurinational State of Bolivia, the decline reflects changes in credit conditions linked to improvements in the financial sustainability indicators of the municipal and departmental autonomous governments, and a widespread boost to public investment. In Mexico, meanwhile, the reduction in the debt, of both States and municipalities, is associated with the regulations and restrictions established in the Financial Discipline of Federative Entities and Municipalities Act since 2016. According to recent data, these are now reporting considerable effects in terms of debt management and sustainability (see box I.3).

**Figure I.23**  
Latin America  
(11 countries):<sup>a</sup>  
subnational public  
debt, 2019–2022  
(Percentages of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC) on the basis of official figures.

**Note:** The data for Chile refer to financial leases.

<sup>a</sup> Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, El Salvador, Mexico, Peru, the Plurinational State of Bolivia, and Uruguay.

### Box I.3

#### The case of Mexico and the effects of the Financial Discipline of Federative Entities and Municipalities Act on debt management and sustainability

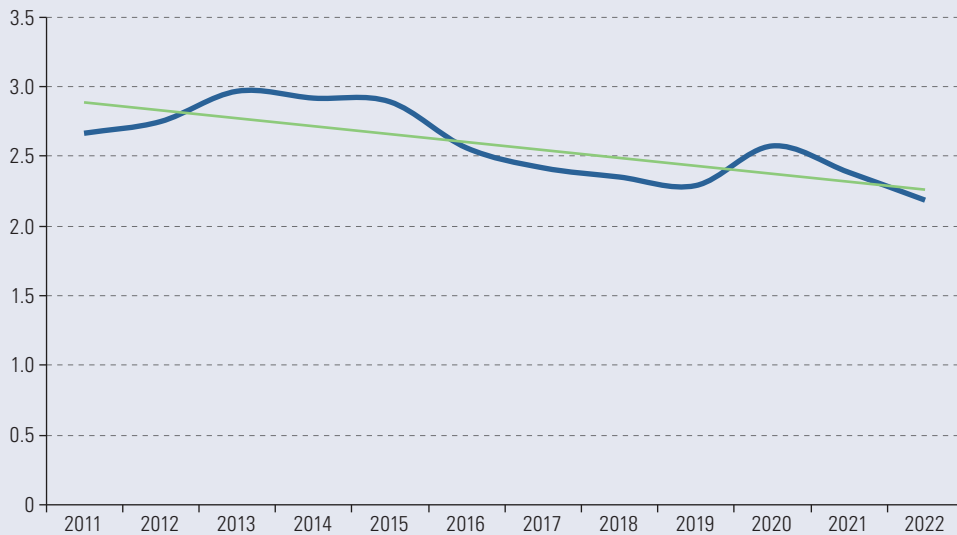
In 2016, the Congress of the Union adopted the Financial Discipline of the Federative Entities and Municipalities Act, with the aim of balancing the public accounts, curbing the growth of public debt and introducing of transparency and accountability mechanisms. This legislation imposes caps on current spending (wages and salaries) and debt, as well as upper limits on financing linked to sustainability indicators, which are published periodically by the Ministry of Finance and Public Credit. The design and implementation of the law is based on a centralist viewpoint, exogenous to the conditions and needs faced by each State and municipal government. This makes it easier to evaluate its impacts on the fiscal aggregates, at both State and municipal levels.

To evaluate the law's initial impacts, it is possible to construct two comparison groups by level of government. The treatment group consists of municipal and State governments that, on the basis of the indicators contained in the law itself, have displayed fiscal behaviour that shows them to be exposed to the law's regulations prior to its implementation. The control group consists of governments that would not be exposed to the law, given their previous fiscal performance. To compare possible differences associated with the law, exposed governments were defined as those in which debt expenditure relative to freely disposable revenues (internally generated revenues plus unrestricted transfers) exceeded 5%. The comparison group consists of all governments in which debt expenditure was below that threshold.

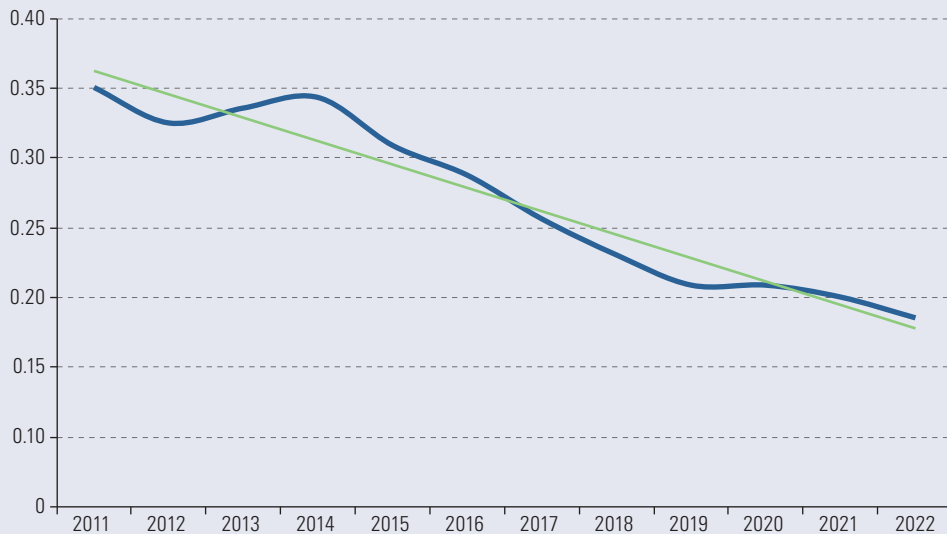
Using a difference-in-differences estimation, Ruelas and Pérez (2023) suggest that implementation of the law was followed by an improvement in the management of debt levels by both State and municipal governments. This is associated with a behavioural change in public debt decisions and management, especially in governments considered to be exposed to the law. The following graphs reveal a gradual reduction in debt balances over the last decade, which became more pronounced as from 2017.

Mexico: subnational government public debt balances, 2011–2022  
(Percentages of GDP)

#### A. States



#### B. Municipalities



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official figures.

These findings show that the law has resulted in the consolidation of a Mexican subnational public debt market, which is primarily bank-based. Governments have strengthened their debt sustainability mechanisms in order to enhance their credibility and thus obtain better financing conditions. There is still a wide gap to be filled, however, namely the financing of municipal and State governments located in deprived areas. These would be unable to access the debt market to finance themselves and would therefore fall even further behind in terms of mobilizing fiscal resources to meet their spending needs.

**Source:** I. Ruelas and N. Pérez, "El impacto de las reglas fiscales en el manejo de las finanzas públicas subnacionales: el caso de México y la Ley de disciplina financiera", paper presented at the XII Ibero-American Financing Conference, 2023 [online] <https://www.aifil-jifl.org/ediciones-anteriores/>.

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CHAPTER



# Carbon taxes in Latin America and the Caribbean: macroeconomic implications of climate change and the potential of a carbon tax to finance climate investment

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## Introduction

- A. Tackling climate change will require exceptional investment, but public investment faces significant fiscal constraints
- B. A carbon tax to mitigate climate change and finance public investment
- C. Macroeconomic simulations of the effects of climate change, carbon taxes and investment
- D. Concluding remarks

## Bibliography

Annex II.A1

Annex II.A2





## Introduction

Latin America and the Caribbean faces elevated climate risks with severe implications for its economic and social well-being. In the medium term, macroeconomic loss estimates for the region are expected to be significant (Van der Borght and others, 2023; Swiss Re Institute, 2021; Kahn and others, 2019; Burke, Hsiang and Miguel, 2015). Likewise, climate change will exacerbate existing structural development gaps in the region, in particular poverty and inequality, while increasing the strain on already inadequate public services, such as health care.

Tackling climate change adaptation and mitigation and achieving the Sustainable Development Goals (SDGs) will require an urgent large-scale investment push, in a region that currently invests very little; investment levels in Latin America and the Caribbean are among the lowest in the world, far below those seen in the strong emerging and developing economies of Asia. Public investment is anaemic. Overall regional investment is lower than investment in developed economies, despite the potential for catch-up growth that investment represents. However, the needed public investment push is at odds with the region's fiscal realities, which include elevated levels of general government gross public debt and rising interest payments that are crowding out other public spending.

Given the urgent need to address climate change, carbon taxes have increasingly been proposed as a means of decreasing greenhouse gas emissions and funding public investment to reduce the need to take on additional sovereign debt (IMF, 2023; Black and others, 2021). Five countries of the region have adopted a carbon tax, namely Argentina, Chile, Colombia, Mexico and Uruguay. Carbon prices are generally low and their tax bases are relatively narrow, resulting in very limited carbon tax revenues.

This chapter contains results of macroeconomic models for a sample of countries in the region with a view to assessing potential carbon tax revenues and the economic effects of using them to finance investment. The countries, namely the Dominican Republic, Guatemala and Peru, present distinct geographical and climate change risk profiles.

The analysis includes an examination of the macroeconomic impact of the intensification of climate change, which is expected to include a progressive slowdown in the medium term as the macroeconomic damage caused by higher temperatures compounds. GDP would decrease substantially by 2050 in the Dominican Republic (-13.8%), Guatemala (-12.6%) and Peru (-13.4%), compared to the counterfactual scenario that assumes no further intensification of climate change.

The chapter also examines the potential of a carbon tax to generate revenues, finance investment and address macroeconomic damage caused by climate change. A carbon tax of US\$ 50 per tCO<sub>2</sub> eq would generate revenues amounting to 0.9%–1.2% of GDP in the three countries. Assuming the full recycling of the revenues (70% for investment and 30% for transfers to compensate households), investment financed by this carbon tax could lead to a net positive increase in economic growth. However, the modest uptick in growth in the short term would not be enough to meaningfully increase GDP by 2050.

The analytical findings in this chapter support the view that a carbon tax is not a silver bullet for climate change. Rather, it must be part of a larger package of measures. There is an urgent need to change the composition and level of investment in the region to drive sustained and sustainable economic growth. However, investment financed exclusively by carbon tax is unlikely to reach the level necessary to reverse the region's low growth trend. The viability of a large-scale investment push in the region requires a holistic climate financing framework to mobilize public and private resources (ECLAC, 2023b).

## A. Tackling climate change will require exceptional investment, but public investment faces significant fiscal constraints

Addressing the existential threat of climate change and achieving the SDGs is contingent on large-scale, economy-wide investment. A full accounting of these investment needs is difficult, but studies suggest that the effort required will be significant (see table II.1). At the global level, the Organisation for Economic Co-operation and Development (OECD, 2017) and the United Nations Conference on Trade and Development (UNCTAD, 2014) have estimated that the achievement of the SDGs would require upward of US\$ 7 trillion in total investment per year. Various estimates suggest that investment needs are especially high for emerging markets and developing countries, where achieving the SDGs will also require the closure of often deeply entrenched development gaps. For example, projections indicate that emerging markets, excluding China, will require additional annual spending equivalent to 6.9% of GDP by 2030 to address key development objectives, such as building human capital and sustainable infrastructure, addressing land use, agriculture and environmental concerns, and adapting to climate change (Bhattacharya and others, 2022).

Estimates for Latin America and the Caribbean suggest that an investment effort of a similar magnitude will be necessary to achieve the SDGs and tackle climate change. Aggregate estimates of the additional annual infrastructure investment needed to close development gaps in the region converge between 3% and 8% of GDP (Rozenberg and Fay, 2019; Fay and others, 2017). The inclusion of other social targets, such as addressing extreme poverty, eradicating infant mortality and extending secondary education, would require upward of 16% of GDP in additional outlays by 2030 (Castellani and others, 2019). There is significant variation at the country level: additional annual investment needs are estimated at more than 10% of GDP by 2030 in Belize, Haiti, Nicaragua and Paraguay (Carapella and others, 2023), but estimates in other countries are as low as 2% of GDP by 2030.

This investment effort must also be aligned with greenhouse gas emissions reduction targets adopted by countries in the region under the Paris Agreement. The most recent submissions of nationally determined contributions contain a variety of relative and absolute mitigation targets, including some of significant magnitude (see figure II.1 and annex II.A2), as well as ambitious sectoral objectives. For example, Antigua and Barbuda aims to produce 86% of its electricity from renewable energy sources by 2030, which would represent a major shift, as 94% of its electricity is currently generated from fossil fuels. Likewise, Saint Kitts and Nevis has established a target of 100% renewable electricity generation by 2030, which would also amount to a near total inversion of the current energy mix. The Bahamas, meanwhile, aims to significantly shift the composition of the overall vehicle fleet, to 35% electric and 15% hybrid by 2030.

**Table II.1**

Representative list of recent studies and estimated investment needs to achieve the Sustainable Development Goals and the climate change adaptation and mitigation targets

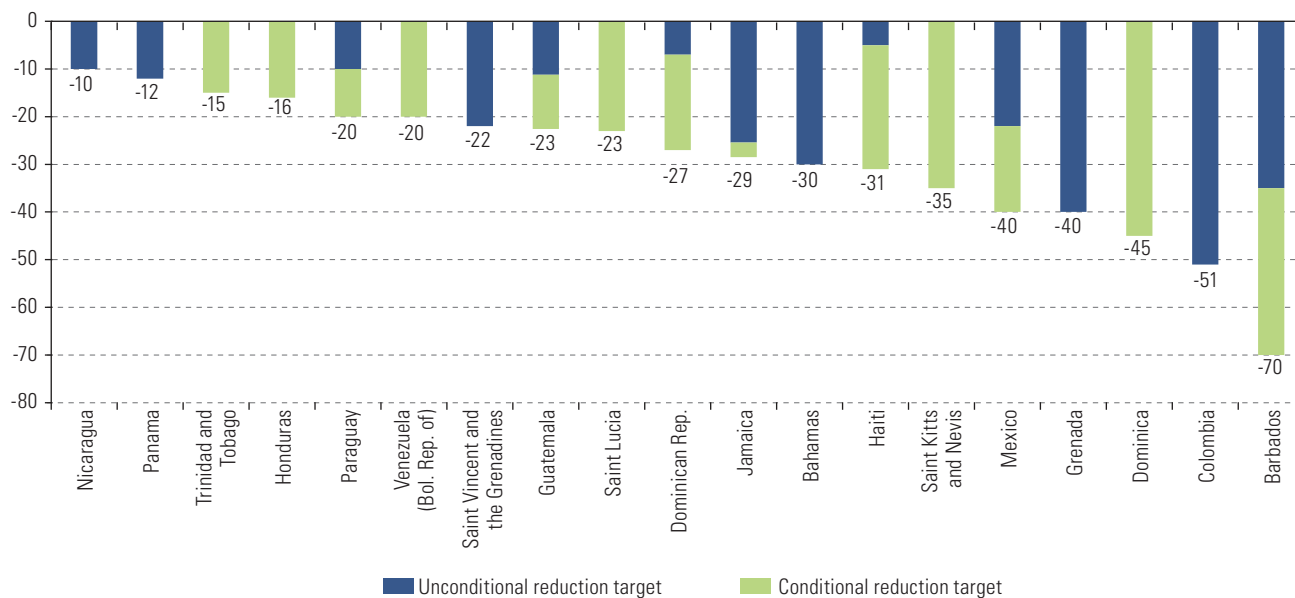
Level	Source	Elements considered	Estimated annual investment needs
Global	OECD (2017)	Infrastructure investment to meet development needs	US\$ 6.9 trillion (US\$ 6.3 trillion for infrastructure and US\$ 0.6 trillion to make infrastructure investment climate-compatible)
	UNCTAD (2014)	Achievement of SDGs	US\$ 5–US\$ 7 trillion from 2015 to 2030
Developing countries	UNCTAD (2014)	Achievement of SDGs	US\$ 3.3–US\$ 4.5 trillion between 2015 and 2030
	UNEP (2021)	Adaptation of agriculture, infrastructure, water supply and other economic areas to counterbalance the physical effects of climate change	US\$ 140–US\$ 300 billion per year by 2030 and US\$ 280–US\$ 500 billion per year by 2050
Emerging markets and developing countries	IEA (2021)	Renewable energy investments to achieve net zero greenhouse gas emissions	US\$ 1 trillion by 2030
Emerging markets, excluding China	Bhattacharya and others (2022)	Human capital; sustainable infrastructure; land use, agriculture and environment; and adaptation and resilience	Additional 6.9% of GDP by 2030
Low- and middle-income countries	Rozenberg and Fay (2019)	Electricity; transport; water and sanitation; flood protection; and irrigation	4.5% of GDP (capital investment) and 2.7% of GDP (maintenance) from 2015 to 2030
Latin America and the Caribbean	Castellani and others (2019)	Public investment required to eradicate extreme poverty	10.6% of GDP by 2030 (16% of GDP by 2030 if the eradication of under 5 mortality and the completion of lower secondary education are included)
	Rozenberg and Fay (2019)	Electricity; transport; water and sanitation; flood protection; and irrigation	3.4% of GDP (capital investment) and 1.1% of GDP (maintenance) between 2015 and 2030
	Fay and others (2017)	Infrastructure investment	3%–8% of GDP
Selected countries in Latin America and the Caribbean	Carapella and others (2023)	Health; education; water and sanitation; electricity; and road infrastructure	Additional 2.2%–15.3% of GDP by 2030 depending on country; weighted regional average of 2.5% of GDP
Barbados, Dominican Republic, El Salvador, Guatemala, Honduras and Saint Lucia	Titelman, Hanni and Pérez Benítez (2023)	Investment needed to fully compensate for the effects of intensifying climate shocks on economic activity	Additional 5.3%–10.9% of GDP from 2025 to 2050

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Organisation for Economic Co-operation and Development (OECD), *Investing in Climate, Investing in Growth*, Paris, OECD Publishing, 2017; United Nations Conference on Trade and Development (UNCTAD), *World Investment Report 2014. Investing in the SDGs: An Action Plan*, Geneva, 2014; United Nations Environment Programme (UNEP), *Adaptation Gap Report 2021: The Gathering Storm – Adapting to climate change in a post-pandemic world*, Nairobi, 2021; International Energy Agency (IEA), *Financing Clean Energy Transitions in Emerging and Developing Economies*, Paris, 2021; A. Bhattacharya and others, *Financing a big investment push in emerging markets and developing economies for sustainable, resilient and inclusive recovery and growth*, London/Washington, D.C., Grantham Research Institute on Climate Change and the Environment/London School of Economics and Political Science/Brookings Institution, 2022; J. Rozenberg and M. Fay (eds.), *Beyond the Gap: How Countries Can Afford the Infrastructure they Need while Protecting the Planet*, Washington, D.C., World Bank, 2019; F. Castellani and others, “Investment gaps in Latin America and the Caribbean”, *International Development Policy*, vol. 11.1, 2019; M. Fay and others, *Rethinking Infrastructure in Latin America and the Caribbean Spending Better to Achieve More*, Washington D.C., World Bank, 2017; P. Carapella and others, “How to assess spending needs of the Sustainable Development Goals: the third edition of the IMF SDG Costing Tool”, *IMF How to Note*, No. 2023/005, Washington, D.C., International Monetary Fund (IMF), 2023; and D. Titelman and others, *Fiscal impact estimates of a net-zero emissions transition for major hydrocarbon producers in Latin America and the Caribbean*, Task Force on Climate, Development and the International Monetary Fund, 2022.

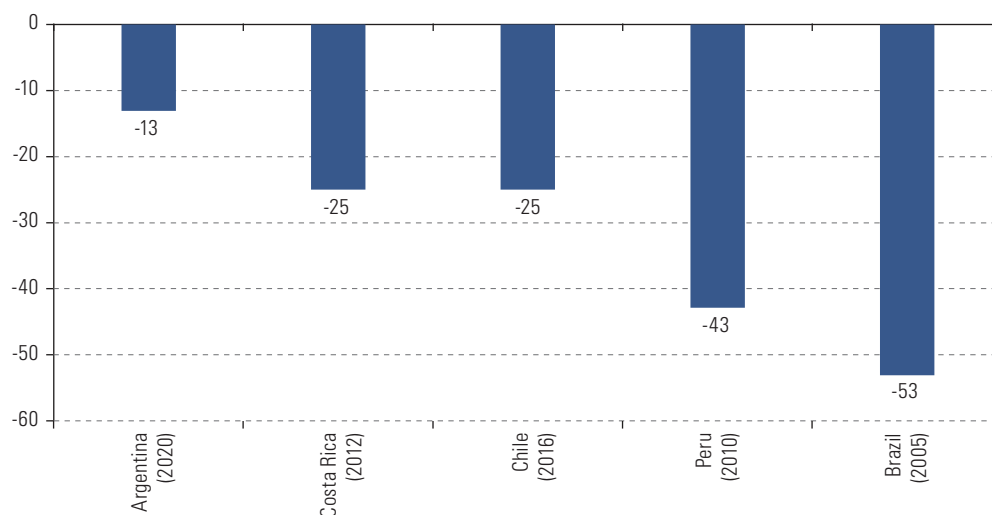
Nationally determined contributions also provide insights into estimated investment needs for climate change mitigation and adaptation in some countries, mainly Caribbean SIDS. The cost of meeting the mitigation and adaptation targets included in these countries’ nationally determined contributions is substantial, surpassing 8% of GDP per year by 2030 in Antigua and Barbuda, Dominica, Grenada, Haiti, and Saint Kitts and Nevis (see figure II.2). While the majority of the costs identified in the nationally determined contributions are linked to mitigation efforts, in line with the targets of the Paris Agreement, some countries also include estimated investment needs for adaptation measures. These are considerable in some countries, including 19.9% of GDP in Dominica and 6.2% of GDP in Haiti. However, these mitigation and adaptation estimates should be considered as a lower bound, as they refer strictly to measures included in the nationally determined contributions and not the entirety of countries’ investment needs.

**Figure II.1**  
Latin America and the Caribbean (selected countries): unconditional and conditional greenhouse gas emissions reduction targets in nationally determined contributions, 2030  
(Percentages)

**A. Relative emissions reduction targets<sup>a</sup>**



**B. Absolute emissions reduction targets<sup>b</sup>**



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of data from World Resources Institute (WRI), Climate Watch [online] <https://www.wri.org/initiatives/climate-watch>.

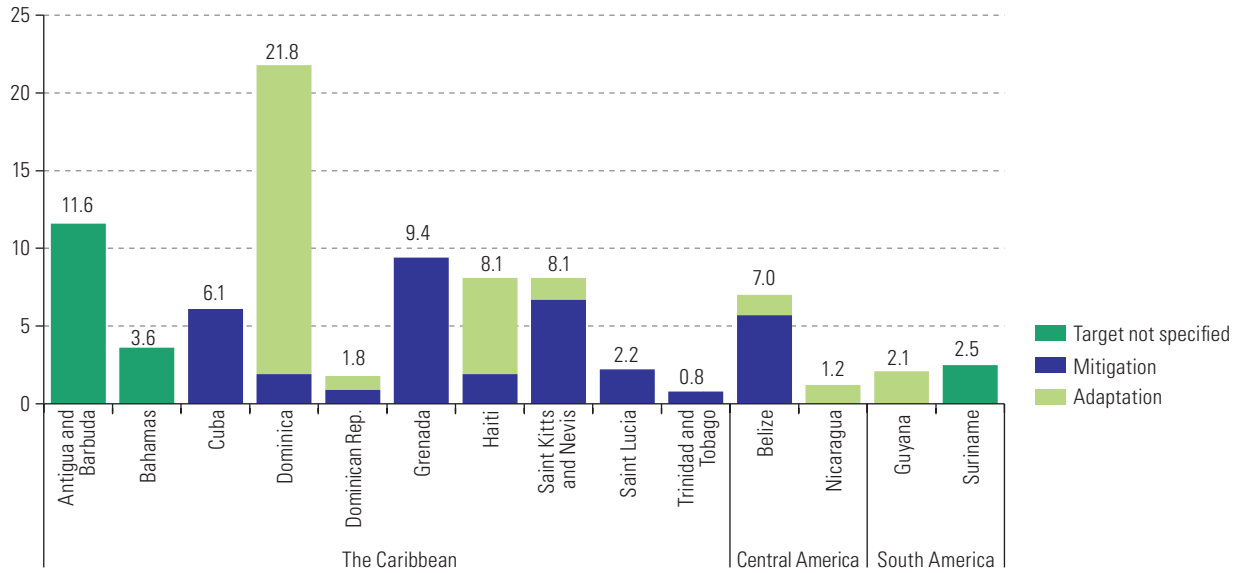
**Note:** El Salvador committed to reduce its annual emissions for the energy sector between 640 ktCO<sub>2</sub> eq (unconditional) and 819 ktCO<sub>2</sub> eq (conditional) relative to the business-as-usual scenario by 2030. Uruguay unconditionally committed to not exceed 9.267 Gg of CO<sub>2</sub> emissions, 818 Gg of methane emissions and 32 Gg of nitrous oxide emissions by 2030, and to reduce hydrofluorocarbon emissions by 10% relative to the business-as-usual scenario; it also committed to reduce its emissions by another 960 Gg of CO<sub>2</sub>, 61 Gg of methane and 2 Gg of nitrous oxide, and to reduce its hydrofluorocarbon emissions by another 5%, conditional on international support. Belize estimates that a total of 5,647 ktCO<sub>2</sub> eq in cumulative emissions will be avoided between 2021 and 2030 (reaching a maximum of 1,080 ktCO<sub>2</sub> eq in emissions avoided in 2030).

<sup>a</sup> The relative emissions reduction target refers to a reduction in emissions relative to projected business-as-usual emissions. In the case of Saint Vincent and the Grenadines, the target year is 2025.

<sup>b</sup> The absolute emissions reduction target refers to a reduction in actual emissions when compared to a base year. The year in parenthesis refers to the base year for each country.

**Figure II.2**

Latin America and the Caribbean (selected countries): estimated annual investment needs to meet adaptation and mitigation targets in nationally determined contributions  
(Percentages of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of data from World Resources Institute (WRI), Climate Watch [online] <https://www.wri.org/initiatives/climate-watch>.

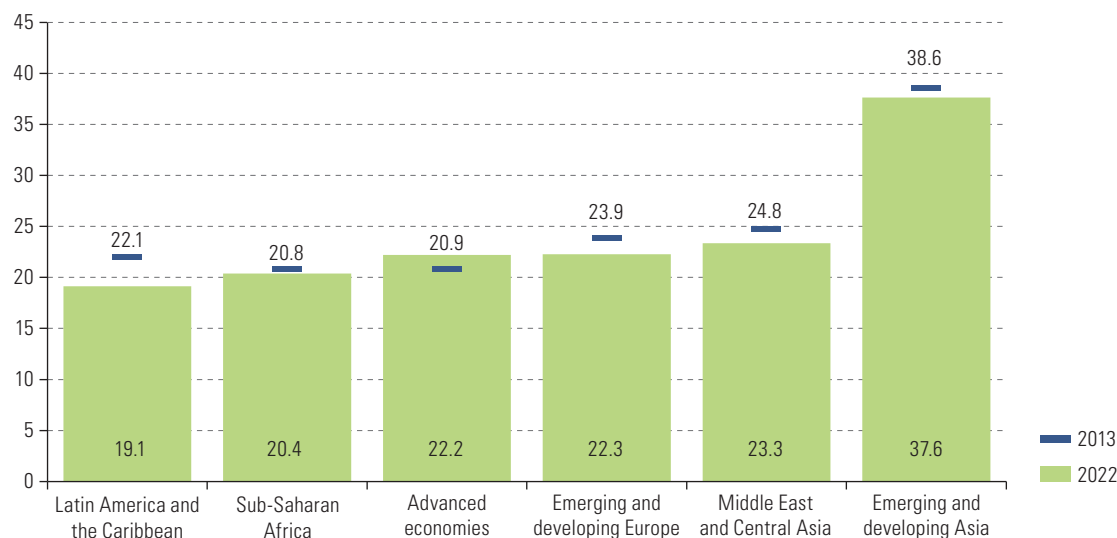
**Note:** Data refer to nationally determined contributions submitted in the following years: 2016 for Guyana; 2018 for Trinidad and Tobago; 2019 for Suriname; 2020 for Cuba, Dominican Republic, Grenada and Nicaragua; 2021 for Antigua and Barbuda, Belize, Saint Kitts and Nevis, and Saint Lucia; and 2022 for Bahamas, Dominica and Haiti.

In light of the sheer magnitude of the investment needed to achieve the SDGs and tackle climate change, the current investment situation is not encouraging. As shown in figure II.3, gross fixed capital formation in the region, relative to the size of its economy (19.1% of GDP in 2022), is low compared to other developing regions, in particular emerging and developing Asia (37.6% of GDP). While the investment-to-GDP ratio fell in all developing regions between 2013 and 2022, the largest decline was in Latin America and the Caribbean. In addition, the region invests less on average than advanced economies, despite the potential for rapid catch-up growth that such investment represents. An investment push of 5%–10% of GDP would equate to a 50% increase in overall investment, which would be without precedent in the region's recent history. Between 1970 and 2022, the largest year-on-year increases in the regional average occurred in 2021 (1.5 percentage points), 2007 (1.3 percentage points) and 1975 (1.3 percentage points).

Weak overall investment in Latin America and the Caribbean is due in part to the particularly anaemic levels of public investment in the region. In 2022, general government gross fixed capital formation in the countries of the region was among the lowest in the world (see figure II.4). Notably, public investment in the region's largest economies, Brazil and Mexico, is below 2% of GDP, or between 40% and 60% of the figure for the United States (3.3% of GDP). However, some countries, including Ecuador, Nicaragua and Peru, have made significant public investment outlays. The regional shortfall is partly attributable to the effects of increasing fiscal consolidation to address public debt sustainability concerns (ECLAC, 2022). In some cases, low public investment is partly offset by public-private partnership investments in various modalities. In 2022, new investment commitments for infrastructure projects with private participation were equivalent to 0.53% of GDP (World Bank, 2023b). Half of such projects announced in 2023 were brownfield projects, which consist of private entities managing, rehabilitating and expanding existing public assets.

**Figure II.3**

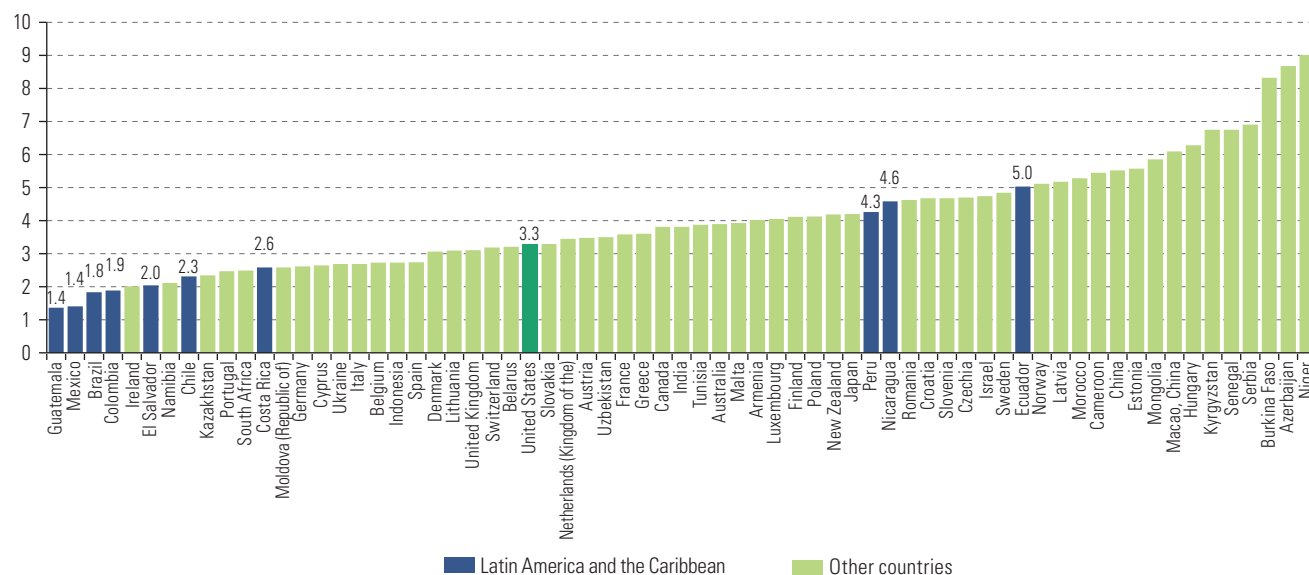
Selected regions and country groupings: gross fixed capital formation, 2013 and 2022  
(Percentages of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations, "National Accounts Statistics: Main Aggregates and Detailed Tables", Statistics Division [online] <https://unstats.un.org/unsd/nationalaccount/madt.asp>.

**Figure II.4**

Selected countries and territories: general government gross fixed capital formation, 2022 or latest available year  
(Percentages of GDP)



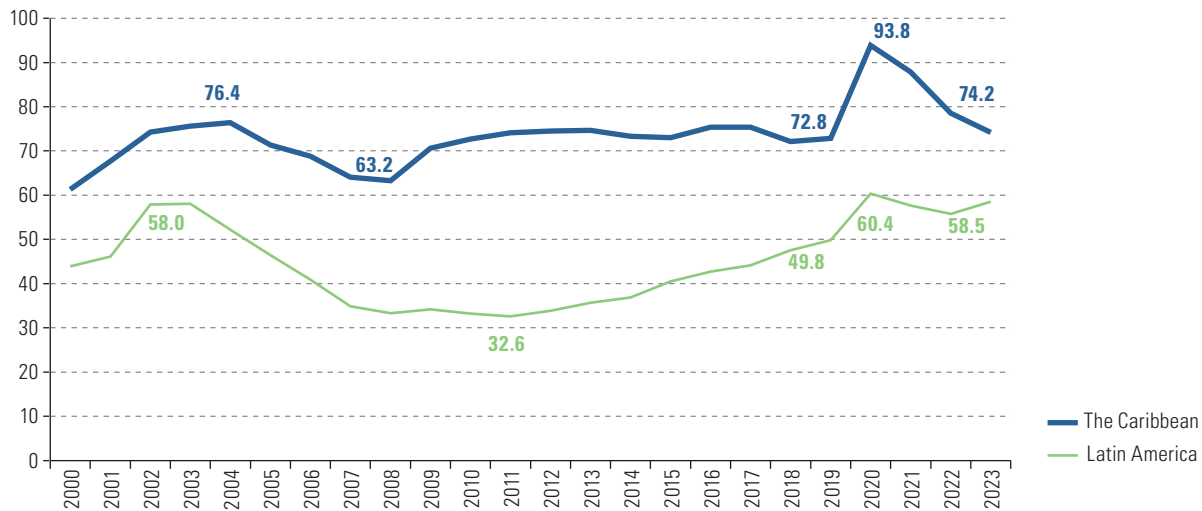
**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of United Nations, "National Accounts Statistics: Main Aggregates and Detailed Tables", Statistics Division [online] <https://unstats.un.org/unsd/nationalaccount/madt.asp>.

**Note:** Figures refer to the ratio of general government gross fixed capital formation (according to national accounts) to GDP at current prices.

Substantial fiscal constraints would have to be overcome to increase public investment in climate action. Regional public debt levels increased sharply in 2020 owing to the coronavirus disease (COVID-19) pandemic, but had risen significantly prior to that, especially in Latin America (see figure II.5). Between 2011 and 2019, general government gross public debt in Latin America grew by 17.2 percentage points, from a recent low of 32.6% of GDP to 49.8% of GDP. In the Caribbean, the increase was 9.6 percentage points, from 63.2% of GDP in 2008 to 72.8% of GDP in 2019. The COVID-19 crisis and the public sector response to offset its impact led to a large increase in public debt in both absolute and relative terms.

**Figure II.5**

Latin America (16 countries)<sup>a</sup> and the Caribbean (13 countries)<sup>b</sup> general government gross public debt, 2000–2023  
(Percentages of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Monetary Fund (IMF), *World Economic Outlook. Steady but Slow: Resilience amid Divergence*, Washington, D.C., April 2024.

**Note:** Data refer to simple averages.

<sup>a</sup> Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay.

<sup>b</sup> Antigua and Barbuda, the Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Jamaica, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, and Trinidad and Tobago.

Receding public debt levels in the wake of the most intense period of the crisis are due in many cases to strong nominal GDP growth amid rising inflation, given that debt in national currency terms has held steady or increased. Each subregion presents its own unique debt characteristics. In the Caribbean, public debt is significantly higher than in Latin America, although it has remained steady over the past two decades owing to large primary surpluses. By contrast, rising debt in Latin America reflects the persistence of primary deficits and the growing upward pressure exerted by the real interest rate.

## B. A carbon tax to mitigate climate change and finance public investment

Carbon taxes have been promoted as a powerful instrument to catalyse a low-carbon transition and finance transformative public fiscal policies (IMF, 2023). This section contains a review of the economic literature on carbon taxes, including the underlying theory of environmental taxation, potential economic and social impacts and the implications of recycling tax revenues. It also reviews the state of carbon taxes in the five countries of the region that implement them, namely Argentina, Chile, Colombia, Mexico and Uruguay. Lastly, it examines carbon tax revenues, highlighting the limitations arising from narrow tax bases and low carbon prices.

## 1. Carbon tax conceptual framework

The release of CO<sub>2</sub> and other greenhouse gases, such as methane, nitrous oxide and fluorinated gases, is a classic example of a negative externality, where the market price of the emitting goods or services does not account for their deleterious impact on societal well-being. Without the appropriate price signals, market participants lack sufficient economic incentive to change their activities, leaving emissions to continue unabated. To combat this type of market failure, Arthur Pigou (1920) proposed the use of a corrective tax (known as a Pigouvian tax) equivalent to the social cost of the negative externality. In the case of greenhouse gases, a carbon tax can fulfil this corrective role by placing a price on emissions. The tax produces a change in relative prices, and economic actors' response to that change causes a reduction in emissions. This approach relies implicitly on the functioning of the market—corrected for any failures—as an efficient mechanism to incentivize changes in consumption and production patterns and thereby reduce greenhouse gas emissions.

Carbon taxes are not the only market-based policy tool that can reduce greenhouse gas emissions. Emissions trading systems, also known as cap-and-trade schemes, are market instruments that impose government-defined limits, in absolute or relative terms, on the volume of greenhouse gas emissions from entities included in the scheme. Emissions allowances are either allocated for free or auctioned to market participants. Entities are required to procure the allowances necessary to cover their emissions. The system establishes a market for the purchase and sale of emissions allowances by market participants. The transactions in this market determine the price of carbon, which can fluctuate significantly according to market conditions. However, in some cases, such systems include stabilization mechanisms, such as carbon price floors and ceilings. Another type of emissions trading system is the rate-based mechanism, where entities included in the system are obligated to meet an emissions intensity benchmark and must acquire additional credits to cover any emissions above this threshold.

While both carbon taxes and emissions trading systems aim to reduce greenhouse gas emissions, carbon taxes can offer certain advantages to developing countries (Parry, Black and Zhunussova, 2022). One major benefit of a carbon tax is that it can generate significant public revenue, whereas emissions trading system revenue depends on the extent to which countries can auction emissions allowances. A carbon tax can also provide a degree of certainty about the future path of carbon prices and thereby encourage investments that reduce emissions. This is especially important in developing regions, such as Latin America and the Caribbean, where private investment in low-carbon projects can be inhibited by political and regulatory risks (ECLAC, 2023b). Another advantage of carbon taxes is their relatively low level of administrative complexity and potentially simple application, in particular when collected from wholesale suppliers of energy products and coupled with existing and difficult-to-evade excise taxes on fuels. By contrast, for an emissions trading system to be effective, it requires an institutional framework to support its administration, together with measurement, reporting and verification mechanisms to ensure compliance.

Carbon tax revenues have significant potential but are highly dependent on the political feasibility of the tax rate, the composition of the tax base and the extent of exemptions for various economic actors. It is estimated that a carbon tax that fixes the price of carbon at US\$ 50 could generate revenue upward of 1.5% of GDP per year in higher-income emerging and developing economies, while a carbon price of US\$ 25 could generate revenue equivalent to 1% of GDP per year in lower-income emerging and developing economies (Black and others, 2021). Studies on Honduras, Paraguay and the Plurinational State of Bolivia have come to similar conclusions (Galindo, Urtecho



and Sánchez, 2023; Borda and others, 2023; Velasco and others, 2023). However, these estimates and studies must be regarded with caution. The application of a carbon tax can induce changes in consumption patterns that erode other energy-based tax bases, reducing net tax revenues. In an ideal situation, where a carbon tax reduces emissions, revenues will likely decline over time as the economy is progressively decarbonized.

While carbon pricing could be an effective tool to reduce greenhouse gas emissions, policymakers must be attentive to its potential impacts on macroeconomic performance and social well-being. Given energy's importance as an economic input, changes in unit prices can negatively affect households' disposable income and firms' profits. In addition to their direct impact on the cost of own energy consumption, higher energy prices can also have indirect second-round effects on the broader economy, leading to an increase in consumer prices and production costs. For firms, falling profit margins and potential production cuts in response to declining consumption can put a damper on investment. In the absence of border carbon adjustment mechanisms, energy-intensive export-oriented firms, which are limited in their ability to pass along changes in energy prices, are particularly vulnerable to price shocks (Keen, Parry and Roaf, 2021).

A key determinant of the scope of impact of carbon pricing on economic and social well-being is the use to which the resulting revenues are put. The literature suggests that a carbon tax can create the "double dividend" of reduced emissions and economic growth if the revenues are used (i.e. recycled) to reduce distortionary taxes that disincentivize investment or work, such as those on capital and labour (Goulder, 1995; Jaeger, 1995; Parry, 1995; Bovenberg, 1999). A carbon tax could also be used to finance targeted subsidies, making their implementation more politically feasible, which in turn could improve equality and reduce poverty (Goulder and others, 2019; Maestre-Andrés, Drews and Van den Bergh, 2019). However, the literature also finds that the different forms of revenue recycling, such as lump-sum rebates, targeted subsidies, cuts in distortionary taxes, public investment, green subsidies and deficit reduction, have varying impacts on macroeconomic and social well-being.

The literature on the macroeconomic impact of carbon pricing on growth is not conclusive, with studies finding both net negative and net positive effects (Köppl and Schratzenstaller, 2023; Freire-González, 2018). Goulder and Hafstead (2013) estimate that a revenue-neutral carbon tax of US\$ 10 per tCO<sub>2</sub> eq emissions in the United States, beginning in 2013 and rising by 5% per year, with revenues recycled through lump-sum rebates to households, would result in a mere 0.6% reduction in GDP in 2040 compared to a baseline scenario with no carbon tax. In addition, they estimate smaller negative impacts on GDP if the revenues are recycled in the form of personal or corporate income tax cuts. Brand and others (2023) modelled the macroeconomic impacts of increasing carbon prices in the eurozone from 85 euros per tCO<sub>2</sub> eq in 2021 to 140 euros per tCO<sub>2</sub> eq in 2030. The model projected a 0.5%–1.2% decrease in real GDP in 2030 relative to a baseline scenario that assumes no change in carbon tax policies, with the difference due in large part to a reduction in investment. In an analysis of the economic impacts of achieving the mitigation targets outlined in China's nationally determined contribution, Timilsina, Pang and Chang (2022) found that a carbon tax would be an efficient mechanism but would entail economic costs regardless of the revenue recycling method.

By contrast, Metcalf and Stock (2023) found that carbon pricing had a net zero or modestly positive impact on GDP growth and employment, irrespective of revenue recycling, in an analysis of data for countries that participate in the European Union Emissions Trading Scheme. An analysis of the revenue-neutral carbon tax applied in British Columbia, Canada, which recycled revenues in the form of income tax cuts for individuals and corporations and annual tax credits for low-income residents, found no

evidence of a negative impact on growth (Bernard and Kichian, 2021). Allan and others (2014) explored the economic implications of different forms of revenue recycling with respect to a carbon tax in Scotland and found that a double dividend was possible, but only if the carbon tax was coupled with an income tax cut.

Some studies suggest that a net increase in economic activity and well-being could be achieved by recycling carbon tax revenues. McKibbin and others (2015) found that recycling revenues through a capital tax cut in the United States could lead to higher investment and employment and a concomitant increase in GDP relative to a baseline counterfactual that excludes the carbon tax. Caron and others (2018) arrived at a similar conclusion, finding that although capital tax cuts are inherently regressive, additional transfers to lower-income households could be a highly cost-efficient means of addressing equity concerns. Timilsina and others (2021) found that a carbon tax in Côte d'Ivoire could bolster growth and labour market formality, in particular if a revenue-neutral reform were introduced to reduce labour and production taxes for formal firms.

The focus of existing revenue recycling studies is largely confined to the reduction of other distortionary taxes, but public investment is another means of supporting a green transition and accelerating economic growth, especially in developing regions. Emerging markets and developing countries face significant investment gaps to achieve the SDGs and tackle climate change, requiring public and private sector efforts. Public investment must play a catalytic role, building climate-resilient economic infrastructure and generating a crowding-in effect in key development sectors. Public investment can have a long-term positive impact on growth and productivity and can speed up the convergence of developing and developed countries (Fournier, 2016). Catalano and Forni (2021) found that green public investment is a crucial instrument to achieve the emissions reductions targets under the Paris Agreement while fostering long-term fiscal sustainability. One possible explanation for this is that the fiscal multipliers of public investment are higher in countries with low public capital stock, such as Latin American countries, and public investment has a positive impact on the marginal productivity of private capital (Izquierdo, Pessino and Vuletin, 2018).

Regional carbon pricing studies tend to arrive at findings similar to those in the broader literature. A meta-analysis by Galindo and others (2017) found that the long-term GDP effects of a US\$ 5–US\$ 10 carbon tax per tCO<sub>2</sub> eq would be minimal for 17 Latin American countries, while a higher carbon tax of US\$ 50–US\$ 100 per tCO<sub>2</sub> eq would create a significant drag on economic growth in the long run. However, the authors also found that the negative effect in most countries would be more than offset by a reduction in capital or labour taxes. Kober and others (2016), using a multi-model approach, found that a carbon tax of US\$ 150 per tCO<sub>2</sub> eq would reduce GDP in 2050 by 1% in Brazil, 3% in Mexico and 1% in Colombia. Calderón and others (2016) estimated that a carbon tax of US\$ 50 per tCO<sub>2</sub> eq in Colombia could result in a 2.3%–3.4% decline in GDP by 2050 compared to a baseline scenario in which no carbon tax is imposed.

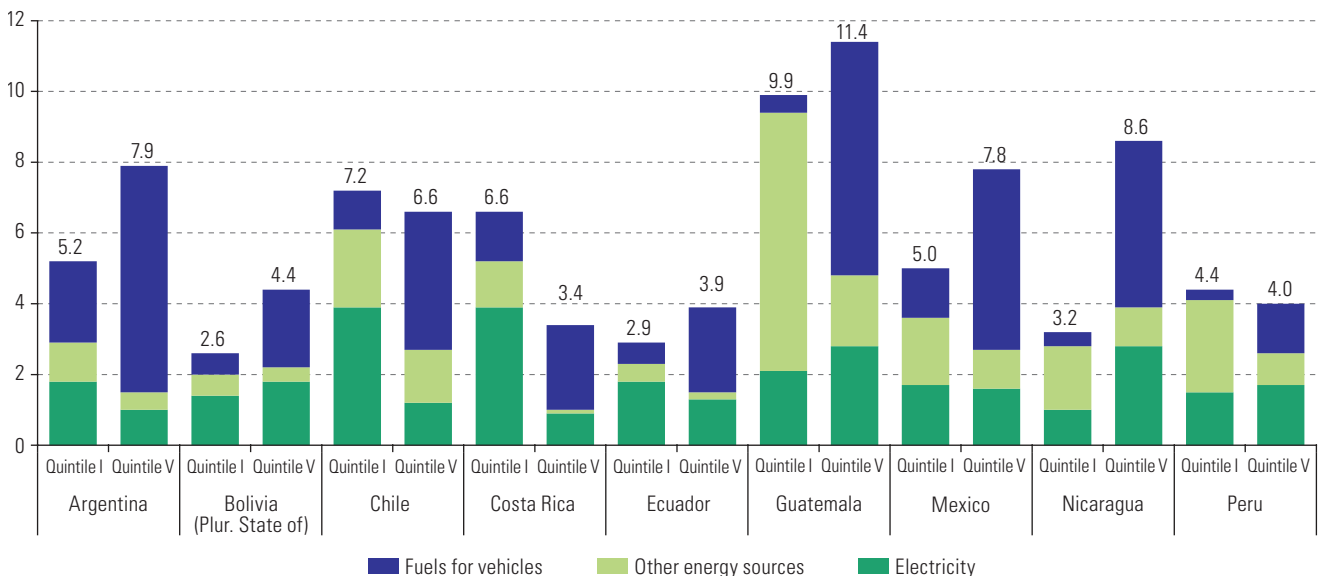
The effects of carbon pricing are not equal for all households (Böhringer, García-Muros and González-Eguino, 2019; Cronin, Fullerton and Sexton, 2019; Goulder and others, 2019). There is ample room for negative distributional effects, depending on the formulation of the carbon tax and the relative importance of the direct and indirect effects of higher energy prices on the consumption basket. Carbon taxes that target fuels used by vehicles can be progressive, as their share in the overall household budget typically increases with income. By contrast, a broad-based carbon tax that includes energy sources used for cooking and heating, such as liquified petroleum gas, can be highly regressive. Da Silva Freitas and others (2016) argued that the indirect effects of energy price transitions can be significantly regressive, as lower-income households spend a higher share of their income on energy-intensive food and public transport.

From a distributional perspective, carbon taxes are largely seen as regressive, particularly in the absence of revenue recycling in the form of subsidies or tax credits (Vona, 2021; IMF, 2020; Goulder and others, 2019; Mathur and Morris, 2014; Grainger and Kolstad, 2010). However, Ohlendorf and others (2021), in a meta-analysis of 53 studies, found a higher likelihood of a progressive impact in lower-income countries. Some studies on Brazil and Mexico have also found that a carbon tax would be progressive (Garaffa and others, 2021; Renner, 2018). Estimates by Malebra, Gaentzsch and Ward (2021) indicate that, in Peru, a carbon tax would have little impact on income distribution.

The regressive or progressive potential of a carbon tax depends in large part on its tax base, owing to the significant differences between the lowest and highest income quintiles in terms of energy products' relative share in the household budget. These differences are readily apparent in the region, where households in the lowest quintile spend a larger share of their income on electricity and other energy sources (typically, fuels for cooking or heating) than households in the highest quintile (see figure II.6). By contrast, higher-income households dedicate significantly more of their budgets to fuels for vehicles. According to estimates by Moz-Christofolletti and Carvalho Pereda (2021), although fuel taxes are progressive in Brazil, an economy-wide carbon tax would be regressive, as electricity, gas and charcoal expenditure accounts for a very large share of household budgets in the lowest quintile. Similarly, estimates by Rosas-Flores and others (2017) suggest that the impact of a carbon tax on fuels in Mexico would be progressive but would turn regressive if applied to liquified petroleum gas used for household cooking and heating.

**Figure II.6**

Latin America (selected countries): expenditure on electricity, fuels for vehicles and other energy sources as a share of total household consumption, 2014 or latest available year (Percentages)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of on CEPALSTAT [online] <https://statistics.cepal.org/portal/cepalstat/index.html?lang=en>.

The distributional implications of carbon pricing may be relatively neutral, but its adoption could have a significant impact on poverty levels. The decline in household income occasioned by a carbon tax, even if equally distributed across households, could push vulnerable families below the poverty line. This is especially

noteworthy in Latin America, where a significant share of the expanding middle class is at risk of sliding back into poverty. Vogt-Schilb and others (2019), in a study of 16 countries in Latin America, estimated that a carbon tax of US\$ 30 per tCO<sub>2</sub> eq would not significantly raise food prices but would have a greater impact on lower-income households, as food constitutes an important share of their overall consumption basket. Similarly, Renner (2018) found that a carbon tax in Mexico that includes methane and nitrous oxide emissions would increase food prices and, by extension, poverty levels. In a study on Peru, Malerba, Gaentzsch and Ward (2021) found that a carbon tax of US\$ 50 per tCO<sub>2</sub> eq would increase the poverty headcount by 7.2% and a tax of US\$ 20 per tCO<sub>2</sub> eq would increase poverty by 2.4%.

Various studies suggest that distributional and poverty concerns can be addressed by dedicating a portion of carbon tax revenues to monetary transfers. In many cases, financing transfers requires only a limited amount of resources, leaving a significant share of revenue for other recycling options. Mathur and Morris (2014) estimated that the regressive impact of a carbon tax of US\$ 15 per tCO<sub>2</sub> eq in the United States could be fully offset by dedicating 11% of the tax revenue to the two poorest income deciles. In a study on a sample of countries in Latin America, Vogt-Schilb and others (2019) found that poor and vulnerable households could be compensated by leveraging existing cash transfer programmes and recycling an average 30% of expected carbon tax revenue. The authors also highlighted that a universal rebate would benefit more households but would be difficult to implement in the region's largely informal economies. Malerba, Gaentzsch and Ward (2021) found that a carbon tax could reduce poverty levels in Peru if the revenues were recycled through existing social programmes.

## 2. Existing carbon taxes in the region

The taxation of carbon emissions in Latin America builds on the combined experiences of countries that have implemented and perfected the use of carbon taxes since the early 1990s. The first generation of carbon taxes was adopted in Scandinavian countries, beginning with Finland (1990) and quickly followed by Sweden (1991), Norway (1992) and Denmark (1994). This initial wave was followed by a lull, although the European Union and some other countries did implement emissions trading systems. The next wave of carbon taxes, beginning with Switzerland (2008), swept through many countries, including Japan (2012), France, Mexico and Spain (2014), Portugal (2015), Chile and Colombia (2017), Argentina (2018), the Kingdom of the Netherlands (2021) and Uruguay (2022). In 2023, there were 39 national and subnational carbon taxes under implementation.

Globally, these carbon taxes vary in their construction, with differing points of regulation (upstream, midstream or downstream), tax bases and tax rates.<sup>1</sup> This is also true in Latin America (see table II.2). In the region, only Chile applies a downstream tax directly to carbon emissions. In the other countries, the carbon taxes are applied mainly upstream or midstream to sales or imports of liquid and solid fuels on the basis of the CO<sub>2</sub> or other greenhouse gas (CO<sub>2</sub> equivalent) emissions created through their combustion (carbon content). The tax base also varies by country. In Colombia, sales of liquefied petroleum gas are only taxed when purchased by industrial users, while sales of natural gas are only taxed when purchased by petrochemical producers. By contrast, the carbon tax in Mexico excludes natural gas entirely, while in Uruguay, the tax only applies to higher-octane gasolines. As a result of these differences in tax bases, the share of greenhouse gas emissions covered by carbon taxes also varies significantly.

<sup>1</sup> See World Bank (2024) for more information on the carbon taxes applied around the world.

**Table II.2**  
Argentina, Chile, Colombia, Mexico and Uruguay: carbon tax legislation

	Argentina	Chile	Colombia	Mexico	Uruguay
Tax instrument	Carbon dioxide tax Established in Act No. 27430 of 2017	Tax on stationary sources of emissions Established in Act No. 20780 of 2014 and amended in Act No. 20899 of 2016	National carbon tax Initially established in Act No. 1819 of 2016 and amended in Act No. 2277 of 2022	Carbon tax as part of the existing law concerning the special tax on production and services Established by decree published in the <i>Diario Oficial de la Federación</i> on 11 December 2013	CO <sub>2</sub> emissions tax as part of the existing domestic excise tax Established in Act No. 19996 of 2021
Year of implementation	2018	2017	2017	2014	2022
Point of regulation and taxpayer	Midstream Refineries, importers and producers of coal	Downstream Establishments that emit 25,000 tCO <sub>2</sub> eq per year	Midstream (downstream for coal) Importers and producers of fossil fuels, including for own consumption (final user for coal)	Midstream Individuals or enterprises that carry out domestic sales or imports	Midstream Refineries and importers of gasoline
Tax base	Liquid fuels, (gasoline, diesel, kerosene and fuel oil) and some solid fuels (petroleum coke and coal)	CO <sub>2</sub> emissions	Petroleum derivatives, natural gas and coal (from 2025 onward)	Liquid fuels and some solid fuels	Higher-octane gasolines (95 octane and 97 octane)
Carbon price in 2024 per tCO <sub>2</sub> eq (dollars)	3.34 (2023) <sup>a</sup>	5.00	6.60	3.79 (2023) <sup>a</sup>	162.00
Type of tax	Unit tax, fixed amount for each covered product based on CO <sub>2</sub> eq content Values updated quarterly on the basis of the consumer price index	Tax applied to measured CO <sub>2</sub> emissions	Unit tax, fixed amount for each covered product based on CO <sub>2</sub> eq content Values updated annually on the basis of the consumer price index plus 1 percentage point until carbon price reaches 3 tax value units	Unit tax, fixed amount for each covered product based on CO <sub>2</sub> eq content that exceeds the CO <sub>2</sub> eq content of natural gas Values updated annually on the basis of the consumer price index Tax may not exceed 3% of the sale price of each fuel	Unit tax, fixed amount for each covered product based on CO <sub>2</sub> eq content Values updated annually on the basis of the consumer price index
Exemptions and preferential tax treatments	<i>Exemptions</i> Exports; sales of fuels for international transport, maritime cabotage and fishing boats; products used as inputs for industrial processes	<i>Exemptions</i> Emissions from hot water boilers for personal use; power generators with capacity <500 kW; generators where biomass is the primary energy source	<i>Exemptions</i> Coking coal; liquefied petroleum gas for industrial users only; natural gas for petrochemical producers only; ethanol for blending with gasoline and biofuels for blending with diesel; sales of fuels for international transport; exports <i>Preferential treatments</i> Special zero rating for some departments and municipalities; carbon tax deduction from income tax	<i>Exemptions</i> Natural gas; hydrocarbons not intended for combustion (e.g. black carbon, asphalt and lubricating oils)	None
Emissions offsets to reduce tax liabilities	No	Yes	Yes	Yes	No
Emissions covered (Percentages) <sup>a</sup>	20.0	29.4	23.0	44.0	11.2
Revenues generated in 2022 (Percentages of GDP)	0.03	0.06	0.03	0.01	0.36
Destination of revenues	General budget, with specific distribution percentages by budget item	General budget	Spending on environmental and climate change policies (80%); financing the National Comprehensive Programme for the Substitution of Illicit Crops (20%)	General budget	General budget, with an unspecified percentage for financing climate change mitigation and adaptation projects

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of national legislations.

<sup>a</sup> Data from World Bank, Carbon Pricing Dashboard [online] <https://carbonpricingdashboard.worldbank.org/>.

There are significant differences in the carbon prices applied by the countries, which range from US\$ 3 per tCO<sub>2</sub> eq in Argentina to more than US\$ 100 per tCO<sub>2</sub> eq in Uruguay. However, the tax in all countries is denominated in national currency, so the dollar equivalent price is affected by exchange-rate movements (except in Chile, which specifically sets a value of US\$ 5 per CO<sub>2</sub> eq). Tax revenues are generally low, although in Uruguay they reached 0.36% of GDP in 2022, owing largely to the high price of carbon. These revenues are put to different uses: in Argentina and Colombia, the legislation specifies how the revenues are to be distributed; in Uruguay, the legislation includes language concerning potential uses but does not specify the amount to be used; and in Chile and Mexico, the carbon tax revenues are used to finance the general budget.

### (a) Argentina

In Argentina, the carbon dioxide tax was established in Act No. 27430 of 2017 and entered into force in January 2018.<sup>2</sup> It was introduced as part of a package of reforms which also streamlined the taxation of liquid fuels and unified several instruments into an excise on liquid fuels and the carbon dioxide tax. The carbon tax base covers a range of liquid fuels—including unleaded gasoline (differentiated by low and high octane), virgin gasoline, natural or pyrolysis gas, solvent, turpentine, diesel and kerosene—and selected solid fuels, such as coal and petroleum coke. Taxpayers include importers; companies that refine, produce, prepare, manufacture and/or obtain liquid fuels and/or other hydrocarbon derivatives in all their forms, directly or through third parties; and coal producers and processors. The taxable event is the delivery of the product, its withdrawal for own consumption or its resale by an importer. The tax is levied only upon the first of occurrence of a taxable event.

The legislation originally established a carbon price of US\$ 10 per tCO<sub>2</sub> eq. Specific rates were established for each fossil fuel covered by the tax according to carbon content (see table II.3). The tax was applied to fuel oil, coal and petroleum coke from January 2019 onward, initially at 10% of the full rate, to increase annually until reaching 100% in 2028. These unit values are adjusted quarterly for changes in the consumer price index. However, the nominal rate in dollars has declined, because of the postponement of this adjustment process from the second half of 2021 to 2023 and the devaluation of the national currency. In 2023, the nominal rate was approximately US\$ 3.34 per tCO<sub>2</sub> eq (World Bank, 2023a).

**Table II.3**

Argentina: carbon tax rate by type of fossil fuel, 2017 and March 2024 (Argentine pesos per unit)

Fossil fuel	Unit	2017	March 2024
Unleaded gasoline (92 octane or less)	Litre	0.412	5.644
Unleaded gasoline (greater than 92 octane)	Litre	0.412	5.644
Virgin gasoline	Litre	0.412	5.644
Natural or pyrolysis gas	Litre	0.412	11.664
Solvent	Litre	0.412	11.664
Turpentine	Litre	0.412	11.664
Gas oil	Litre	0.473	6.480
Diesel	Litre	0.473	13.391
Kerosene	Litre	0.473	13.391
Fuel oil	Litre	0.519	8.816
Petroleum coke	Kilogram	0.557	9.462
Coal	Kilogram	0.429	7.287

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of national legislation.

<sup>2</sup> See [online] <https://servicios.infoleg.gov.ar/infolegInternet/anexos/305000-309999/305262/texact.htm>.

The legislation exempted certain transactions from the tax, including exports; sales of fuels for international aviation and shipping, as well as fishing vessels; products used as raw inputs for chemical and petrochemical processes; and fuel oil used for maritime cabotage. In the case of biodiesel and bioethanol, the tax only applies to the fossil fuel component. Pure biofuels are not covered by the tax, nor are products used as inputs to produce fossil fuels that are covered.

Carbon tax revenues —excluding those for fuel oil, petroleum coke and coal—<sup>3</sup> are allocated as follows: National Treasury (10.4%), National Housing Fund (FONAVI) (15.07%), provinces (10.4%), national pension obligations under the social security system (28.69%), Water Infrastructure Trust (4.31%), Transportation Infrastructure Trust (28.58%) and Public Transportation Subsidy (2.55%). The legislation also specifies the distribution of resources to the provinces. Carbon tax revenues from fuel oil, petroleum coke and coal are distributed to the provinces through the federal tax revenue sharing system.

## (b) Chile

Chile established a carbon tax in 2014 as part of a comprehensive tax reform (Act No. 20780) and amended it in 2016 (Act No. 20899). CO<sub>2</sub> emissions are covered by the tax on stationary sources of emissions. The carbon tax base also includes emissions of particulate matter, nitrogen oxide (NO<sub>x</sub>) and sulfur dioxide (SO<sub>2</sub>). Unlike in other countries in the region, where fuel producers or importers are taxed, the Chilean tax applies to downstream emitting establishments.

Taxpayers include all establishments that emit 25,000 tons or more of CO<sub>2</sub> eq per year or 100 tons or more in particulate matter. However, the tax does not apply to emissions from hot water boilers for exclusive personal use. Power generators with a capacity of less than 500 kW are also exempt. The tax on CO<sub>2</sub> emissions does not apply to establishments where biomass is the primary energy source, regardless of whether or not additives are used in the combustion process.

For CO<sub>2</sub> emissions, the tax is fixed at US\$ 5 per tCO<sub>2</sub> eq. This is unique in the region; no other country fixes the carbon price in dollars.

For emissions of particulate matter, NO<sub>x</sub> and SO<sub>2</sub>, the legislation establishes a methodology to calculate the tax. The tax rate is equivalent to 0.1 (10%) for each ton emitted, multiplied by the result of the following formula:

$$T_{i,j} = CSCpc_i * Pobj$$

where  $T_{i,j}$  is the tax rate per ton of contaminant  $i$  emitted in municipality  $j$ , measured in dollars per ton.

$CSCpc_i$  is the per capita social cost of contamination of contaminant  $i$ .

$Pobj$  is the population of municipality  $j$ .

The per capita social cost of contamination is fixed in dollars: US\$ 0.90 for particulate matter, US\$ 0.01 for SO<sub>2</sub> and US\$ 0.025 for NO<sub>x</sub>. The legislation stipulates that the Ministry of the Environment will prepare a report every 10 years with a proposal to update this factor.

If the emitting establishment is in a municipality located in a zone designated by regulation to have a moderate or high concentration of particulate matter, NO<sub>x</sub> or SO<sub>2</sub> emissions, the formula includes an additional factor:

$$T_{i,j} = CCA_{j,i} * CSCpc_i * Pobj$$

<sup>3</sup> The tax revenues derived from fuel oil, petroleum coke and coal are used for the national budget (42.34%) and distributed to the provinces (57.66%).

where  $CCA_{j,i}$  is the air quality coefficient for pollutant  $i$  in municipality  $j$ . The air quality coefficient for municipality  $j$  depends on the designation of its location as a moderate or high concentration zone. The coefficient is set to 1.2 for high concentration zones and 1.1 for low concentration zones. For the purposes of this calculation, the coefficient is applied even if part of the municipality where the emitting establishment is located does not fall within the designated zone. Likewise, if the municipality falls within both types of zones, the air quality coefficient for the high concentration zone is applied.

The Ministry of the Environment publishes an annual list of the establishments that are required to report on their emissions and another list of the municipalities that are in areas designated as moderate or high concentration zones.

The legislation requires the Superintendent of the Environment to establish the methodologies and guidelines for monitoring, reporting and verification purposes. Each year, taxpayers are required to report their emissions to the Superintendent who, on that basis, submits a report to the Internal Revenue Service for the calculation of tax liability and the notification of taxpayers.

Taxpayers can reduce their tax liability for a given contaminant by undertaking projects to reduce their emissions of that contaminant. These projects must be additional (i.e. over and above any actions required by regulation or law), measurable, verifiable and permanent. In the cases of emissions of particulate matter, NO<sub>x</sub> and SO<sub>2</sub>, the projects must be undertaken in designated moderate or high concentration zones. Qualifying projects must be certified by a third-party auditor. Upon certification, the Superintendent of the Environment calculates the taxpayer's net emissions (i.e. emissions minus emission reductions).

In addition to the tax on fixed sources of emissions, there is a green tax on mobile sources of emissions that applies to the purchase of new light vehicles. The tax rate by vehicle is calculated in monthly tax units (UTM)<sup>4</sup> using the following formula:

$$\text{Tax in UTM} = \left[ \frac{35}{\frac{\text{Urban fuel efficiency of vehicle} \left( \frac{\text{km}}{\text{litre}} \right)}{120 * \text{NOx emissions of vehicle} \left( \frac{\text{g}}{\text{km}} \right)}} \right] * (\text{Sales price} * 0.00000006)$$

The sale price included in the calculation incorporates the payment of the value added tax. The law provides for numerous exemptions, including for passenger transport vehicles, vehicles destined for taxi service, tractors, motor homes, ambulances and hearses. To facilitate the administration of the tax, the Ministry of Transport and Telecommunications is required to submit to the Internal Revenue Service a report on urban fuel efficiency and NO<sub>x</sub> emissions by car model.

### (c) Colombia

Colombia's national carbon tax was initially established in Act No. 1819 of 2016 and entered into force in 2017. It was amended in 2022 as part of a structural reform that entered into force in 2023 (Act No. 2277). The tax is levied on the CO<sub>2</sub> eq content of petroleum derivatives, natural gas and solid fuels used in combustion processes. A major development in 2022 was the inclusion of thermal coal in the tax base. The tax is applied upon the first occurrence of a domestic sale, import for sale, or withdrawal or import for own consumption. In the case of petroleum derivatives and natural gas, the tax is applied upstream to purchasers of the goods directly from producers or importers. For coal, the taxpayer is the final user, and they pay the tax directly to the tax authorities.

<sup>4</sup> In March 2024, the value of the monthly tax unit was equivalent to US\$ 66.8.



The legislation includes several exemptions. Coking coal is not included in the tax base. For liquified petroleum gas, the tax only applies to industrial users, and for natural gas, it only covers sales to hydrocarbon refiners and petrochemical producers. Fuel alcohol to be blended with gasoline for use in motor vehicles and biofuels to be blended with diesel are exempt from the tax. The tax does not apply to sales of marine diesel and fuels used for international transport, nor does it apply to exports of fossil fuels. The tax is zero-rated for gasoline, diesel and jet fuel in the departments of Amazonas, Caquetá, Guainía, Guaviare, Putumayo, Vaupés and Vichada and to certain municipalities of the department of Chocó, including Sipí, Río Sucio, Alto Baudó, Bajo Baudó, Acañí, Unguía, Litoral del San Juan, Bojayá, Medio Atrato, Río Iró, Bahía Solano, Juradó and Carmen del Darién. However, this preferential treatment does not apply in areas where hydrocarbon production or refining occurs. The carbon tax is deductible from the income tax.

Act No. 2277 of 2022 set the carbon price at 20,500 Colombian pesos (equivalent to US\$ 4.30 in December 2022) per tCO<sub>2</sub> eq. It defines rates for each fossil fuel according to its CO<sub>2</sub> emissions factor, which is expressed in unit of weight (kgCO<sub>2</sub> eq) per unit of energy (terajoules), according to volume or weight (see table II.4). The legislation stipulated that these rates would be adjusted annually in February, beginning in 2024, to reflect the prior-year change in the consumer price index plus 1 percentage point until the rate is equivalent to three tax value units per tCO<sub>2</sub> eq, after which point the adjustment will be based solely on inflation. For coal, the application of the tax will be progressive, starting at 0% of the full rate for 2023 and 2024 followed by annual increments of 25% of the total rate until full application in 2028. For 2024, the carbon price was set at 25,799.56 Colombian pesos (equivalent to US\$ 6.60 in February), which is still below the three tax value unit threshold (141,195 Colombian pesos, or US\$ 35.9 in February).<sup>5</sup>

Fossil fuel	Unit	2016 (Act 1819)	2022 (Act 2277)	2024
Natural gas	Cubic metre	29	36	39.70
Liquified petroleum gas	Gallon	95	134	168.64
Gasoline	Gallon	135	169	186.37
Kerosene	Gallon	148	197	247.93
Jet fuel	Gallon	148	202	254.22
Diesel	Gallon	152	191	210.63
Fuel oil	Gallon	177	238	254.22
Coal <sup>a</sup>	Ton	...	52,215	65,713.38

**Table II.4**  
Colombia: carbon tax  
by type of fossil fuel  
(Colombian pesos per unit)

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of national legislation.

<sup>a</sup> In 2024, the unit tax for coal is applied at 0% of the full rate as established in the legislation.

Under Act 2277, taxpayers may also reduce their tax liabilities if they can certify that their activities are carbon-neutral, based on the regulations established by the Ministry of the Environment and Sustainable Development. In order to be eligible for this reduction, carbon neutrality certification may be based on the activities of taxpayers or end users. However, this mechanism only allows a reduction of up to 50% of the total tax liability, and once it has been employed, it cannot be used to obtain any other tax benefit.

The 2022 reform resulted in the overhaul of carbon tax revenue distribution, and gave rise to a sustainability and climate resilience fund managed by the Ministry of the Environment and Sustainable Development. Since January 2023, 80% of carbon tax

<sup>5</sup> For more information, see resolution no. 7 of the Directorate of National Taxes and Customs [online] <https://www.dian.gov.co/normatividad/Normatividad/Resoluci%C3%B3n%20000007%20de%2031-01-2024.pdf>.

proceeds have been deposited into this fund, with the aim of financing a wide range of environmental and climate change projects. These include financing the climate action goals in Act No. 2169 of 2021 (the Climate Action Act) and those outlined in the country's nationally determined contributions submitted within the framework of the Paris Agreement on climate change. The remaining 20% of the carbon tax revenues are used to finance the National Comprehensive Programme for the Substitution of Illicit Crops.

#### (d) Mexico

The carbon tax in Mexico was established during a structural tax reform in 2013,<sup>6</sup> and is part of the special tax on production and services. It covers most fossil fuels that are used for combustion and is levied on the additional amount of emissions generated when these fossil fuels are used instead of natural gas, which serves as a benchmark. Natural gas is not included in the tax. Products not intended for combustion, such as paraffin, raw materials that produce black carbon, long residue, asphalt, light cycle oil, basic lubricating oils, other lubricants, propylene (including refinery-grade propylene and chemical-grade propylene), are exempt.

The tax is collected midstream, directly from natural or legal persons carrying out domestic sales or imports. In lieu of paying the tax, carbon offsets linked to projects implemented in the country and endorsed by the United Nations Framework Convention on Climate Change may be used. The value of carbon offsets is based on their market value at the time the tax is to be paid. The use of carbon offsets is regulated and managed by the Ministry of Finance and Public Credit.

Initially, legislation established a carbon price of 39.8 Mexican pesos (at the time equivalent to US\$ 3.5) per tCO<sub>2</sub> eq. Specific rates were set for specific fossil fuels on the basis of the CO<sub>2</sub> equivalent content generated in excess of CO<sub>2</sub> equivalent content that would be generated by natural gas (see table II.5). Nevertheless, the effective rate of the carbon tax applied to some products is less owing to special tax treatments. For example, the law stipulates specific prices for domestic sales of gasoline and diesel, irrespective of the carbon tax rates. For other fossil fuels, it provides a methodology to calculate the rate. For mixed products, the tax is based on the quantity of each fossil fuel contained in the product. Carbon tax rates are updated in January each year, applying an update factor based on the year-on-year change in the consumer price index in December of the previous year. However, in order to avoid contributing to inflation, this tax is capped at 3% of the sale price of each fuel. The rate in 2023 was roughly US\$ 3.79 per tCO<sub>2</sub> eq, although the carbon price per product varied significantly (World Bank, 2023a).

**Table II.5**  
Mexico: carbon tax  
by type of fossil fuel  
(Mexican cents and pesos  
per unit)

Fossil fuel	Unit	2014	2024 <sup>a</sup>
Propane	Cents per litre	6.93	9.3315
Butane	Cents per litre	8.98	12.0759
Gasoline	Cents per litre	12.17	16.3677
Jet fuel and other types of kerosene	Cents per litre	14.54	19.5488
Diesel	Cents per litre	14.76	19.8607
Fuel oil	Cents per litre	15.76	21.1956
Petroleum coke	Pesos per ton	18.29	24.6014
Coal coke	Pesos per ton	42.88	57.6738
Coal	Pesos per ton	32.29	43.4269
Other fossil fuels	Pesos per ton of carbon contained	46.67	62.7762

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of national legislation.

<sup>a</sup> Agreement No. 177/2023 [online] [https://www.dof.gob.mx/nota\\_detalle.php?codigo=5712297&fecha=22/12/2023#gsc.tab=0](https://www.dof.gob.mx/nota_detalle.php?codigo=5712297&fecha=22/12/2023#gsc.tab=0).

<sup>6</sup> See [online] [https://www.dof.gob.mx/nota\\_detalle.php?codigo=5325371&fecha=11/12/2013#gsc.tab=0](https://www.dof.gob.mx/nota_detalle.php?codigo=5325371&fecha=11/12/2013#gsc.tab=0) and <https://www.diputados.gob.mx/LeyesBiblio/pdf/LIEPS.pdf>.



### (e) Uruguay

Uruguay introduced an excise duty on CO<sub>2</sub> emissions in 2021 (Act 19.966) as part of the existing domestic excise tax. The tax base includes sales of higher-octane gasolines (95 octane and 97 octane). For the excise duty, the taxable event is the first transaction carried out by manufacturers and importers. For 2022, the law established a carbon price of 5,645.45 Uruguayan pesos (equivalent to US\$ 126 in January of that year) per tCO<sub>2</sub> eq. Rates per unit based on this price are set for each product depending on the CO<sub>2</sub> content as determined by the Ministry of Industry, Energy and Mining (see table II.6). The carbon price is updated annually in line with the variation in the consumer price index. In 2024, the carbon price reached 6,373 Uruguayan pesos (equivalent to US\$ 162 in January of that year) per tCO<sub>2</sub> eq.

Fossil fuel	Unit	2022	2024
Gasoline (super unleaded 95 octane)	Pesos per litre	11.66	13.00
Gasoline (premium unleaded 97 octane)	Pesos per litre	11.78	13.13

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of national legislation.

**Note:** Values for 2022 were established in December 2021 by Decree No. 441/021, while those for 2024 were established in December 2023 by Decree No. E/1360.

**Table II.6**

Uruguay: carbon tax by type of fossil fuel (Uruguayan pesos per unit)

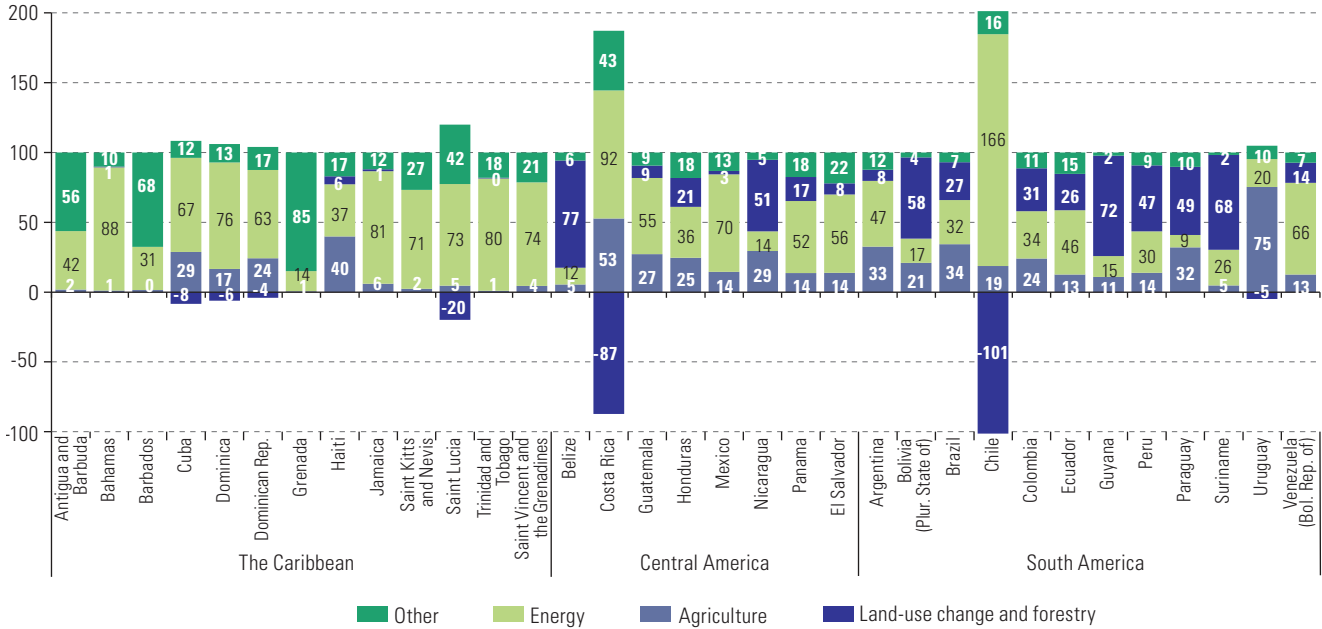
The law does not explicitly stipulate how the carbon tax revenues should be used. Rather, it authorizes the government to allocate an unspecified percentage to establish a special fund to finance policies to foster sustainable transportation, the reduction of greenhouse gas emissions and the climate change adaptation of ecosystems and productive systems.

## 3. Carbon tax revenues in the region are limited by narrow tax bases and low carbon prices

The carbon tax base is determined by the level and composition of emissions. As seen in figure II.7, a significant share of GHG emissions in the Caribbean could be subject to a carbon tax, with more than half of emissions coming from the energy sector. The composition of emissions in Central American countries is more varied, with the energy sector also accounting for a large share, but with more emissions originating from agriculture, in line with the importance of that sector in many of these countries. Emissions from the agricultural sector could be covered by a carbon tax, but there have been few examples to date. Meanwhile, in South America, land use, land-use change and forestry are major contributors to overall GHG emissions, of which they are the main sources in Guyana, Paraguay, Peru, the Plurinational State of Bolivia and Suriname. As with the agricultural sector, emissions originating from land-use change and forestry would require carbon tax instruments specifically tied to the activity.

The energy sector, which is already subject to taxation in many countries, provides policymakers with the most straightforward path to applying a carbon tax. However, such a tax would need to take into account the varied sources of emissions within the sector. As figure II.8 shows, emissions from electricity generation predominate in the Caribbean, reflecting heavy dependence on carbon-intensive fuel sources. The transportation sector is equally important across the region, in line with the rise in vehicle ownership and the low penetration of non-fossil fuel transportation options.

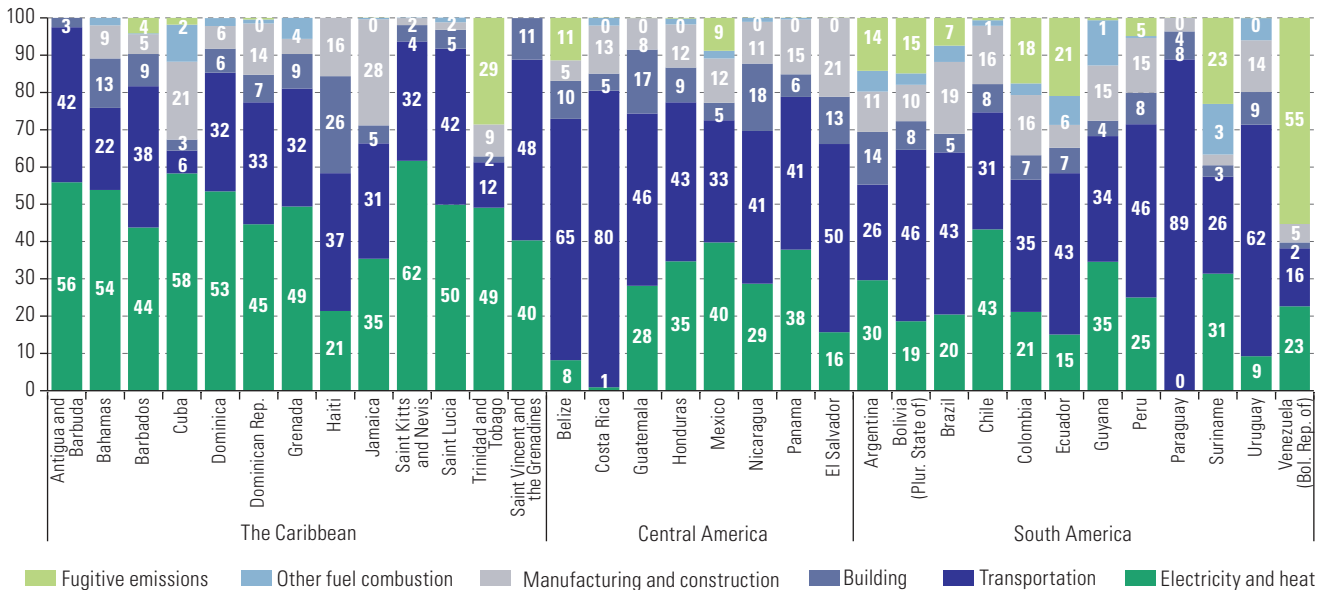
**Figure II.7**  
Latin America and the Caribbean: greenhouse gas emissions, by country and sector, 2019  
(Percentages)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of data from World Resources Institute (WRI), Climate Watch [online] <https://www.wri.org/initiatives/climate-watch>.

**Note:** Subregions are defined by Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2022: Mitigation of Climate Change. Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, P. R. Shukla and others (eds.), Cambridge, Cambridge University Press, 2022. Emissions figures from the land use, land-use change and forestry sector may be positive (representing emissions) or negative (representing carbon sequestration).

**Figure II.8**  
Latin America and the Caribbean: greenhouse gas emissions from the energy sector, by country and subsector, 2019  
(Percentages)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of data from World Resources Institute (WRI), Climate Watch [online] <https://www.wri.org/initiatives/climate-watch>.

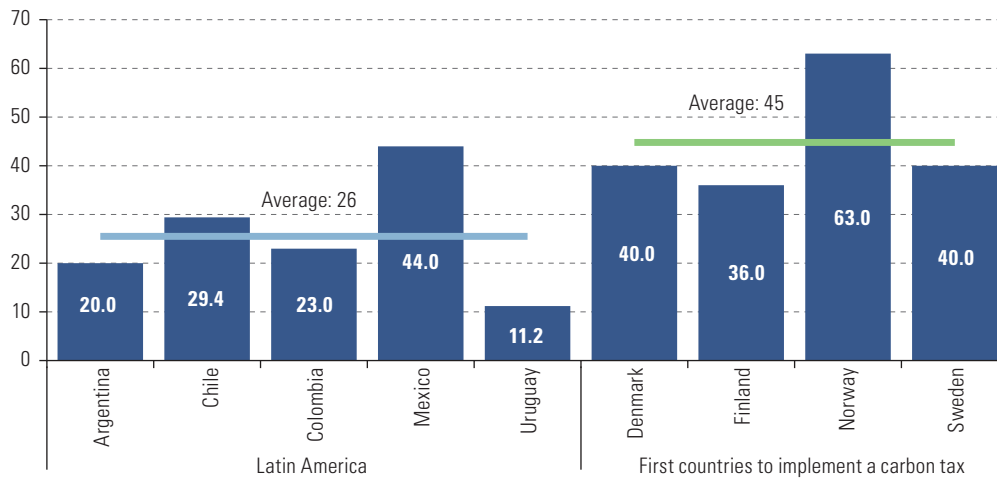
**Note:** Subregions are defined by Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2022: Mitigation of Climate Change. Working Group III Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, P. R. Shukla and others (eds.), Cambridge, Cambridge University Press, 2022.

While carbon taxes have the potential to generate significant revenues, their performance in the region is constrained by narrow tax bases and low carbon prices. The carbon taxes currently in effect in the region cover a relatively limited share of total greenhouse gas emissions, averaging 26% in 2022, compared to the Scandinavian countries that were among the first to implement carbon taxes (45%) (see figure II.9). However, trends in the countries of the region are considerably mixed, with coverage ranging from 11.2% in Uruguay to 44% in Mexico. Carbon prices are also very low in the region, ranging between US\$ 3.3 and US\$ 6.6 in Argentina, Chile, Colombia and Mexico, compared with carbon prices of around US\$ 50 or more in most countries outside the region with such taxes. Uruguay is an outlier, with one of the highest carbon prices in the world, which partly offsets the narrow tax base.

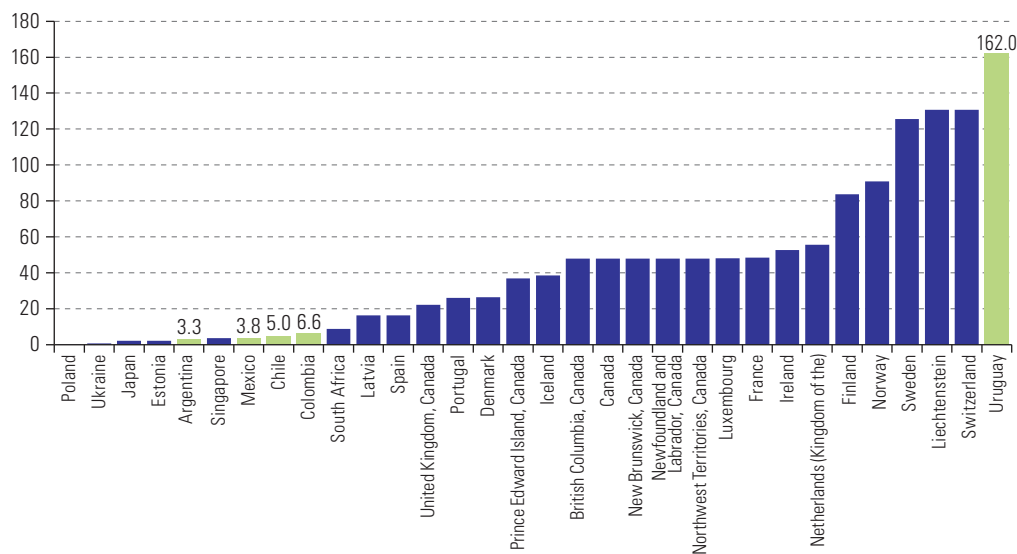
**Figure II.9**

Selected countries, provinces and territories: greenhouse gas emissions covered by existing carbon taxes and nominal carbon price, 2022

**A. Proportion of greenhouse gas emissions covered by existing carbon tax**  
(Percentages)



**B. Nominal carbon price**  
(Dollars)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of World Bank, Carbon Pricing Dashboard [online] <https://carbonpricingdashboard.worldbank.org/> and official data.

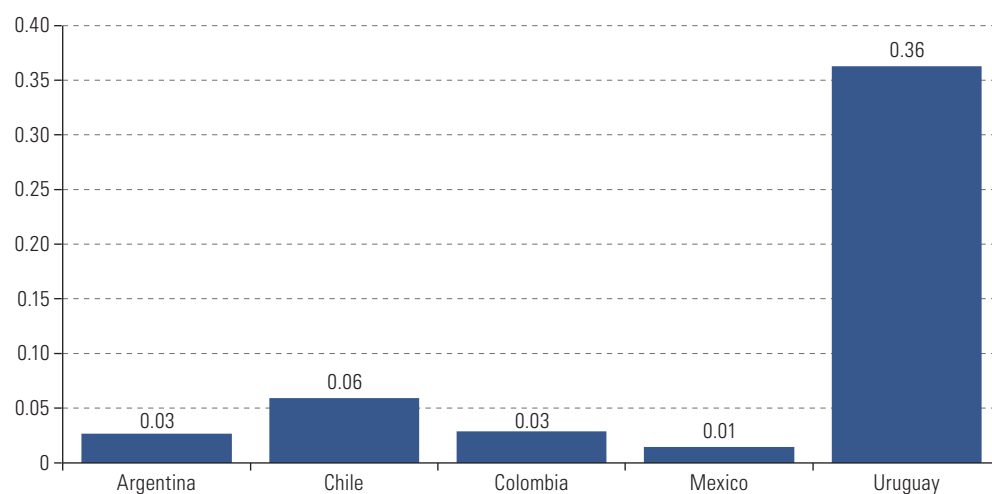
**Note:** Carbon price data for Chile, Colombia and Uruguay are from national sources and refer to 2024.

Carbon tax revenues in the region are limited, accounting for less than 0.1% of GDP in Argentina (0.03%), Chile (0.06%), Colombia (0.03%) and Mexico (0.01%) in 2022 (see figure II.10). The exception to this general trend is Uruguay, where the high carbon price resulted in carbon tax revenues accounting for 0.36% of GDP in 2022. Available data indicate little change in the level of carbon tax revenues in 2023. Carbon taxes have proved to be a volatile source of revenue in most countries, owing in part to temporary tax relief measures to address the COVID-19 pandemic and curb energy price inflation in 2021–2022. In Argentina, quarterly tax updates for gasoline and gasoil scheduled for the second half of 2021 and for 2022 were postponed to April 2023. Similarly, a carbon tax exemption for gasoline and diesel was introduced in March 2022 and is expected to remain in effect until the end of 2024.

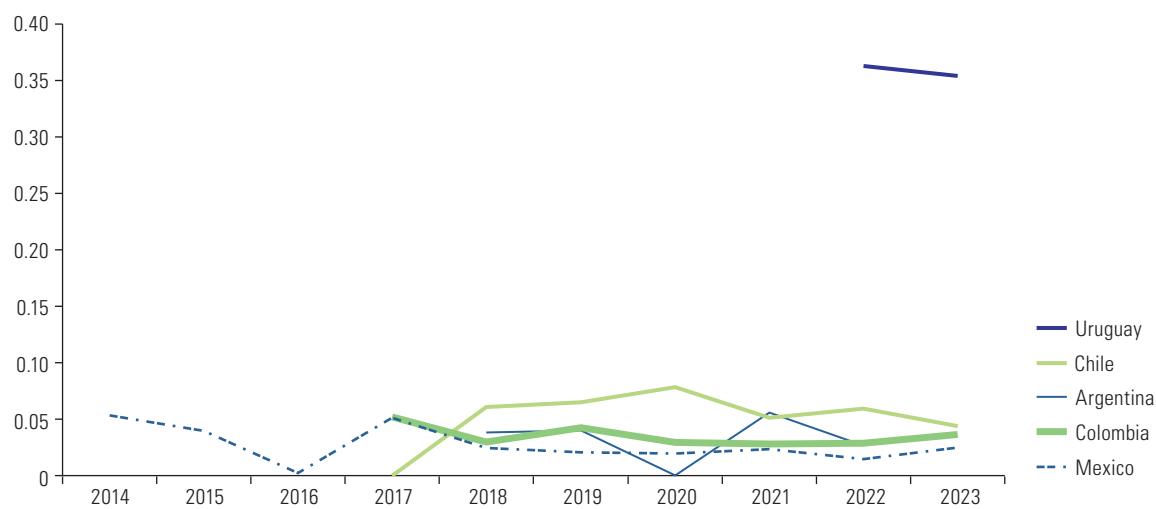
**Figure II.10**

Selected countries: carbon tax revenues, 2022 and 2014–2023  
(Percentages of GDP)

**A. 2022**



**B. 2014–2023**



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official data and of World Bank, Carbon Pricing Dashboard [online] <https://carbonpricingdashboard.worldbank.org/> (for Argentina).



## C. Macroeconomic simulations of the effects of climate change, carbon taxes and investment

Macroeconomic simulations are based on the Long Term Growth Model developed by the World Bank (Loayza and Pennings, 2022), which is in turn based on the neoclassical Solow-Swan growth model typically referred to in the literature. In addition to the standard components of the Solow-Swan production function (capital accumulation, population growth and productivity) the World Bank has incorporated other drivers of growth such as human capital, demographics and labour market participation into its model. There are several Long Term Growth Model extensions, including one on public capital and growth, on which the simulations in this section are based.

Three scenarios are developed in this section to explore the macroeconomic impact of climate change and a carbon tax. The baseline counterfactual scenario mirrors the medium-term trend derived directly from the Long Term Growth Model. Another scenario explores the intensification of climate change, and includes a damage function applied to the total factor productivity term in the model's production function, based on the one employed by Nordhaus (2018). The third scenario includes a carbon price of US\$ 50 per tCO<sub>2</sub> eq, with the revenues from the tax used to finance investment (70%) and compensatory transfers to households (30%). The methodology used in this section is described in detail in annex II.A1.

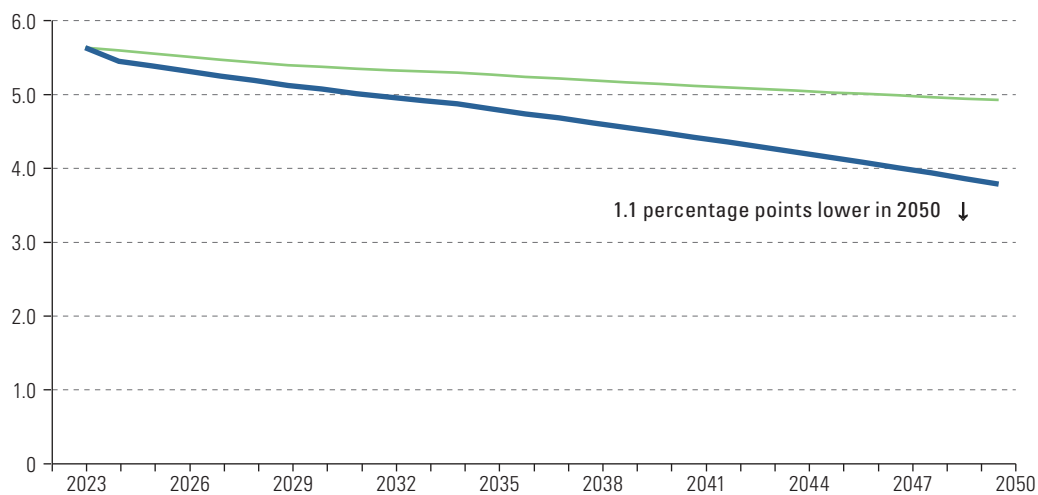
### 1. Climate change will have a significant macroeconomic impact in the medium term

The deleterious effects of climate change are projected to take an increasingly heavy toll on economic growth in the medium term. Rising temperatures are expected to weigh on labour output and hamper labour productivity (Dasgupta and others, 2021). Agricultural output will be affected, as changing hydrometeorological conditions alter agricultural productivity and crop yields (IPCC, 2023; Castellanos and others, 2022; Romanello and others, 2021; Cook and others, 2020). More frequent and severe weather events, particularly tropical cyclones, threaten to generate significant productive capital losses, undercutting economic activity and employment, especially with regard to tourism in the Caribbean (Mycoo and others, 2022; Pathak and others, 2021; Cevik and Ghazanchyan, 2020). These multiple impacts will likely result in cascading effects that will further damage the underlying economic growth drivers in the region.

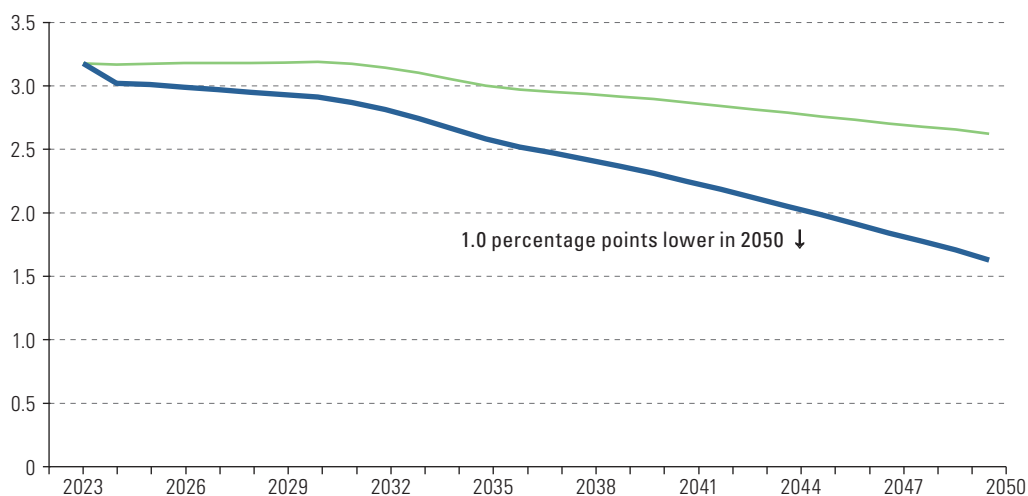
Climate change is projected to substantially reduce economic growth rates in the medium term. In the countries examined, the GDP growth rate in 2050 is expected to be roughly 1 percentage point lower than the level seen under the medium-term trend growth baseline scenario (see figure II.11). This drag on growth is forecast to worsen the secular decline in the projected medium-term trend, as population growth slows and total factor productivity (TFP) provides little impetus for an increase. TFP growth is negative in Guatemala, but slightly positive in the Dominican Republic and Peru. While climate change affects this model owing to its impact on TFP, it will also weigh heavily on the capital stock. Central American and Caribbean countries are particularly at risk of events that will have implications for potential economic growth.

**Figure II.11**  
Selected countries: GDP growth, by scenario, 2023–2050  
(Percentages)

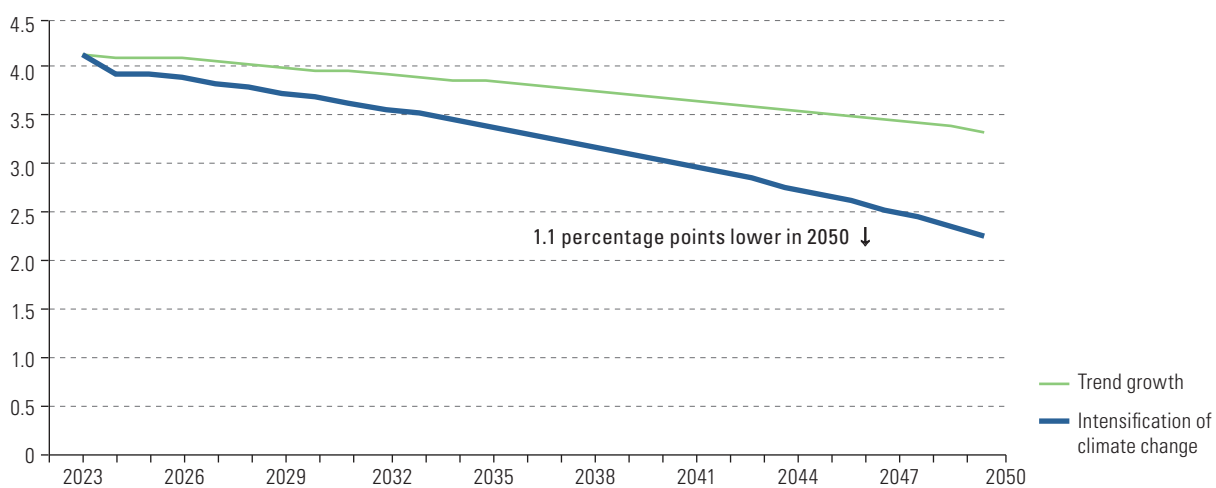
**A. Dominican Republic**



**B. Guatemala**



**C. Peru**



Source: Economic Commission for Latin America and the Caribbean (ECLAC).

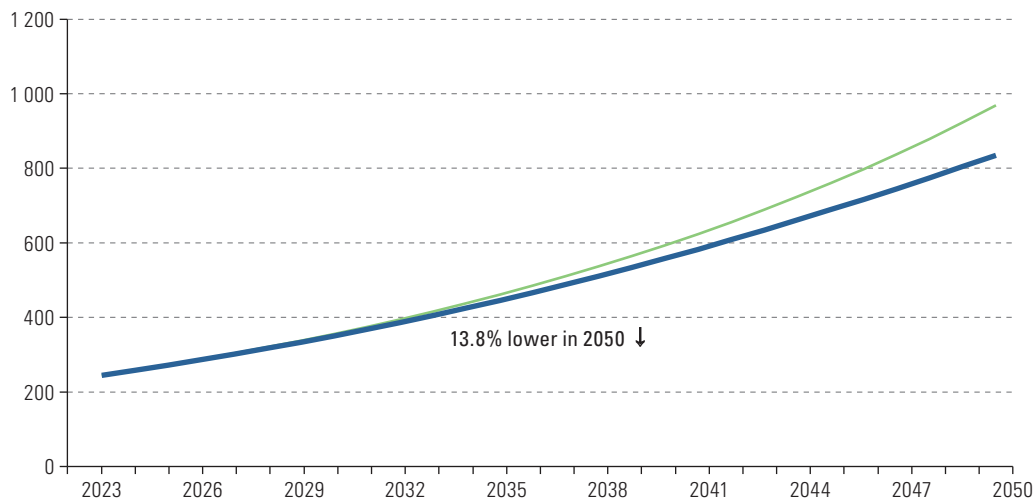


Weaker growth in the short term implies significant medium-term costs. As seen in figure II.12, GDP in 2050 would be substantially lower under the scenario of intensifying climate change compared to the medium-term trend growth baseline scenario. The Dominican Republic is expected to be the most affected country, with a 13.8% decline in 2050 GDP compared to the baseline. Peru would also be badly affected, with an estimated 13.4% decrease. In Guatemala, the decline would be less pronounced, but still substantial, owing in part to a marginally smaller decrease in the growth rate compared to the baseline than the other countries. A worrying result of this decrease is the impact on per capita GDP and social well-being. The threat of these countries becoming old before becoming rich would increase significantly in the scenario of intensification of climate change.

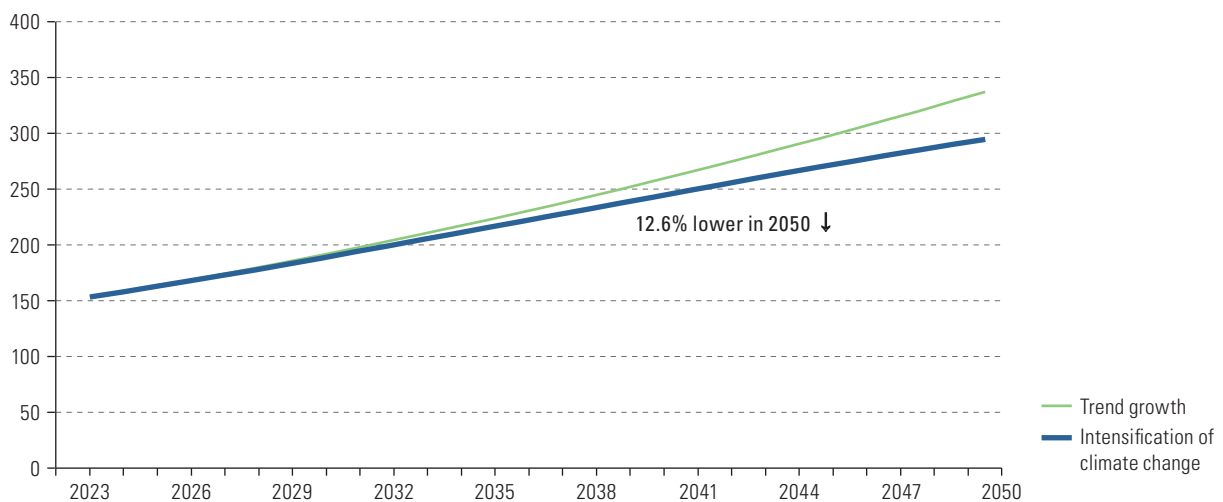
**Figure II.12**

Selected countries: GDP, by scenario, 2023–2050  
(Billions of dollars at constant prices)

**A. Dominican Republic**

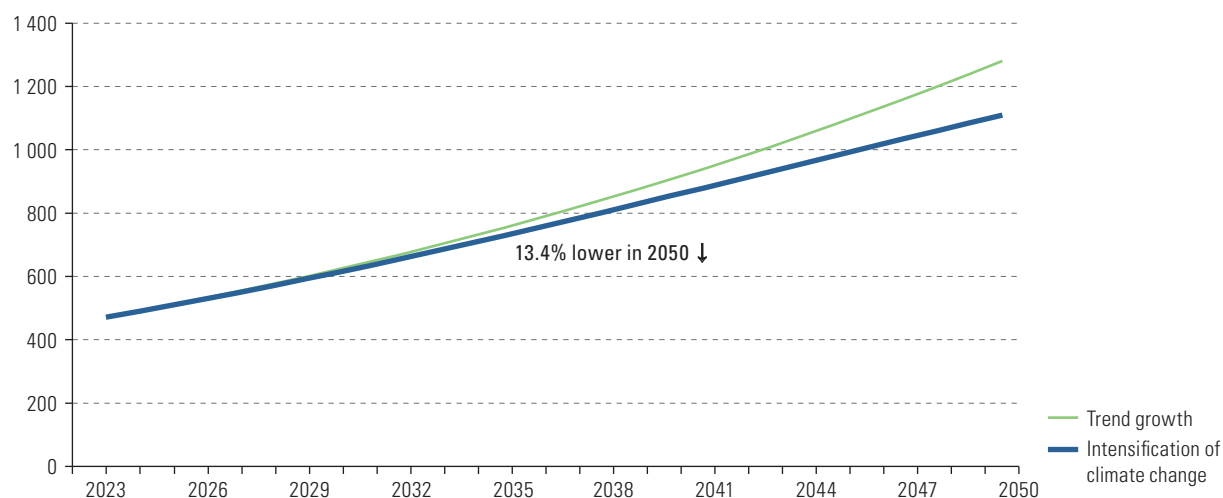


**B. Guatemala**



— Trend growth  
— Intensification of climate change

## C. Peru



Source: Economic Commission for Latin America and the Caribbean (ECLAC).

The projected economic impacts of climate change in Latin American and Caribbean countries vary widely in the literature. The estimated outcomes presented in this document range from pessimistic to optimistic (see table II.7). Burke, Hsiang and Miguel (2015) expect per capita GDP to contract sharply under the business-as-usual Representative Concentration Pathway (RCP) 8.5 scenario, which incorporates an increase of 3.7 degrees Celsius in global temperature by 2100. They estimate a contraction in per capita GDP of between 28% and 31% in the Dominican Republic and Guatemala, with a less pronounced decline in Peru, by 2050. By contrast, the projections of Kahn and others (2019) point to smaller decreases in per capita GDP by 2050, although these authors expect Peru to record the largest impact. Estimates by Swiss Re Institute (2021) for Peru are similar to those of Burke Hsiang and Miguel (2015) and to those presented in this section.

**Table II.7**  
Impacts of climate change on per capita GDP (Percentage of per capita GDP without climate change)

Country	Study	Estimated impact			Assumptions
		2030	2050	2100	
Dominican Republic	Burke, Hsiang and Miguel (2015)	-8.84	-31.01	-85.61	RCP 8.5
	Kahn and others (2019)	-0.35	-1.06	-3.31	RCP 8.5
Guatemala	Burke, Hsiang and Miguel (2015)	-7.95	-28.35	-83.34	RCP 8.5
	Kahn and others (2019)	-0.80	-2.12	-5.48	RCP 8.5
Peru	Burke, Hsiang and Miguel (2015)	-2.53	-10.69	-50.66	RCP 8.5
	Kahn and others (2019)	-0.66	-2.46	-7.61	RCP 8.5
	Swiss Re Institute (2021)	-4.10	-13.70	-	3.2 degrees

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of M. Burke, S. M. Hsiang and E. Miguel, "Global non-linear effect of temperature on economic production", *Nature*, vol. 527, October 2015; M. E. Kahn and others, "Long-term macroeconomic effects of climate change: a cross-country analysis", *NBER Working Papers*, No. 26167, National Bureau of Economic Research (NBER), 2019; and Swiss Re Institute, *The economics of climate change: no action not an option*, Zurich, 2021.

**Note:** RCP 8.5 refers to the baseline scenario factoring in the highest emissions, no climate policy, and an increase of 3.7 degrees Celsius in global temperature by 2100. Swiss Re Institute estimates for 2050 refer to the impact for 2048.

## 2. Investment financed exclusively by a carbon tax would not offset economic losses caused by the intensification of climate change

An effective carbon tax that reduces emissions and generates significant public revenue will inevitably affect economic activity. Changes in the relative prices of carbon-intensive and low-carbon goods and services alter production and consumption patterns, with macroeconomic implications. In carbon-intensive economies, these shifts may result in painful disruptions, which in turn may lead to an accelerated depreciation of the

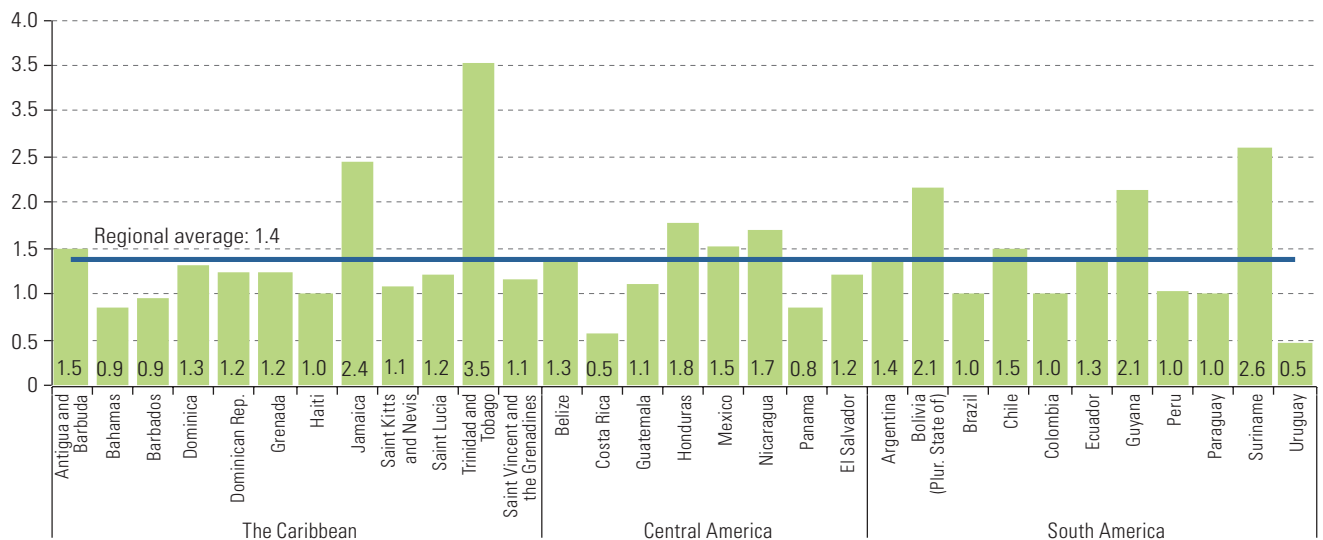
productive capital stock and considerable transition costs for producers and consumers. For developing countries, substituting carbon-intensive goods with low-carbon goods may also boost imports to the detriment of domestic production. However, as established in the literature, the productive use of carbon tax revenues may facilitate the transition to a low-carbon economy and offset macroeconomic costs.

A new scenario is constructed to assess the impact of a carbon tax on economic activity, which factors in intensifying climate change. The carbon tax is set at US\$ 50 per tCO<sub>2</sub> eq emissions, which is largely in line with the carbon price corridors proposed in the literature to achieve tangible reductions in greenhouse gas emissions. According to the High-Level Commission on Carbon Prices (2017), carbon prices consistent with the targets outlined in the Paris Agreement would be at least US\$ 40–US\$ 80 per tCO<sub>2</sub> eq by 2020, and US\$ 50–US\$ 100 per tCO<sub>2</sub> eq by 2030. For Black and others (2021), in order to meet the 2030 target of limiting global warming to 2°C, carbon prices should range from US\$ 40 to US\$ 70 per tCO<sub>2</sub> eq for higher-income emerging and developing countries and US\$ 20 to US\$ 60 per tCO<sub>2</sub> eq for lower-income emerging and developing countries. The tax base is assumed to include CO<sub>2</sub> eq emissions from the electricity, transport and manufacturing sectors.

Carbon tax could be a significant source of revenue in the region. As shown in figure II.13, estimated carbon tax receipts represent 1% of GDP in many countries, with a regional average of 1.4% of GDP. These figures are similar to those indicated in the literature. Black and others (2021) estimate that a carbon price of US\$ 50 per tCO<sub>2</sub> eq would yield revenues equivalent to 1.5% of GDP on average in higher-income emerging and developing countries, while a price of US\$ 25 per tCO<sub>2</sub> eq would generate revenues representing 1.0% of GDP on average in lower-income emerging and developing countries. Higher-than-average revenues in countries such as Guyana, Jamaica, the Plurinational State of Bolivia, Suriname and Trinidad and Tobago derive from significant industrial activities linked to the exploitation of non-renewable natural resources. Carbon tax revenues for the countries included in this simulation exercise are slightly below the regional average: 1.2% of GDP in the Dominican Republic, 1.1% of GDP in Guatemala and 1.0% of GDP in Peru.

**Figure II.13**

Latin America and the Caribbean: estimated carbon tax revenues based on a carbon price of US\$ 50 per ton of CO<sub>2</sub> eq emissions  
(Percentages of GDP)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC).

**Note:** Carbon tax revenues in dollars are estimated by applying the carbon price to emissions generated in the electricity, transport and manufacturing sectors in 2019. The carbon tax-to-GDP ratio is then calculated using data on GDP in dollars at current prices from International Monetary Fund (IMF), *World Economic Outlook: A Navigating Global Divergences*, Washington, D.C., October 2023.

The use of carbon tax revenues could have a decisive impact on the economy. In this simulation, carbon tax revenues are used to fund both public and private investment, along with transfers to households to offset the impact of higher energy prices. To determine the distribution of carbon tax revenues, 30% is allocated to compensate lower-income families in line with existing estimates in the literature (IMF, 2023; Vogt-Schilb and others, 2019). The remaining 70% is used to finance direct public investment and transfers to the private sector to support investment in low-carbon technologies and infrastructure. The carbon tax is ramped up progressively during the first seven years of the projection period, reaching its maximum in 2030, the threshold year established in Black and others (2021).

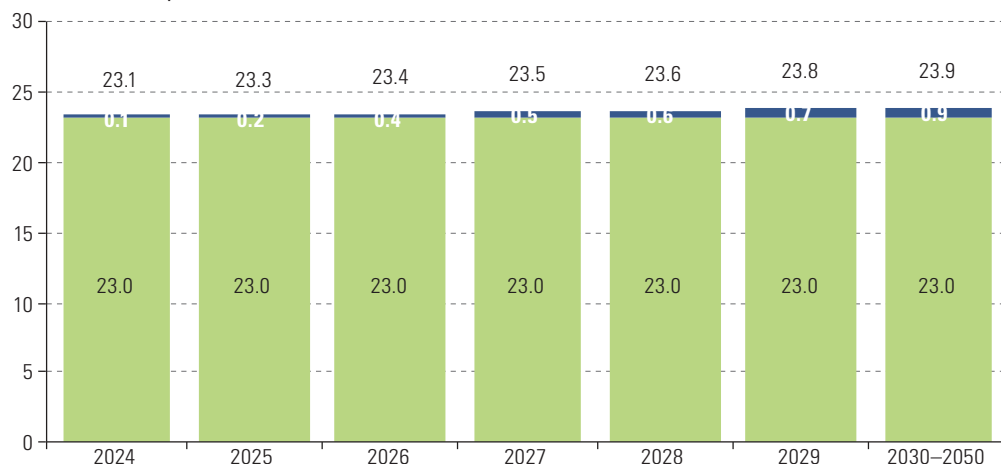
Recycling carbon tax revenues results in a moderate increase in total investment. The model incorporates a conservative assumption that investment levels will remain steady relative to GDP throughout the forecast period, which may be optimistic as investment, relative to GDP, has declined in the past decade. Figure II.14 indicates an increase of roughly 0.1 percentage points per year in total investment in all countries between 2024 and 2030. This points to total investment in 2030 representing 23.9% of GDP in the Dominican Republic (compared to 23% of GDP in 2023), 15.1% of GDP in Guatemala (compared to 14.4% of GDP in 2023) and 20.7% of GDP in Peru (compared to 20% of GDP in 2023). The largest increase is recorded in Guatemala, where investment financed by carbon tax revenues raises total investment by 5%.

**Figure II.14**

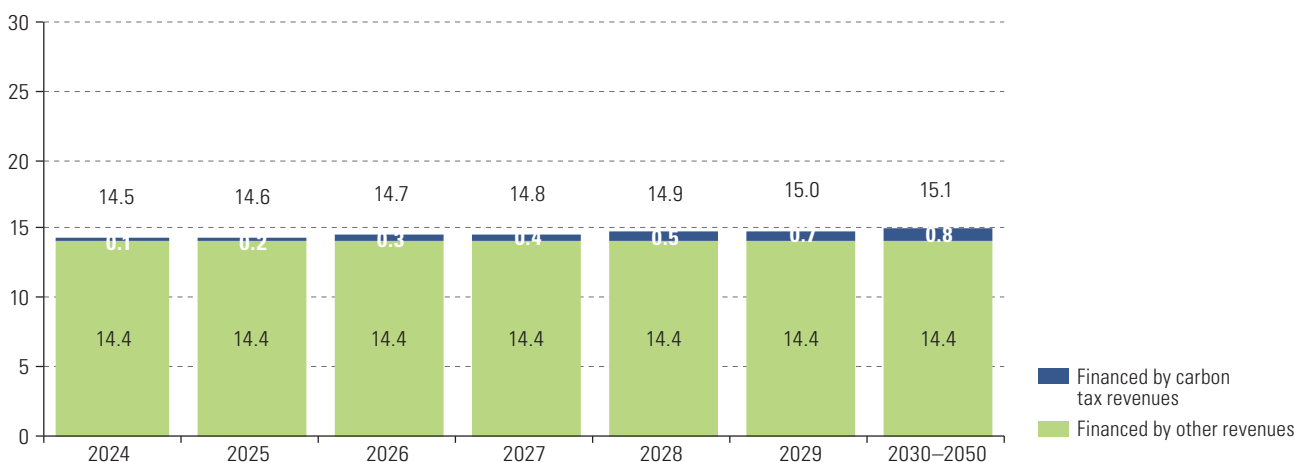
Selected countries: total investment, by component, 2024–2050

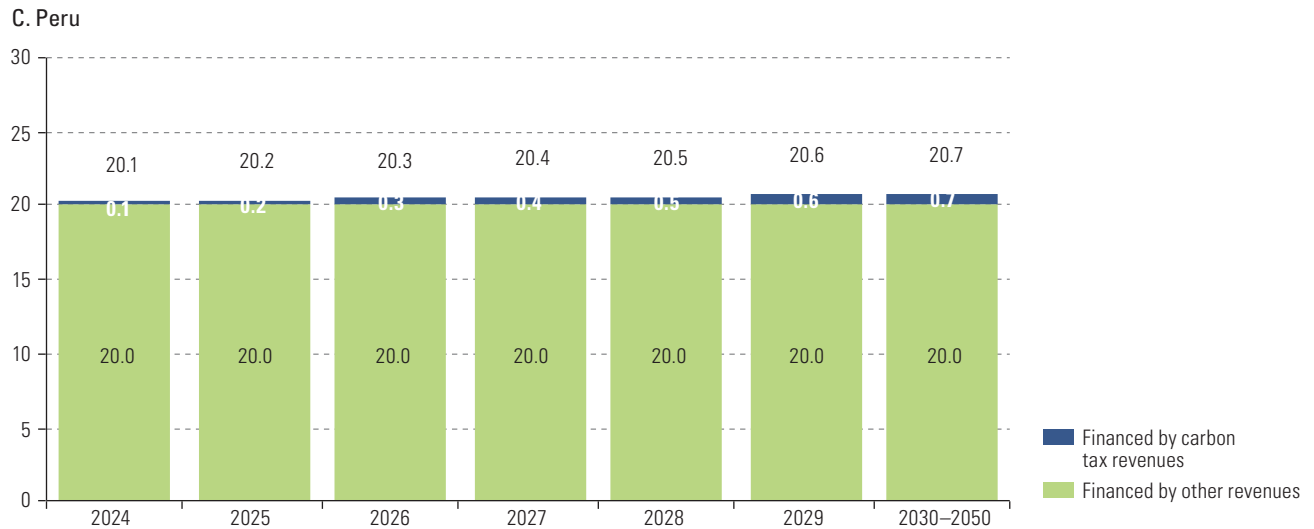
(Percentages of GDP)

**A. Dominican Republic**



**B. Guatemala**





**Source:** Economic Commission for Latin America and the Caribbean (ECLAC).

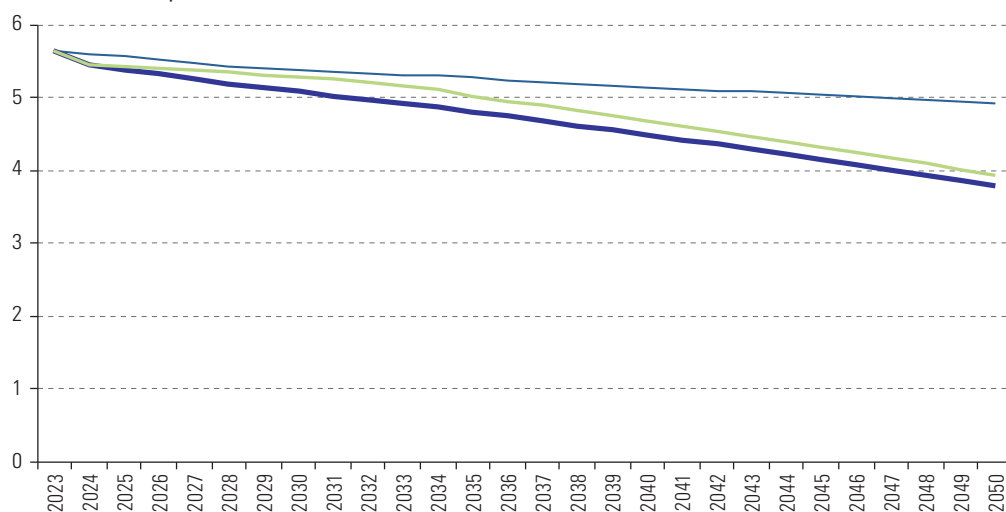
Although rising total investment accelerates growth in the short term, this effect dissipates over the projection period. The carbon tax depresses growth marginally in the first years of its application (see figure II.15), but this effect is progressively offset as stronger investment financed by the tax increases the total capital stock. The boost to growth is most noticeable in the Dominican Republic, Guatemala and Peru, where the gap between the scenarios of intensifying climate change and of trend growth narrows significantly by 2030. Thereafter growth is projected to stall in the 2030s as total investment stabilizes. Nevertheless, growth rates remain higher than those under the scenario of intensifying climate change throughout the projection period in all countries.

These projections should be considered with caution as multiple factors could influence growth in the medium term. Downside risks include a prolonged period of weak productivity growth if a disorderly transition inhibits the reallocation of resources within the economy (Geels, Pinkse and Zenghelis; 2021; OECD, 2017). Unproductive public investment may not result in the expected boost to economic growth. On the upside, growth rates may be higher than projected if fiscal multipliers for green capital formation are greater than expected. Decarbonization efforts that foster innovation could lead to deep technological changes that boost productivity and growth (IMF, 2020).

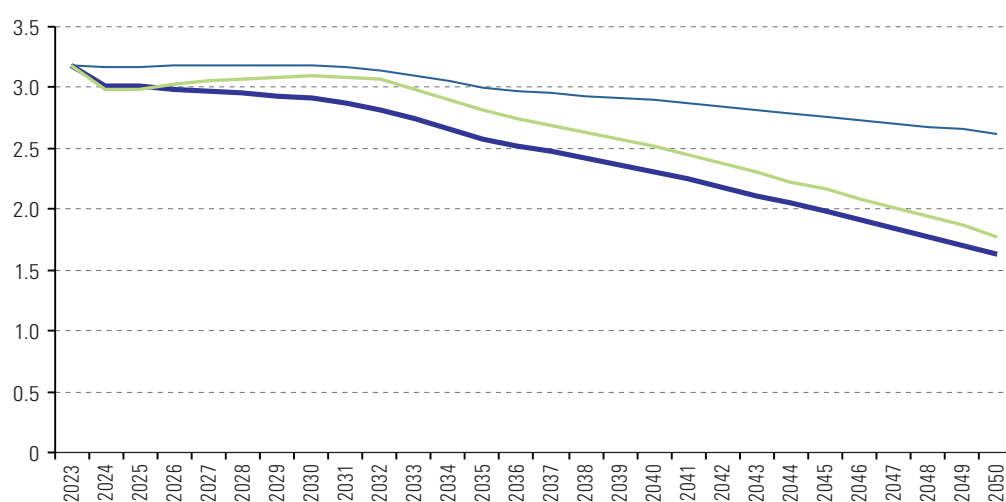
Strong growth in the short term leads to higher GDP at the end of the projection period. However, the increase does not significantly narrow the gap between the scenarios of intensifying climate change and of trend growth (see figure II.16). In the Dominican Republic, Guatemala and Peru, the investment push financed by the carbon tax points in 2050 to GDP between 4% and 5% higher than that estimated for the scenario of intensifying climate change. GDP in the carbon tax investment scenario is between 9% (Guatemala) and 10% (other countries) below the trend growth estimate for 2050.

**Figure II.15**  
Selected countries: GDP growth rate, by scenario, 2023–2050  
(Percentages)

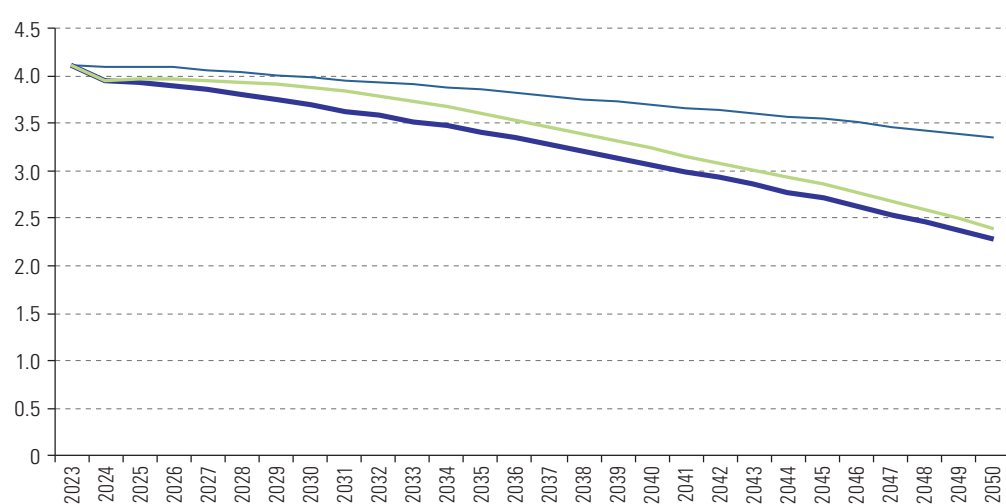
**A. Dominican Republic**



**B. Guatemala**



**C. Peru**

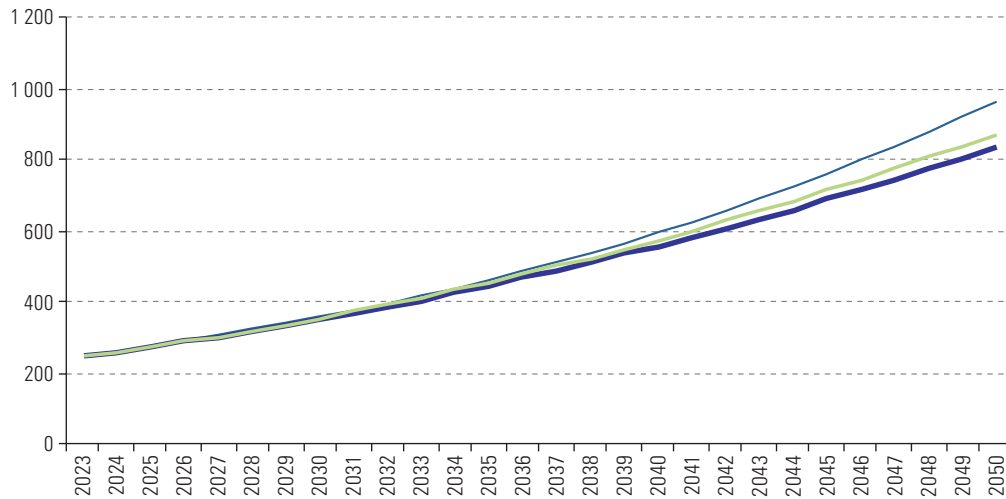


— Trend growth  
— Carbon tax  
— Intensification of climate change

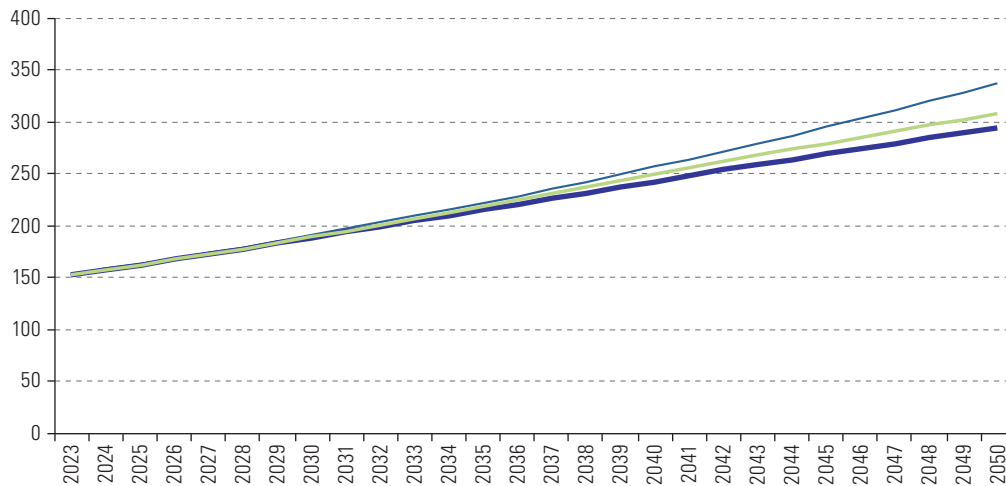
Source: Economic Commission for Latin America and the Caribbean (ECLAC).

**Figure II.16**  
 Selected countries: GDP, by scenario, 2023–2050  
 (Billions of dollars at constant prices)

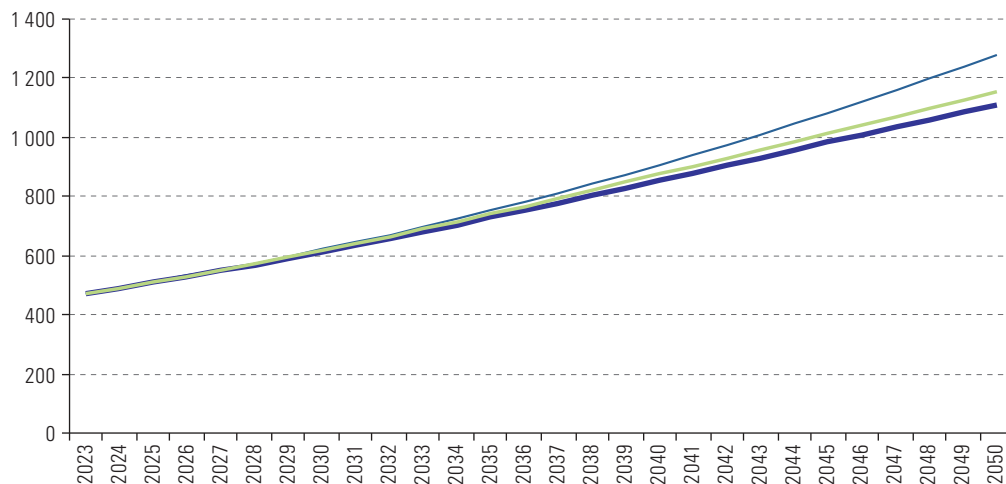
**A. Dominican Republic**



**B. Guatemala**



**C. Peru**



— Trend growth  
 — Carbon tax  
 — Intensification of climate change

Source: Economic Commission for Latin America and the Caribbean (ECLAC).

## D. Concluding remarks

Climate change poses an existential threat to Latin American and Caribbean countries. The increasing cost of rising temperatures and changing hydrometeorological conditions threatens to derail sustainable and inclusive development. Left unchecked, climate change has the potential to perpetuate the region's suboptimal low-growth equilibrium. The deeply entrenched structural development gaps in the region —e.g. inequality, poverty, informality and low productivity— will become increasingly pronounced, representing an additional drag on economic growth.

Building resilience to climate change, reducing the region's greenhouse gas emissions, and fostering development will require a large-scale increase in public and private investment. While estimates vary, studies indicate that the annual investment required to tackle climate change and close development gaps in the region may range from roughly 2.2% of GDP to 16% of GDP. This would require a significant increase in the level of total investment, which is currently the lowest in the world. Most of this investment would have to come from the public sector, but countries face significant fiscal constraints with high levels of public debt.

Carbon taxes have been promoted as an effective instrument to foster a low-carbon transition and incentivize a shift in the composition of investment. They could also generate substantial public revenues that could be used to reduce taxes, bolster investment, or support social policies. However, carbon taxes can also weigh on economic activity and generate undesirable distributional effects. The literature suggests that these impacts can be addressed by the productive use of carbon tax revenues. Nevertheless, there is little ex post evidence to guide policymaking.

This chapter explored the interaction of carbon taxes, investment and growth in three countries in the region: the Dominican Republic, Guatemala and Peru. Modelling indicated that a carbon tax with a price of US\$ 50 per tCO<sub>2</sub> eq would generate significant revenues. Although the investment financed by such a tax could have a net positive impact on economic growth, the modest increase would not close the gap between a scenario of intensifying climate change and a medium-term trend growth counterfactual scenario.

These results indicate the need for a much larger investment effort. While a carbon tax can encourage a change in the composition of investment, the region desperately needs an increase in the volume of investment. Countries should consider a mix of policies to finance a low-carbon transition and foster sustainable and inclusive development (ECLAC, 2023b). The public sector would have to play a key role, but efforts are needed to mobilize and channel private investment towards climate change and sustainable development sectors.

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## Annex II.A1

### Methodology

#### A. Basic structure: a supply-side approach

##### 1. Production function

Let it be assumed that the technology for a given economy at time  $t$  can be described by a Cobb-Douglas production function with constant returns to scale as noted below:

$$Y_t = A_t K_t^\alpha L_t^\beta \quad (1)$$

where  $Y_t$  denotes the output,  $A_t$  the total factor productivity (TFP) index,<sup>7</sup>  $K_t$  the aggregated capital stock, and  $L_t$  the labour input used in the production process. The parameters  $\alpha$  and  $\beta$  stand for the capital and labour shares, respectively, or in other terms the related elasticities of output with respect to each input. Under the hypothesis of constant returns to scale,  $\beta$  equals  $(1-\alpha)$ .

In order to examine the appropriate role of fiscal instruments in addressing climate change, including the likely implementation of a carbon price, it is necessary to distinguish public capital from private capital, the former being a key driver of economic growth. Equation (1) can therefore be rewritten as follows:

$$Y_t = A_t (K_t^P)^\alpha (K_t^G)^\gamma L_t^{1-\alpha-\gamma} \quad (2)$$

where  $K^P$  and  $K^G$  refer to private and public capital, and parameters  $\alpha$  and  $\gamma$  denote private and public capital shares given the hypothesis of constant returns to scale, which entails  $(\beta=1-\alpha-\gamma)$ .

##### 2. Capital accumulation process

For any economy, total, public and private capital accumulation can be characterized by the following equations:<sup>8</sup>

$$K_t = I_{t-1} + (1 - \delta) K_{t-1} \quad (3)$$

$$K_t^G = I_{t-1}^G + (1 - \delta^G) K_{t-1}^G \quad (4)$$

$$K_t^P = I_{t-1}^P + (1 - \delta^P) K_{t-1}^P \quad (5)$$

where  $I$ ,  $I^G$  and  $I^P$  denote total, public and private investment flows respectively, and  $\delta$ ,  $\delta^G$  and  $\delta^P$  the corresponding depreciation rates, with  $\delta$ ,  $\delta^G$ ,  $\delta^P \in (0,1)$ .

##### 3. Labour force

The size of the labour force represented by the number of workers can be expressed as:

$$L_t = \rho_t \omega_t N_t \quad (6)$$

<sup>7</sup> In this analysis, technical progress is defined as Hicks-neutral (Hicks, 1932), i.e. it increases both capital and labour inputs in the same proportions (Solow, 1957).

<sup>8</sup> Note that the process of capital accumulation can be expressed by a differential equation as  $K_t = I_t - \delta K_t$ .

with  $\rho_t$  denoting the labour participation rate,  $\omega_t$  the working-age population ratio, respective to the total population, and  $N_t$  the total population in any given economy. Note that  $N_t = e^{nt}$ , with  $n$  representing the demographic growth rate assumed to be exogenous ( $n > 0$ ). In some cases, the labour force employed during the production process can be considered in terms of effective units, for example, in the following manner,  $\bar{L}_t = h_t L_t$ , where  $h_t$  is the human capital per worker (usually represented by the average years of schooling). However, this step is not included in our analysis to avoid redundancy issues since the very definition of technical progress adopted in this framework already covers this aspect.

## 4. Determination of the economic growth rate

On the basis of the previous equations, the Cobb-Douglas production function can be expressed under an “intensive” form (i.e. by unit of labour), hereinafter:<sup>9</sup>

$$y_t = A_t f(k_t) = A_t (k_t^P)^\alpha (k_t^G)^\gamma \quad (7)$$

with  $y_t = Y_t/L_t$  and  $k_t = K_t/L_t$  (for any  $K^P$  and  $K^G$ ).

From equation (7), the growth rate of output per unit of labour between ( $t$ ) and ( $t+1$ ), i.e. in discrete terms, is computed as:

$$(1+g_{y_{t+1}}) = (1+g_{A_{t+1}})(1+g_{k_{t+1}^P})^\alpha (1+g_{k_{t+1}^G})^\gamma \quad (8)$$

where  $g$  stands for the growth rate of each variable considered.

We obtain the growth rate of total output ( $Y$ ), using  $y_t \stackrel{\text{def}}{=} \frac{Y_t}{L_t}$  and equation (6), hence:

$$(1+g_{y_{t+1}}) = (1+g_{y_{t+1}})(1+g_{\rho_{t+1}})(1+g_{\omega_{t+1}})(1+g_N) \quad (9)$$

## B. Impact of climate change on TFP

### 1. TFP trend

Conventionally, the growth path of technical progress is described by the following equation:

$$A_t = A_0 e^{\lambda t} \quad (10)$$

where  $A_0$  and  $\lambda$  indicate respectively the initial condition in the economy and the exogenous rate of technical change.<sup>10</sup> Within this framework, technical change is assumed to be output-augmenting (i.e. both capital- and labour-augmenting), termed as Hicks-neutral.<sup>11</sup>

### 2. TFP trend and the damage function

In accordance with recent literature, it is assumed that climate change tends to influence TFP and thus the medium-term growth trajectory.<sup>12</sup> Thus, it is assumed that the damage (the economic impact of climate change) can be formulated as follows:

<sup>9</sup> The hypothesis of homogeneity of degree one allows the exploitation of the intensive form of the production function by breaking down production per worker into key components: TFP, and private and public capital intensity.

<sup>10</sup> In general,  $A_0$  is set to 1.

<sup>11</sup> See Hicks (1932) for the original version. For a textbook discussion, see Dasgupta (2010) and Jones (1975).

<sup>12</sup> See, for example, Kumar and Maiti (2024), Casey, Fried and Goode (2023), and Letta and Tol (2019).

$$A_t = (1 - D_t) \widehat{A}_t \quad (11)$$

where  $D_t$  is defined as the climate damage function and  $\widehat{A}_t$  the measured TFP. The macroeconomic impact of climate change is thus considered to be a fractional loss in TFP. The damage function can then be specified in the form of a quadratic polynomial function depending on the global temperature ( $T$ ):<sup>13</sup>

$$D_t = \theta_1 T_t + \theta_2 T_t^2 \quad (12)$$

The  $\theta$  parameters are fixed and adjusted according to a specific increase in global temperatures to account for the intensification of climate change.<sup>14</sup>  $D_t$  therefore embodies a reduced expression of economic damage occurring at time  $t$  as a function of changes in temperature anomalies (see table II.A1.1).<sup>15</sup>

**Table II.A1.1**

Latin America and the Caribbean: 2022 temperature ranking and 2022 temperature anomalies relative to averages for 1991–2020 and 1961–1990 (Degrees Celsius)

	2022 temperature ranking <sup>a</sup>	2022 anomaly <sup>b</sup>	
		1991–2020	1961–1990
Mexico	Sixth–fifteenth warmest year	0.23 [0.12–0.34]	0.96 [0.61–1.07]
Central America	Tenth–sixteenth warmest year	0.09 [-0.02–0.16]	0.59 [0.46–0.73]
The Caribbean	Fifteenth–thirty-first warmest year	-0.02 [-0.13–0.06]	0.50 [0.20–0.65]
South America	Twelfth–twenty-fifth warmest year	-0.04 [-0.09–0.08]	0.50 [0.39–0.67]
Latin America and the Caribbean	Twelfth–twenty-first warmest year	0.00 [-0.06–0.10]	0.55 [0.46–0.70]

**Source:** World Meteorological Organization (WMO), *State of the Climate in Latin America and the Caribbean 2022*, Geneva, 2023.

<sup>a</sup> The 2022 average temperature ranking refers to the range of historical rankings for the period covering 1900–2022 as calculated using the Berkeley Earth, ECMWF Reanalysis v5 (ERA5), GISS Surface Temperature Analysis (GISTEMP), HadCRUT5, Japanese 55-year Reanalysis (JRA-55) and NOAA GlobalTemp data sets.

<sup>b</sup> Values refer to an average of the 2022 temperature anomaly, relative to each period, as calculated using the Berkeley Earth, ERA5, GISTEMP, HadCRUT5, JRA-55 and NOAA GlobalTemp data sets. The values presented in intervals refer to the minimum and maximum temperature anomaly calculated using each data set.

## C. Climate scenarios

The future effects of climate change on the growth prospects of selected Latin American and Caribbean countries through changes in TFP are examined under two scenarios. The first is a baseline scenario under which the climate status quo is maintained, and in which growth evolves in a context of effective implementation of mitigation and adaptation policies in the medium term. Therefore,  $D$  in equation (12) would be eliminated since climate change is already integrated into the future TFP trend. The second scenario is pessimistic, and assumes the intensification of climate change, which tends to impact growth projections owing to its harmful and lasting effects on TFP. In this case,  $D$  in equation (12) will reflect a decrease in the TFP trend and economic growth in each period. The simulation of the different models factors in an increase in global temperature of 3.4°C by 2100 owing to the worsening of climate change.<sup>16</sup> In

<sup>13</sup> According to this specification, tipping points are not included. See Nordhaus (2018).

<sup>14</sup> For the parameterization, based on historical data, it is assumed that the lowest TFP growth rates over the period 1960–2019 may reflect the future impact of climate change. The average obtained for the region allows an approximation of the functional form (curve) considered.

<sup>15</sup> Temperature anomalies are generally assessed relative to a reference period. For instance, pre-industrial temperature levels (see Estrada, Tol and Botzen, 2019). It is the most common damage function used, for example in integrated assessment models and for global-scale climate impact analyses and estimations of the social cost of carbon emissions (Neumann and others, 2020).

<sup>16</sup> The trend in climate change intensification (associated with increases in global temperatures) until 2100 was obtained from the En-ROADS climate simulator (developed by Climate Interactive, the MIT Sloan Sustainability Initiative, and Ventana Systems). See [online] <https://www.climateinteractive.org/en-roads/>.

a nutshell, the relevance of the damage function derives from the translation of broad economic losses implied by the future intensification of climate change compared to a reference scenario in which climate conditions remain unchanged.

## D. Carbon pricing and recycling of additional fiscal revenues

### 1. Fiscal policy and investment financing

To address the specific role of fiscal instruments in mitigating climate change and boosting future economic growth, it is assumed that public investment is financed solely by the public sector through tax revenues:

$$I_t^G = s_{K^G} (\tau Y_t) \quad (13)$$

where  $\tau$  stands for the tax rate, with  $\tau \in (0, 1)$ ,  $\tau Y$  tax revenues, and  $s_{K^G}$  the share allocated to investment in public capital.

Private investment is supported both by the public sector through tax revenues and by the private sector through disposable income after taxation  $(1-\tau)Y$ .<sup>17</sup> Hence, we obtain:

$$I_t^P = (s_{K^P}^G \tau + s_{K^P}^P (1-\tau)) Y_t \quad (14)$$

Therefore, the public sector allocates a proportion of tax revenues ( $s_{K^P}^G$ ) to private capital accumulation, while the private sector allocates a share of disposable income ( $s_{K^P}^P$ ).

From equations (4) and (5), the accumulation of public and private capital is derived as:

$$\dot{K}_t^G = s_{K^G} (\tau Y_t) - \delta^G K_t^G \quad (15)$$

$$\dot{K}_t^P = (s_{K^P}^G \tau + s_{K^P}^P (1-\tau)) Y_t - \delta^P K_t^P \quad (16)$$

### 2. Carbon pricing, public investment push and climate change mitigation

As noted above, fiscal policy can play a major role in mitigating the effects of worsening climate change. In this chapter, a carbon tax is implemented that provides additional tax revenues distributed between public and private investments according to the initial structure of the economy. Regarding the carbon tax, 70% of additional tax revenues are recycled (the remaining 30% are used to finance social transfers) to support higher investments financed by the public sector (public and private investments). Under both strategies, private capital should benefit from government financing (public capital accumulation) since an increase in public capital entails an increase in the productivity of private capital.<sup>18</sup>

<sup>17</sup> Private investment outlays financed through subsidies or transfers stemming from the government budget tend to be framed as public financing of private investment.

<sup>18</sup> From equation (2), we obtain  $\frac{Y_t}{K_t^P} = A_t (K_t^P)^{\alpha-1} (K_t^G)^{\gamma} L_t^{1-\alpha-\gamma}$ . See Dykas, Tokarski and Wisła (2023).



## E. Model calibration and GDP simulations<sup>19</sup>

### 1. General considerations

We explore below the assumptions required to calibrate the different models and simulate medium-term GDP growth rates over the period 2020–2050 for each selected economy (Dominican Republic, Guatemala and Peru).<sup>20</sup> This step includes the calibration of future paths of growth drivers as well as key parameters based mainly on historical data (see table II.A1.2). However, two main aspects should be clarified. The depreciation rates of total, public and private capital are calculated for each period using the capital accumulation equations (3, 4 and 5) based on the capital and investment series developed by IMF (Investment and Capital Stock Dataset).<sup>21</sup> TFP growth rates computed from the Penn World Table 10.01 database show high volatility. To address this issue, a wavelet approach was carried out to determine the long-term trend based on available data according to each country, over a period ranging from 1955 to 2019.<sup>22</sup>

**Table II.A1.2**

Baseline set-up, on the basis of historical data (1960–2019)

	Parameters/variables		Source
Capital <sup>a</sup>	Total capital depreciation rate	10-year average for 2010–2019 (computed)	Investment and Capital Stock Dataset, 1960–2019
	Public capital depreciation rate	10-year average for 2010–2019 (computed)	Investment and Capital Stock Dataset, 1960–2019
	Private capital depreciation rate	10-year average for 2010–2019 (computed)	Investment and Capital Stock Dataset, 1960–2019
	Initial total K/Y ratio	Most recent value 2019	Investment and Capital Stock Dataset, 1960–2019
	Initial public K/Y ratio	Most recent value 2019	Investment and Capital Stock Dataset, 1960–2019
	Initial private K/Y ratio	Most recent value 2019	Investment and Capital Stock Dataset, 1960–2019
	Total investment ratio (I/Y)	Most recent value 2019	Investment and Capital Stock Dataset, 1960–2019
	Initial public investment ratio (I <sub>g</sub> /Y)	Most recent value 2019	Investment and Capital Stock Dataset, 1960–2019
	Initial private investment ratio (I <sub>p</sub> /Y)	Most recent value 2019	Investment and Capital Stock Dataset, 1960–2019
	Public investment share of total investment (I <sub>g</sub> /I)	Most recent value 2019	Investment and Capital Stock Dataset, 1960–2019
Labour force	Labour share	10-year average 2010–2022	Penn World Table 10.01
	Initial human capital index annual growth rate <sup>b</sup>	10-year average 2000–2019	Penn World Table 10.01
	Initial population annual growth rate	Most recent value 2019	United Nations population division / World Bank estimates
	Annual population growth rate by 2100	Projected values	United Nations population division / World Bank estimates
	Share of male population in total population	Average (10 years)	World Bank estimates
	Initial working-age population to total population ratio	Value in 2019	World Bank estimates
	Working-age population to total population ratio by 2100	Projected value	United Nations population division
	Labour participation	Average (10 years)	World Bank indicators (modelled International Labour Organization estimate)
	Labour participation – male	Average (10 years)	World Bank indicators (modelled International Labour Organization estimate)
	Labour participation – female	Average (10 years)	World Bank indicators (modelled International Labour Organization estimate)

<sup>19</sup> Based on the Long Term Growth Model Public Capital Extension (LTGM-PC) spreadsheet (see [online] <https://www.worldbank.org/en/research/brief/LTGM>).

<sup>20</sup> The projection period includes 2020 as historical data for most variables used in this exercise are only available up to 2019. No modification to the projection is made to account for shocks in that year due to the COVID-19 pandemic as this exercise seeks to forecast medium-term and not short-term growth.

<sup>21</sup> See for instance An, Kangur and Papageorgiou (2019).

<sup>22</sup> See EViews (2020) for general guidance.

	Parameters/variables		Source
TFP	Initial TFP annual growth rate	20-year average (2000–2019)	Denoised growth rate (own estimations) based on Penn World Table 10.01
Other considerations	Elasticity of output with respect to public capital <sup>c</sup>	Default value (essential infrastructure)	Devadas and Pennings (2022)
	Initial GDP per capita	Most recent value 2019	Investment and Capital Stock Dataset, 1960–2019 / Penn World Table 10.01
	Initial GDP growth	Most recent value (2019)	Investment and Capital Stock Dataset, 1960–2019

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Monetary Fund (IMF), “Investment and Capital Stock Dataset (ICS)” [online] <https://data.imf.org/?sk=1CE8A55F-CFA7-4BC0-BCE2-256EE65AC0E4>; R. C. Feenstra, R. Inklaar and M. P. Timmer, “The Next Generation of the Penn World Table”, *American Economic Review*, vol. 105, No. 10, 2015; S. Devadas and S. Pennings, “Assessing the effect of public capital on growth: an extension of the world bank long term growth model”, *The Long Term Growth Model: Fundamentals, Extensions, and Applications*, N. V. Loayza and S. Pennings (eds.), Washington, D.C., World Bank, 2022.

**Note:** Parameters are assumed to be constant. Unlike the Long Term Growth Model Public Capital Extension (LTGM-PC), efficient public capital stock and congestion parameters are not included. As such, the values are set to 1 for the former and 0 (pure public good) for the latter.

<sup>a</sup> Expressed in billions of constant international dollars at 2017 prices.

<sup>b</sup> For information purposes.

<sup>c</sup> The selected value of the elasticity of output to public capital ( $\gamma$ ) is based on estimations extracted from meta-analysis (see Devadas and Pennings, 2022). For calibration purposes, this parameter is set to the upper bound, i.e. 0.17, related to essential public infrastructure, which tends to apply only to productive capital.

## 2. Projected GDP growth rates given investment rates

Under the two defined scenarios (climate status quo and intensification of climate change) and the carbon tax scenario, three sets of projected GDP growth rates will be determined. This projection exercise is based on the results from equation 9. A first step involves simulating GDP growth rates under the reference scenario which assumes a climate status quo as current trends are expected to continue over the projection period. In the adverse scenario of intensifying climate change, GDP growth rates are simulated by considering the pace of TFP with the inclusion of the effects of climate change through the damage function. This step allows the comparison of future growth trajectories and the specific isolation of the impact of a deterioration in climate conditions and an increase in global warming on economic growth.

The second step considers the implementation of a carbon tax to respond to the intensification of climate change.<sup>23</sup> Therefore, GDP growth rates are simulated according to the defined fiscal strategy. Estimations of additional tax revenues obtained via the carbon tax (US\$ 50) entail a recycling process and prompt a modification of investment rates (private and public) in the economy.

<sup>23</sup> Both the carbon tax and the public investment push are expected to be implemented in 2024, with gradual increases until 2030.



## Annex II.A2

Table II.A2.1

Latin America and the Caribbean (33 countries): mitigation targets established in nationally determined contributions

Country	Nationally determined contributions	Mitigation target	
		Unconditional	Conditional upon international support
Antigua and Barbuda	Updated first NDC (2021)	<ul style="list-style-type: none"> <li>• 86% renewable energy generation in the electricity sector by 2030</li> <li>• Electric vehicles to account for 100% of new vehicle sales by 2030</li> </ul>	
Argentina	Updated second NDC (2021)	Net emissions will not exceed 349 million (tCO <sub>2</sub> eq)	
Bahamas	Updated first NDC (2022)	<ul style="list-style-type: none"> <li>• 30% reduction relative to business-as-usual emissions</li> <li>• 30% renewable energy generation in the electricity sector</li> <li>• Vehicles: 35% electric and 15% hybrid</li> </ul>	
Barbados	Updated first NDC (2021)	35% reduction relative to business-as-usual emissions	70% reduction relative to business-as-usual emissions
Belize	Updated first NDC (2021)	5.6 MtCO <sub>2</sub> eq (cumulative avoided emissions), 1 MtCO <sub>2</sub> eq (annual reduction of emissions)	
Bolivia (Plurinational State of)	Updated first NDC (2022)	<ul style="list-style-type: none"> <li>• 79% of the energy consumed will come from renewable energy plants (50% of installed capacity) by 2030</li> </ul>	
Brazil	Adjusted first NDC (2023)	Absolute reduction of 53.1% in emissions by 2030, compared with 2005	
Chile	Updated first NDC (2020)	GHG emissions budget not exceeding 1,100 MtCO <sub>2</sub> eq between 2020 and 2030, with a GHG emissions peak by 2025 and a level of 95 MtCO <sub>2</sub> eq by 2030	
Colombia	Updated first NDC (2020)	<ul style="list-style-type: none"> <li>• 51% reduction relative to business-as-usual emissions</li> <li>• 40% reduction in black carbon emissions compared to 2014</li> </ul>	
Costa Rica	Updated first NDC (2020)	Absolute maximum net emissions in 2030 of 9.11 million tons of carbon dioxide equivalent (CO <sub>2</sub> eq)	
Cuba	Updated first NDC (2020)	24% of electricity generation based on renewable energy sources by 2030	
Dominica	Updated first NDC (2022)	<ul style="list-style-type: none"> <li>• 45% reduction in emissions by 2030, compared to 2014</li> <li>• 100% renewable energy by 2030</li> <li>• ~648Gg forest carbon sequestration from 2020 to 2025, ~621Gg from 2025 to 2030 through the REDD-plus mechanism</li> <li>• 10% reduction in hydrofluorocarbon emissions by 2030</li> </ul>	
Dominican Republic	Updated first NDC (2020)	7% reduction in emissions by 2030 compared to business-as-usual emissions	27% reduction in emissions (of which 20 percentage points will be conditional on external financing) by 2030, compared to business-as-usual emissions
Ecuador	First NDC (2019)	<ul style="list-style-type: none"> <li>• 9% decline by 2025 in GHG emissions from the energy, agriculture, industrial processes and waste sectors, compared to 2010 emissions</li> <li>• 4% decline by 2025 in GHG emissions from land use, land-use change and forestry, compared to 2008 emissions</li> </ul>	<ul style="list-style-type: none"> <li>• 29.9% decline by 2025 in greenhouse emissions from the energy, agriculture, industrial processes and waste sectors, compared to 2010 emissions</li> <li>• 20% decline by 2025 in greenhouse gas emissions from land use, land-use change and forestry, compared to 2008 emissions</li> </ul>
El Salvador	Updated first NDC (2022)	By 2030, a reduction of 640 ktCO <sub>2</sub> eq in the energy sector's business-as-usual emissions compared to 2019	By 2030, a reduction of 819 ktCO <sub>2</sub> eq in the energy sector's emissions compared to business-as-usual emissions
Grenada	Second NDC (2020)	40% reduction in GHG emissions by 2030, relative to 2010	
Guatemala	Updated first NDC (2022)	11.2% reduction of GHG emissions by 2030, relative to business-as-usual emissions	22.6% reduction of GHG emissions by 2030, relative to business-as-usual emissions
Guyana	Updated first NDC (2016)		100% renewable energy by 2025
Haiti	Updated first NDC (2022)	6% reduction of GHG emissions by 2030, relative to business-as-usual emissions	32% reduction of GHG emissions by 2030, relative to business-as-usual emissions
Honduras	Updated first NDC (2021)	16% reduction in emissions (excluding land use, land-use change and forestry) by 2030, compared to the business-as-usual scenario, along with sectoral non-GHG targets	
Jamaica	Updated first NDC (2020)	25.4% reduction of GHG emissions by 2030, relative to business-as-usual emissions	28.5% reduction of GHG emissions by 2030, relative to business-as-usual emissions

Country	Nationally determined contributions	Mitigation target	
		Unconditional	Conditional upon international support
Mexico	Updated first NDC (2022)	<ul style="list-style-type: none"> <li>• 30% reduction of GHG emissions by 2030, relative to business-as-usual emissions</li> <li>• 51% reduction of black carbon emissions by 2030, relative to business-as-usual emissions</li> </ul>	<ul style="list-style-type: none"> <li>• 35% reduction of GHG emissions by 2030, relative to business-as-usual emissions; 40% reduction with larger increase in international support</li> <li>• 70% reduction of black carbon emissions by 2030, relative to business-as-usual emissions</li> </ul>
Nicaragua	Updated first NDC (2020)	60% renewable energy generation in the electricity sector by 2030	
Panama	Updated first NDC (2020)	11.5% reduction in total emissions from the energy sector by 2030, relative to business-as-usual emissions	
Paraguay	Updated first NDC (2021)	10% reduction of GHG emissions by 2030, relative to business-as-usual emissions	20% reduction of GHG emissions by 2030, relative to business-as-usual emissions
Peru	Updated first NDC (2020)	Net GHG emissions not to exceed 208.8 MtCO <sub>2</sub> eq in 2030	Net GHG emissions not to exceed 179.0 MtCO <sub>2</sub> eq in 2030
Saint Kitts and Nevis	Updated first NDC (2021)	<ul style="list-style-type: none"> <li>• 61% reduction in CO<sub>2</sub> emissions by 2030, relative to 2010</li> <li>• 100% renewable energy generation in the electricity sector</li> <li>• Electrification of 2% of total vehicle stock</li> </ul>	
Saint Lucia	Updated first NDC (2021)	7% reduction in GHG emissions in the energy sector by 2030 relative to 2010 emissions	
Saint Vincent and the Grenadines	Updated first NDC (2016)	22% reduction of GHG emissions by 2025, relative to business-as-usual emissions,	
Suriname	Second NDC (2019)	Above 35% renewable energy generation in the electricity sector by 2030	
Trinidad and Tobago	First NDC (2018)	30% reduction in public transportation emissions, relative to 2013, by 2030	15% reduction in emissions from power generation, transportation and industrial sectors, relative to business-as-usual emissions, by 2030
Uruguay	Second NDC (2022)	<ul style="list-style-type: none"> <li>• Emissions not to exceed 9.267 Gg CO<sub>2</sub>, 818 Gg methane and 32 Gg nitrous oxide emissions by the year 2030</li> <li>• 10% reduction in hydrofluorocarbon emissions by 2030</li> </ul>	
Venezuela (Bolivarian Republic of)	Updated first NDC (2021)	20% reduction of GHG emissions by 2030, relative to business-as-usual emissions	

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of nationally determined contributions (NDCs) submitted to the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat.



CHAPTER



# Identification of public expenditure on climate change in Latin America

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## Introduction

- A. Review of the main international approaches to climate expenditure tagging
- B. Summary and comparison of national methodologies for measuring cross-cutting climate-relevant public expenditure in six Latin American countries
- C. Proposal for classification of cross-cutting climate-relevant public expenditure
- D. Government spending on environmental protection
- E. Quantification of cross-cutting climate-relevant public expenditure in six Latin American countries
- F. Conclusions and observations

## Bibliography

## Annex III.A1



## Introduction

Latin American and Caribbean countries are highly vulnerable to the effects of climate change owing to a combination of geographical, socioeconomic and environmental factors. First, the region's great geographical diversity, ranging from coastal areas to mountainous regions and tropical rainforests, increases its exposure to adverse climate phenomena in different areas, including threats from hurricanes, floods, droughts and other extreme events. Second, from a socioeconomic perspective, many countries in the region rely heavily on climate-sensitive sectors, such as agriculture and tourism. Agriculture is especially vulnerable to changes in climatic conditions, with effect on food security and income generation. Furthermore, a significant proportion of the population resides in coastal areas, making people more susceptible to sea level rise and extreme weather events. Environmentally speaking, the region's rich biodiversity increases its vulnerability, as changes in weather patterns can have direct impacts on ecosystems and local flora and fauna.

Rising temperatures and changes in hydrometeorological conditions, with more frequent droughts, floods and heat waves, greater variability in precipitation levels and patterns, represent a threat to economic growth, by reducing labour productivity and agricultural production and rapidly eroding capital stock.

It is essential to adopt climate change adaptation and mitigation strategies to ensure a more sustainable and resilient future for the generations ahead. However, the high levels of public debt and narrow fiscal spaces of the region's countries limit the scope of fiscal policy to respond to climate shocks.

For these reasons, the measurement of public spending on climate change matters is crucial for effective management of resources and for assessing progress in the implementation of climate adaptation and mitigation policies. It is essential to provide a clear view of how public funds are being allocated to address climate challenges, enable informed decision-making to optimize investment, and to make climate actions and policies as effective as possible. Statistics on climate-related public expenditure also provide a basis for strategic planning, accountability and resource optimization, which are key to crafting a successful and sustainable response to climate change.

Measuring public spending on climate change is also key to monitoring countries' compliance with their international commitments, particularly with respect to climate targets in the framework of the Paris Agreement, such as nationally determined contributions, as well as in relation to the global commitments assumed in the Sustainable Development Goals of the 2030 Agenda for Sustainable Development.

In particular, public investment plays an important role both in fulfilling international commitments and in promoting sustainable development and reducing vulnerability to disasters. Public investment is essential in building resilience, mitigating emissions and transitioning to a more sustainable economy, and can contribute significantly to addressing climate challenges at the global and local levels.

Public investment helps to finance programmes aimed at adapting to or mitigating climate change. Investment in adaptation includes infrastructure projects to strengthen resilience to climate change, such as building or improving early warning systems, developing sustainable infrastructure and adapting existing infrastructure to withstand extreme climate events such as floods and cyclones. Investment in mitigation can foster the use of clean and sustainable technologies, encouraging the adoption of more environmentally efficient practices and technologies, thereby reducing greenhouse gas emissions. Public investment can facilitate the transition to cleaner energy sources,

promoting renewable energy generation and energy efficiency, thus reducing dependence on fossil fuels and their adverse impacts. It can also contribute to sustainable economic development, by creating jobs in sectors related to clean energy, energy efficiency and sustainable resource management.

With this in mind, this chapter aims to identify, classify, measure and analyse public spending and investment on climate change adaptation and mitigation, based on the analysis of official data available in six Latin American countries: Argentina, Colombia, Honduras, Mexico, Nicaragua and Peru.

The chapter is structured as follows: this introduction is followed, in section A, by a review of the main international approaches to climate finance data, international statistical frameworks, classifiers and tagging of climate-relevant public expenditure. Next, section B examines and compares the official methodologies used by the countries to identify and measure the climate-related budget. Section C proposes a classification of public climate spending, which is applied in the data analysis and includes both the functional and economic classification of spending and a categorization by type of climate spending. Section D gives a brief analysis of government spending on environmental protection for 16 Latin American and Caribbean countries that have data available. Next, section E analyses in detail the data on cross-cutting climate-relevant public expenditure in the six countries selected. Lastly, section F offers conclusions and observations concerning the study and offers some guidelines.

## A. Review of the main international approaches to climate expenditure tagging

Climate budget tagging methodologies were originally developed with support from the United Nations Development Programme (UNDP) and the World Bank, drawing on the experience of tagging other public policy goals, such as poverty, gender and international development goals. Climate budget tagging also builds on climate finance reporting initiatives, such as the Rio markers developed by the Development Assistance Committee (DAC) of the Organisation for International Co-operation and Development (OECD), as well as the multilateral development banks' joint methodology for reporting on international flows of climate finance (World Bank, 2021a).

There follows a brief review of the main international approaches to climate finance reporting, international statistical frameworks, budget classifiers and proposals by international organizations for climate expenditure tagging.

### 1. Rio markers

The Rio markers are a methodology developed by the OECD Development Assistance Committee, originally to guide reporting by member States on development assistance in support of the 1992 Rio Conventions on Climate Change, Biological Diversity, and Desertification.

The approach focuses on tracking activities that mainstream the goals of the Framework Conventions into cooperation for development on environmental matters. DAC members were thus to identify whether financing activities were aligned with environmental considerations. The first three Rio markers for biodiversity,<sup>1</sup> climate

<sup>1</sup> This marker is used to identify activities that contribute to the goals of the Convention on Biological Diversity.



change mitigation and desertification<sup>2</sup> were introduced in 1998, and a fourth marker on climate change adaptation was added in 2010.

Specifically, the following two markers were identified to track activities that contribute to the goals of the United Nations Framework Convention on Climate Change (OECD, 2016):

- (i) Mitigation: An activity should be classified as related to climate change mitigation when it “contributes to the objective of stabilisation of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system by promoting efforts to reduce or limit GHG emissions or to enhance GHG sequestration.”
- (ii) Adaptation: An activity should be classified as adaptation-related if “it intends to reduce the vulnerability of human or natural systems to the current and expected impacts of climate change, including climate variability, by maintaining or increasing resilience, through increased ability to adapt to, or absorb, climate change stresses, shocks and variability and/or by helping reduce exposure to them. This encompasses a range of activities from information and knowledge generation to capacity development, planning and the implementation of climate change adaptation actions”.

The methodology provides examples of activities to facilitate their identification and classification in these categories.

The Rio markers system also marks and scores activities according to the activity objective, with a three-value scoring system that classifies activities as:

- (i) Principal: when climate change mitigation or adaptation is explicitly stated as fundamental in the design of, or motivation for, the activity, and is included in the activity documentation (score of 2).
- (ii) Significant: when the objective of climate change mitigation or adaptation is explicitly stated but is not the fundamental motivation for the activity, which may have other objectives (score of 1).
- (iii) Zero: when the activity does not target climate change mitigation or adaptation objectives.

This approach does not translate these scores into a percentage of the climate budget or quantify the amount of climate-related development finance.

Although the Rio markers were initially created to standardize reporting on development assistance in the context of climate change, they later served as a basis to develop national reporting on the labelling of public expenditures related to climate change mitigation and adaptation.

## 2. European Union methodology

In the multiannual financial framework (MFF) 2014–2020 (*Official Journal of the European Union, 2013*), the European Commission introduced a tracking methodology to measure the contributions of different European Union public expenditure programmes aimed at addressing the climate challenge. The methodology was based on the OECD Rio markers and tracks expenditure based on the intention of the activity being financed, i.e. whether it is designed to achieve an overall climate objective or is only expected to make a significant positive contribution. The MFF for 2014–2020 set a climate spending target of at least 20% of the European Union budget.

<sup>2</sup> This marker is used to identify activities that contribute to the goals of the Convention to Combat Desertification.

The MFF for 2021–2027 (European Commission, 2021) subsequently raised this target to 30% and changed the tracking methodology to take into account not only the objective of actions but also their expected outcomes. It maintained the three-score approach of the Rio markers (principal, 100%; significant, 40%; and insignificant, 0%), but moved towards classifying by type of action based on expected climate effect.

Climate-relevant public expenditure is calculated by multiplying the overall assignment to the programme or project by the corresponding coefficient (100%, 40% or 0%), then the climate-related public expenditures are added.<sup>3</sup>

All the measures tagged as climate-relevant address one of the following objectives:<sup>4</sup>

- **Adaptation:** This involves finding solutions to and ensuring preparedness for the adverse effects of climate change, enhancing resilience, taking appropriate action to prevent or minimize the damage such effects can cause and taking advantage of any opportunities that may arise.
- **Mitigation:** This refers to action that limits the magnitude of long-term climate change. Climate-change mitigation generally involves reductions in greenhouse gas emissions.

### 3. The joint methodology of the multilateral development banks

The joint methodology of the multilateral development banks is used for climate finance reporting and, since June 2023, has been adjusted to track financial flows in line with the objectives of the Paris Agreement.<sup>5</sup>

Multilateral development banks estimate climate finance based on the type of activity carried out, covering components or subcomponents of projects that directly contribute to or promote climate change adaptation or mitigation.

In relation to tracking of finance for adaptation, between 2021 and 2022, the multilateral development banks' methodology was expanded from traditional infrastructure sectors to a wider range of sectors, such as education, health, social protection, financial services, and research and innovation for adaptation solutions. The methodology has three steps: (i) setting out the climate change vulnerability context of the project; (ii) making an explicit statement of intent of the project to reduce climate change vulnerability; and (iii) articulating a clear and direct link between specific project activities and the project's objective to reduce vulnerability to climate change.

In relation to tracking of finance for mitigation, the methodology is based on a detailed list of activities in sectors and subsectors that reduce greenhouse gas emissions and are compatible with low-emissions development. Since 2021, a more granular breakdown of this list has been adopted with clear criteria and additional guidance.

Where a project contributes to both mitigation and adaptation, the proportion of each is to be established in order to avoid double counting of financing. However, some multilateral development banks report these "dual benefit" projects separately.

<sup>3</sup> For further details, see European Union (2016).

<sup>4</sup> See [online] [https://commission.europa.eu/strategy-and-policy/eu-budget/performance-and-reporting/horizontal-priorities/green-budgeting/climate-mainstreaming\\_en#climate-methodology](https://commission.europa.eu/strategy-and-policy/eu-budget/performance-and-reporting/horizontal-priorities/green-budgeting/climate-mainstreaming_en#climate-methodology).

<sup>5</sup> For further details, see European Investment Bank (2023).



## 4. Reporting under the United Nations Framework Convention on Climate Change

The UNFCCC reporting regime focuses on international climate finance flows, rather than providing information on each country's climate-relevant public expenditures.

Most OECD Development Assistance Committee countries use data generated from the Rio markers methodologies for their reporting to UNFCCC, applying weighting coefficients to determine the proportion of climate-relevant finance. Activities identified as principal are generally reported at 100%. However, the lack of a common standard for weighting activities scored as significant leads to variations between countries. Consequently, climate finance data reported through UNFCCC are not strictly comparable.<sup>6</sup>

## 5. Climate Public Expenditure and Institutional Review (CPEIR) methodology

The Climate Public Expenditure and Institutional Review (CPEIR) methodology provides a qualitative and quantitative analysis of public expenditure based on the following key objectives (UNDP, 2018):

- Review of the status of national response to climate change through climate change strategies, action plans and sectoral policies, and their linkages to expenditures (policy analysis).
- Analysis of institutions and of national accords that integrate priority climate change policies into national budgeting and its management (institutional analysis).
- Estimation of climate-relevant public expenditure over a specific time period (climate public expenditure analysis).

A study by the Inter-American Development Bank (IDB) (Delgado, Eguino and Lopes, 2021) found that in Latin America and the Caribbean, as at the global level, the CPEIR methodology is the most widely used, albeit with some major adaptations. In all cases, each country used its own specific methodological approaches, and most use tags or markers that reflect a blend of methodological considerations originating from OECD (such as the Rio markers), the World Bank, the Climate Finance Group for Latin America and the Caribbean (GFLAC) and the Colombian Climate Public and Private Expenditure and Institutional Review (CPEIR) (Delgado, Eguino and Lopes, 2021).

Six countries in the region have used this tool: Chile (2016), Colombia (2018), Ecuador (2017 and 2019), El Salvador (2018), Honduras (2016) and Nicaragua (2015).<sup>7</sup>

According to the World Bank (2021a), many of the CPEIRs recommended that national authorities follow up with climate budget tagging initiatives and institutionalize the process for identifying climate-relevant expenditures and facilitating tracking through the budget process.

<sup>6</sup> For further details, see World Bank (2021a).

<sup>7</sup> For further details, see UNDP (2022 and 2018).

## 6. Classification of the functions of government (COFOG)

The classification of the functions of government (COFOG) in the *Government Finance Statistics Manual 2014* (IMF, 2014) establishes major functional classifications and serves as an analytical framework to answer the question of what expenditure is for. In other words, the classification serves to identify the public policies that budget funds are going towards, and to evaluate how governments meet society's demands through public spending.

According to the *Government Finance Statistics Manual 2014* (IMF, 2014), the functional classification of expenditure is a detailed classification of the functions and socioeconomic objectives pursued by general government units through different types of expenditure. Functions are further classified in 10 divisions, one of which is "Environmental protection" (division 5). This division covers waste management, wastewater management, pollution abatement, protection of biodiversity and landscape, and research and development relating to environmental protection.

However, since the classification of spending items is based on their main purpose or final use, this approach is not sufficient to identify and quantify all climate-related public spending, since climate issues cut across the various areas and functions of government.

## 7. System of Environmental-Economic Accounting and Classification of Environmental Protection Activities and Expenditure

The System of Environmental-Economic Accounting (SEEA) is an international statistical standard that provides an accounting framework designed to integrate economic and environmental information to better understand the interrelationships between the economy and the environment, as well as the stocks of environmental assets and their variations. It thus provides information related to a broad spectrum of environmental and economic issues including, in particular, the assessment of trends in the use and availability of natural resources, the extent of emissions and discharges to the environment resulting from economic activity, and the amount of economic activity undertaken for environmental purposes.<sup>8</sup>

SEEA categorizes environmental economic activities in two groups: environmental protection and resource management. These activities are defined as those whose primary purpose is to reduce or eliminate pressures on the environment, or to make more efficient use of natural resources.

The structure of the first group, environmental protection activities, mirrors the structure of the Classification of Environmental Protection Activities (CEPA), which is broken down into the following classes:

- Protection of ambient air and climate.
- Wastewater management.
- Waste management.
- Protection and remediation of soil, groundwater and surface water.

<sup>8</sup> For further details, see United Nations and others (2017).

- Noise and vibration abatement (excluding workplace protection).
- Protection of biodiversity and landscapes.
- Protection against particle radiation (excluding external safety).
- Research and development for environmental protection.
- Other environmental protection activities.

However, as noted in a study by IDB (Pizarro and others, 2021), the CEPA system includes activities whose primary purpose is to prevent, reduce or eliminate pollution or any other form of environmental degradation. This means that, to be considered an environmental protection action or activity, it must meet the criterion of primary purpose or ultimate cause, i.e. the activity must be intended to protect the environment. Actions and activities that have positive environmental effects but without this being their main objective are not treated as environmental protection activities. Accordingly, activities that mitigate climate change but are not specifically aimed at this purpose are not considered climate-relevant activities (Pizarro and others, 2021).

## 8. Proposals by the Economic Commission for Latin America and the Caribbean (ECLAC) to measure expenditure on environmental protection

In 2015, ECLAC and the National Institute of Statistics and Geography (INEGI) of Mexico prepared a methodological guide for measuring general government environmental protection expenditure,<sup>9</sup> based on international statistical frameworks such as the System of Environmental-Economic Accounting (SEEA) and the IMF *Government Finance Statistics Manual*. The guide offers a methodological route for calculating environmental protection expenditure through examples, as well as concepts, definitions, classifications and guidelines.

According to this guide, environmental protection expenditure is spending by different economic units, including the general government, to finance activities whose main purpose is the prevention, control, reduction and elimination of pollution, as well as the promotion, development and stewardship of the environment (ECLAC/INEGI, 2015).

For measuring environmental protection expenditure, ECLAC uses the nine items of the Classification of Environmental Protection Activities mentioned above; however, it does not include the SEEA natural resource management classifier in environmental protection expenditure.

It also proposes a cross-classification where the IMF function of government spending (in particular division 5) is related to activity carried out to reduce environmental damage (Classification of Environmental Protection Activities), as shown in table III.1.

The guide also refers to the importance of distinguishing between current and capital expenditure in the economic classification of public spending on environmental protection. Current expenditure on environmental protection is environment-related spending on personal services, materials, supplies and general services, while capital spending on environmental protection is environment-related spending on real estate and personal property, machinery and equipment and end-of-pipe technology, for example (CEPAL/INEGI, 2015).

<sup>9</sup> In this guide, the general government sector comprises the following resident institutional units: central, state and local government, non-profit institutions controlled and financed by government units, and social security funds of the different levels of government.

**Table III.1**

Cross-classification: classification of the functions of government and Classification of Environmental Protection Activities

Classification of the Functions of Government (COFOG)	Classification of Environmental Protection Activities (CEPA)								
	Protection of ambient air and climate	Wastewater management	Waste management	Protection and remediation of soil, groundwater and surface water	Noise and vibration abatement	Protection of biodiversity and landscapes	Protection against particle radiation	Research and development for environmental protection	Other environmental protection activities
Waste management			X						
Wastewater management		X							
Pollution abatement	X			X	X		X		
Protection of biodiversity and landscape						X			
Related research and development								X	
Environmental protection n.e.c.									X

**Source:** Economic Commission for Latin America and the Caribbean/National Institute of Statistics and Geography (ECLAC/INEGI), "Guía metodológica: medición del gasto en protección ambiental del gobierno general", *Project Documents* (LC/W.653), Santiago, 2015.

In addition, the guide offers a methodology for calculating general government spending on environmental protection in three steps —preparation, data analysis and estimation of environmental protection expenditure— and puts forward basic recommendations and guidelines to enable each country to adapt the proposal to its particular conditions and specific needs.

## 9. Methodology of the Inter-American Development Bank

According to a study by the Inter-American Development Bank (IDB), public climate-related expenditure is defined as expenditure to tackle climate change or its impacts through actions such as mitigation or adaptation, and also includes expenditure on activities with substantial impacts on climate management or in response to climate impacts, such as natural disasters associated with extreme events. In other words, it refers to all public expenditure whose main purpose is climate action or, although it may have other main purposes, involves activities that, by their technical nature, have an impact on climate change.<sup>10</sup>

The IDB methodology is based on several of the approaches explained above: contributions from multilateral development banks and the CPEIR methodology, as well as being in line with the System of Environmental-Economic Accounting and the IMF *Government Finance Statistics Manual*.

Specifically, the proposal consists of anchoring the classification of climate expenditures to the current structure of the classification of the functions of government (COFOG) system of the IMF *Government Finance Statistics Manual*, using a double-entry functional classification matrix that employs a satellite account approach to include both primary purpose and secondary purpose of climate-relevant expenditures. Expenditures whose main purpose is climate management are reclassified in a new subdivision (as part of

<sup>10</sup> For further details, see Pizarro and others (2022).



COFOG division 5 on environmental protection), while expenditure on activities that are climate-relevant but not as their primary purpose (including those that generate a negative impact) or secondary-purpose activities, are classified using a double-entry tag (see table III.2).

Functions of government	Primary marker (climate is the main purpose)	Secondary marker (climate is a secondary purpose)
1. General public services		
2. Defence		<input checked="" type="checkbox"/> For example: emergency aid for defence expenditures after a climate-related disaster.
3. Public order and safety		<input checked="" type="checkbox"/> For example: fire control after a climate-related disaster.
4. Economic affairs		<input checked="" type="checkbox"/> For example: investment in energy projects to reduce carbon emissions.
5.1. Environmental protection		
5.2. Climate change	<input checked="" type="checkbox"/>	
6. Housing and community services		<input checked="" type="checkbox"/> For example: emergency housing for population affected by a climate-related disaster.
7. Health		<input checked="" type="checkbox"/> For example: increased investment in health services owing to climate impacts.
8. Recreation, culture and religion		
9. Education		
10. Social protection		<input checked="" type="checkbox"/> For example: employment benefits owing to climate effects.

**Table III.2**  
Climate change classification system proposed by the Inter-American Development Bank based on the classification of the functions of government

**Source:** R. Pizarro and others, *Climate Change Public Budget Tagging: Connections across Financial and Environmental Classification Systems*, Washington, D.C., Inter-American Development Bank (IDB), 2021.

In addition, activities funded by primary purpose climate expenditures are classified according to the type of action: as mitigation, adaptation or mixed. Activities that are climate-relevant but not as their primary purpose are categorized into the categories of mitigation, adaptation, mixed or having negative impacts, while secondary purpose activities are divided into the categories of recovery and emergency.

## 10. Climate budget tagging

The UNDP climate budget tagging initiative builds on the experience from other thematic budget measurement tools (such as for gender, poverty reduction, or children) and its methodological guide is based on the experience of seven case study countries in developing and applying climate budget tagging, in Bangladesh, Ghana, Indonesia, Kenya, Nepal, Pakistan and the Philippines.

This approach recognizes climate change as a cross-cutting issue that cannot be effectively addressed through traditional budget analysis, since the public policy treatment of climate change is not confined to any specific sector or programme; instead, policies and actions for mitigation and adaptation are distributed among several ministries, such as public works, agriculture, energy and transportation.

According to Bain, Nguyen y Baboyan (2019) climate budget tagging is a key tool for “identifying, classifying, weighting and marking climate-relevant expenditures in a government’s budget system, enabling the estimation, monitoring and tracking of those expenditures”. This is achieved by incorporating a climate budget tag or code into budget lines or groups of budget lines.

The tagging methodology proposed by UNDP has 10 steps, in three key phases.

Phase I: Purpose and setting of climate budget tagging

- Step 1. Define key objectives and stakeholders
- Step 2. Identify how climate budget tagging can help reach national climate change goals
- Step 3. Identify the parameters established by the Ministry of Finance

Phase II: Determine the technical design

- Step 4. Define and classify climate expenditures
- Step 5. Define weighting methodology for tagged expenditure
- Step 6. Determine how climate change expenditure will be identified in the public financial management system

Phase III: Implementation approach

- Step 7. Determine overall modality for tagging
- Step 8. Design tagging procedure
- Step 9. Determine reporting format
- Step 10. Assign roles and responsibilities for development and implementation

The first phase is to identify the purpose and setting of climate tagging. This involves defining the government's objectives and aims in introducing tagging, as well as identifying the main stakeholders involved. In addition, it is necessary to have a comprehensive mapping and understanding of both the climate change policy context and the requirements and capabilities of the public financial management system.

The second phase focuses on determining the technical design of the tagging. This involves defining and classifying climate spending, for which guidelines must be developed to identify what is and is not climate-relevant and establish a typology for climate change spending (for example, separating adaptation and mitigation). In addition, it is necessary to define how the climate relevance of expenditure will be measured and weighted, so that less weight is given to less relevant activities than to more relevant activities. This stage also determines how expenditures will be identified or tagged in the budget system, in line with existing budget classifiers and codes.

The third phase involves determining the implementation approach, including details of how tagging will be introduced, validated and reviewed. In this phase, functions and responsibilities are determined, along with the modality of tagging, degree of centralization, level of automation of the systems, possible adoption of a gradual approach and the definition of the scope, design and frequency of reporting and other results-based outputs.

## 11. Green budgeting

Green budgeting is a practice which uses the tools of budgetary policymaking to help achieve climate and environmental objectives, such as those relating to biodiversity, air quality and water quality. It involves evaluating the environmental impacts of budget policies, to ensure that they are consistent with national and international climate commitments (OECD, 2021, and European Union/IMF/OECD, 2021).

An effective approach to green budgeting is based on four key, mutually reinforcing elements (OCDE, 2021 and European Union/IMF/OECD, 2021):



- (i) A strong strategic framework to clearly establish the country's environmental priorities and objectives, for example through national plans and strategies to guide fiscal decision-making.
- (ii) The use of budget policy tools to gather empirical evidence to support decision-making and policy coherence. These tools include green budget tagging, environmental impact assessments, carbon pricing, and mainstreaming the green perspective into spending reviews and performance targets.
- (iii) Proper reporting to facilitate accountability and transparency on the alignment of the budget with green objectives and scrutiny by parliament and civil society.
- (iv) A suitable budgetary governance framework with clearly defined responsibilities and calendar of actions, linking strategic planning and budgeting and building the capacities of public servants.

Climate budget tagging is a critical tool to support green budgeting. The practice involves evaluating each budget measure and assigning it a “tag” according to its positive or negative contribution to green objectives.

According to OECD, the design of an approach to green budget tagging should incorporate several essential principles in addition to those mentioned above. For example, to promote national ownership of this tool, budget tagging should be decided on the basis of national priorities and adapted to each country's context. It is also essential to align the categories of the tagging system with each country's particular climate or environmental objectives. Tagging can benefit from a weighting system that allows some budget measures to contribute partially to these objectives. Countries should also attempt to tag both positive and negative measures, either across the whole budget or at least in priority sectors such as agriculture, transport, energy and the environment, including by tagging disaster risk management measures and adaptation separately from mitigation. Given that tagging is inherently subjective, clear guidance, review and validation processes are essential to ensure consistency and avoid greenwashing.<sup>11</sup>

## B. Summary and comparison of national methodologies for measuring cross-cutting climate-relevant public expenditure in six Latin American countries

As noted in World Bank (2021a), there are three essential design elements for climate budget tagging methodologies: the identification of climate-relevant expenditures; the identification of appropriate coverage; and the climate spending estimation approach. Table 3 compares these aspects for the six countries under study, along with other elements of the methodologies.

Regarding the year in which tagging began to measure climate expenditure in Latin America, the pioneering countries were Mexico and Peru. Mexico was the first, with an advance initiative in 2013, while Peru began in 2014, reflecting an early awareness of the importance of measuring resources going to climate goals. Colombia, Honduras and Nicaragua started their methodologies in 2017. Although Colombia implemented the methodology in 2017, it has data from 2011, which gives a fuller perspective of the evolution of climate investment. Argentina's experience has been more recent, as it adopted budget tagging in 2023.

<sup>11</sup> For further details, see OECD (2021).

**Table III.3**  
Latin America (6 countries): summary of methodologies for tagging of public expenditure on climate change

	Argentina	Colombia	Honduras	Mexico	Nicaragua	Peru
Starting year	2023	2017 (data are available from 2011)	2017	2013	2017	2014
Definition of climate budget tagging	Expenditure on primary climate objective, activities with climate impacts or in emergencies or during recovery from climate impacts.	Actions explicitly related to climate change; actions that contribute to mitigation, adaptation or both.	Expenditure on activities whose primary or secondary aim relates to climate change or which make a direct or indirect climate contribution.	Expenditure on measures or actions to mitigate and adapt to climate change, whether explicit or implicit.	By the projected impact of the activity on the climate. Four dimensions are included: adaptation and disaster risk; loss and damage; mitigation; and environmental management.	...
Taxonomies	None.	List (non-exhaustive) of actions in different sectors that may have an effect on climate change. Questions to differentiate between mitigation, adaptation or both.	Indicative list of general climate-relevant activities, grouped by sector.	Questions to identify whether actions contribute to adaptation, mitigation or both, based on the objectives of the national climate change policy enshrined in the General Climate Change Law, the Special Climate Change Programme and nationally determined contributions.	Indicative list of relevant activities.	...
Coverage	National administration.	Covers 12 selected climate-relevant sectors at the national, regional and local levels. <sup>a</sup> Includes investment spending only.	Non-financial public sector (national administration, decentralized institutions and public enterprises, not local governments).	Federal public sector (federal public administration entities and State enterprises).	Central government (all ministries and entities).	National, regional and local government.
Estimation approach	Tagged at the lowest budget item category (activity and works). New categories are those that fully contribute to sustainable environment and climate change; for existing categories: weighting is applied. <sup>b</sup>	Activities are identified and weighted at 100%.	Applied at the lowest level of budget structure (activity). Weightings of climate relevance (90%–100%, 60%–80%, 30%–50%, 10%–20%).	Identification of the budget line and quantification at the budget item level (greater disaggregation). Explicit: 100%; implicit: partial.	At the activity level (lowest level of the budget structure). No weighting.	The methodology is applied at the lowest level of the budget structure (activity, investment action or works).
Classifications	Institutional, object of expenditure, source of financing, budget line, economic category, purpose and function, climate category.	Sectoral, geographical, institutional, climate purpose (adaptation, mitigation, both), origin of financing, strategic and instrumental lines of the national climate change policy.	By priority sectors, functional classification (some years only), climate category, institution, financing source and expenditure group.	Administrative, functional, economic, object of expenditure, source of financing, geographic, programmatic structure.	Institutional, by type of climate spending (adaptation and disaster risk reduction, loss and damage, mitigation and general environmental management), economic, by origin of financing.	Economic, by source of financing, functional-budget line, institutional, geographical, type of climate measure.
Embedding in budget process	Introduced in the preliminary budget and presented in the message that accompanies the General Budget Law of the National Administration.	Ex post after the budget process.	As part of the budget formulation process. Data are entered into the financial information system.	Proposed as a cross-cutting annex in the draft federal expenditure budget that is subsequently approved in the Federal Expenditure Budget law.	Included during budget preparation.	...
Publication	Open database, interactive tables and graphs, quarterly monitoring reports, message communicating the General Budget Law of the National Administration.	Databases, interactive maps, tables, graphs and tracking, reporting and verification reports.	The consolidated climate change budget is published in one of the volumes of the General Budget of Revenue and Expenditures of the Republic.	Open database. Published as an annex with its methodology in the expenditure budget bill and law.	Annex I of the central government budget. Budget execution report.	Database in the economic transparency portal of the Ministry of Economy and Finance.

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official country methodologies.

<sup>a</sup> At the time of writing, the information from departmental and municipal budgets was available only up to 2020.

<sup>b</sup> Although the system allows weighting on the basis of historical calculations of the impact on the budget line of expenditure related to mitigation or adaptation, in this first year of application of the methodology it has not been necessary to weight climate expenditure.

In their definition of climate-relevant expenditures and activities, the countries analysed all coincide in distinguishing climate-relevant activities based on their expected impact. This contrasts with approaches in countries in Asia and Africa that include only items or activities that are specifically mentioned in national climate change policy documents or that have climate change as a primary or direct aim.<sup>12</sup> In general, the definitions adopted by Latin American countries conform to the OECD Rio markers and IDB definitions, although with certain adaptations and differences in terminology. They all afford emphasis to actions that contribute to adaptation to climate change and mitigation of its effects, although in Honduras emphasis is placed on the management of climate-related disasters, which is accounted separately from adaptation.

Regarding taxonomies or lists of climate-relevant activities as part of the tagging methodology, Argentina and Peru<sup>13</sup> have chosen not to use specific taxonomies (or, at least, have not published any). Colombia,<sup>14</sup> Honduras and Nicaragua use taxonomies that are merely indicative, in other words they are not intended to be exhaustive but rather a guide to climate-relevant activities. In addition, Colombia, like Mexico,<sup>15</sup> includes questions to identify whether actions contribute to adaptation, mitigation or both.

An important aspect of Colombia's approach is that it specifically excludes activities that have an adverse effect on the environment or society, even if they contribute to mitigation or adaptation. These include nuclear plants, large hydroelectric dams, fracking and other technologies that lack management or control of negative externalities.

With respect to the level of coverage of the tagging methodologies reviewed, the majority cover central government public expenditure in all (or many) entities and sectors. Furthermore, Mexico includes State enterprises, while Colombia and Peru also include regional and local governments. However, Colombia has data for subnational government levels only up to 2020, so this study includes data only from the general national budget and the general royalties system. All countries include both current and capital spending in climate-relevant expenditure, except Colombia, which includes investment spending only.

In the estimation approach, all the countries apply tagging at the lowest level of the budget (such as activity, project and works), to ensure that the estimate includes only expenditures that are climate-relevant and excludes resources going to activities that do not have climate change adaptation or mitigation impacts. Only two countries (Honduras and Mexico) apply climate relevance weighting to estimate the climate-relevant proportion of activity or project expenditure. In the case of Argentina, the methodology is designed to allow weighting by means of historical calculations of the impact of mitigation or adaptation expenditures on the category, but in this first year of estimates it has not been necessary to use them.

Each country presents the data in databases or government reports, via different classifications of spending. All six cases analysed use some kind of institutional classification in addition to the source of financing. With regard to economic classification—distinguishing current from capital climate-relevant expenditures—, Argentina,

<sup>12</sup> For an analysis of the methodologies used in different countries around the world, see World Bank (2021a).

<sup>13</sup> In the case of Peru, no methodology details had been published at the time of writing.

<sup>14</sup> In 2022, the Government of Colombia published its Green Taxonomy, which offers a common language to identify, classify and differentiate economic assets and activities that contribute substantially to the achievement of the country's environmental objectives. It is aimed at supporting bond issuers, investors, financial institutions and public entities, among others, that are interested in green or environmentally sustainable investments. The taxonomy is dynamic, given the need to complement and periodically update the economic assets and activities included. See [online] [https://www.taxonmiaverde.gov.co/webcenter/ShowProperty?nodeId=/ConexionContent/WCC\\_CLUSTER-191401](https://www.taxonmiaverde.gov.co/webcenter/ShowProperty?nodeId=/ConexionContent/WCC_CLUSTER-191401).

<sup>15</sup> In March 2023, the Government of Mexico published the first edition of its Sustainable Taxonomy, which consists of a system of classifying activities by their contribution to climate change adaptation and mitigation, based on certain criteria. It seeks to facilitate financing flows and the mobilization of capital into investments in activities that contribute to the achievement of environmental and social objectives, and to generate reliable information for the market, contribute to mitigating the risk of greenwashing and provide greater certainty and transparency. See [online] [https://www.gob.mx/cms/uploads/attachment/file/809773/Taxonom\\_a\\_Sostenible\\_de\\_M\\_xico\\_.pdf](https://www.gob.mx/cms/uploads/attachment/file/809773/Taxonom_a_Sostenible_de_M_xico_.pdf).

Mexico, Nicaragua and Peru make this distinction, while Colombia includes only climate expenditures. Honduras presents the data classified by group of expenditure (personal services, non-personal services, materials and supplies, capital goods, transfers and grants, financial assets and public debt service). Argentina, Mexico and Peru also classify expenditures by object of expenditure.

Argentina, Honduras, Mexico and Peru classify climate-relevant spending by function of government, while Colombia classifies by sectors and subsectors. With the exception of Honduras, the countries issue data classified by budget line, although the level of disaggregation varies in each case and in Colombia data are available only at the activity level. Three countries (Colombia, Mexico and Peru) publish information to distinguish where the expenditure occurs (state, department, municipality and so on), that is, they include a geographical classification.

All the countries except Mexico also classify expenditure by climate purpose or category of adaptation, mitigation or both. Although Mexico's methodological guide includes questions regarding the identification and classification of items according to their contribution to climate change adaptation or mitigation, at the time of writing this categorization did not yet appear in its databases and official reports. Honduras quantifies climate-related disaster management separately from adaptation, while Nicaragua also has categories for loss and damage and general environmental management. In Colombia and Peru, disaster risk management and response differentiated as a subcategory or activity of adaptation.

Colombia is the only country to publish the link between the different expenditure items and its national climate objectives, since the budget information is presented according to the strategic and instrumental lines of the National Climate Change Policy. Although Mexico sets adaptation and mitigation objectives on the basis of legislation (General Climate Change Law), national planning instruments (Special Climate Change Programme) and its nationally determined contributions, linking tagged spending with the national climate change objectives, this information has not been published in the open-access databases or in the annexes that accompany the budget.

Regarding the way tagging is included in the budget process, most of the countries (Argentina, Honduras, Mexico, Nicaragua and Peru) mark climate-relevant expenditures during budget preparation. Colombia tags its expenditure *ex post*, i.e. after the budget process is completed, thereby providing a review of climate-relevant expenditures. Argentina, Mexico, Nicaragua and Peru not only publish the climate spending approved in the budget, but also carry out quarterly or annual monitoring of this spending and publish figures for accrued or executed spending.

Finally, the countries take different routes to publishing climate-relevant public spending. Climate-relevant public resources are reported alongside the budget in four of the countries examined (Argentina, Honduras, Mexico and Nicaragua). In Argentina they are published in the message issued along with the national general budget law, in Honduras they are included in one of the budget volumes, while in Mexico and Nicaragua climate spending is reported as a budget annex. Four countries (Argentina, Colombia, Mexico and Peru) publish open data with fully downloadable databases with different levels of detail. There are also four countries that publish some type of analytical report with tables, graphs and explanations regarding climate spending (Argentina, Colombia, Honduras and Nicaragua). Argentina, Colombia and Nicaragua publish reports explaining and analysing executed climate expenditures, although Colombia's has not been updated (the most recent report published carries information up to 2020). In Nicaragua, this analysis is published in the budget execution report. Honduras also prepares an analytical report, in this case with the figures that are budgeted, which is published together with the budget.



## C. Proposal for classification of cross-cutting climate-relevant public expenditure

With a view to presenting the data on public climate expenditure and analysing governments' efforts to pursue climate change mitigation and adaptation policies, different ways of classifying and grouping this information are proposed below to facilitate comparability between countries. However, the greatest caution must be exercised in making international comparisons, taking into account the methodological differences set forth in section III.B.

### 1. Classification of expenditure by function

According to the *Government Finance Statistics Manual 2014* (IMF, 2014), the classification of expenditure by function is a detailed classification of the socioeconomic functions and objectives pursued by government units through different types of expenditure. The functions are classified in 10 divisions, as summarized in table III.4.

Function	Description
1. General public services	Expenditure concerning the administration, operation or support of executive and legislative organs, expenditure on financial, fiscal and external affairs, spending on general services, public debt transactions (interest payments) and transfers of a general character between different levels of government.
2. Defence	Outlays on military defence, civil defence and foreign military aid.
3. Public order and safety	Police services, fire protection services, law courts and prison administration.
4. Economic affairs	Spending on general economic, commercial, and labour affairs; administration of affairs, services and programmes concerning agriculture, forestry, fishing and hunting; fuel and energy; mining; manufacturing and construction; transport; communication; and other industries (such as distribution, storage, warehousing, hotels, restaurants and tourism).
5. Environmental protection	Waste and wastewater management; pollution abatement; protection of biodiversity and landscape; environmental protection research and development; and other expenditures on environmental protection.
6. Housing and community amenities	Outlays on affairs and services concerning housing development, slum clearance, construction of dwellings, community development, planning of new communities, water supply and street lighting.
7. Health	Outlays on services provided to individuals or collectively. Grouped into medical products, appliances, and equipment; outpatient services; hospital services; and public health services.
8. Recreation, culture, and religion	Provision of recreational, sporting and cultural services; operation of facilities for these activities; administration, supervision and regulation of broadcasting and publishing affairs; and spending on religious and other community services.
9. Education	Services provided to individual pupils and students and expenditure on services provided on a collective basis (such as formulation and administration of government policy; standards; regulation; and supervision of educational establishments).
10. Social protection	Services and transfers provided to individuals and expenditure on services provided on a collective basis (such as formulation and administration of social policy; formulation and enforcement of related legislation). Covers the following groups: sickness and disability; old age; survivors; families and children; unemployment; housing; and other policies combatting social exclusion.

**Table III.4**  
Classification  
of expenditure by  
government function

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Monetary Fund (IMF), *Government Finance Statistics Manual 2014*, Washington, D.C., 2014.

**Note:** Each of the 10 functions includes the research and development expenditure related to that function.

Although division 5, expenditure on environmental protection, concerns public expenditure on policies and actions for climate change adaptation and mitigation, as noted earlier, climate issues cut across the different functions of government. There are programmes and actions whose main purpose is not climate change, but which contribute to mitigation and adaptation and are distributed among the different government functions, such as certain public works, agriculture, renewable energies, transportation and fire protection programmes.

## 2. Economic classification of expenditure

To the extent permitted by the available information, the analysis distinguishes between current and capital spending on climate change adaptation and mitigation.

According to the IMF Manual (2014), “The economic classification of expense identifies the types of expense incurred according to the economic process involved. When supplying goods and services to the community, a government unit may produce the goods and services itself and distribute them, purchase them from a third party and distribute them, or transfer cash to households so they can purchase the goods and services directly.”

This is because the government assumes various costs when providing goods and services, for example, the payment of wages to its employees, the use of goods and services, or the depreciation of assets. It also carries out transfers (cash or in kind), such as subsidies, grants and social benefits, in order to redistribute income and wealth.

Table III.5 summarizes the economic classification of expenditure and briefly describes each of the categories it includes.

**Table III.5**  
Economic classification  
of expenditure

Type of expenditure	Category	Description
Current expenditure	Wages and salaries	Payments in cash to employees in return for services supplied and contributions made by the government as an employer.
	Purchase of goods and services	Includes all goods and services purchased in the market.
	Interest payments	Payments for the use of borrowed money.
	Subsidies and current transfers	Current unrequited payments made by the government.
	Other current expenditures	All types of current transfers not elsewhere classified.
Capital expenditure	Acquisition of fixed capital assets	Payments made to purchase new or existing durable goods, or their production undertaken by the government itself, for non-military productive purposes.
	Capital transfers	Unrequited payments, not producing or settling financial credit, made to enable recipients to acquire capital assets.
	Other capital expenditures	All types of capital transfers not elsewhere classified.

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Monetary Fund (IMF), *Government Finance Statistics Manual 2014*, Washington, D.C., 2014 and CEPALSTAT.

## 3. Classification by category or type of climate expenditure

It is an interesting exercise to group the information on public climate spending by its contribution to climate policy objectives, that is, by category or type of climate spending. The two main categories are adaptation and mitigation, although some actions contribute simultaneously to both objectives. In addition, countries that have more detailed systems treat disaster risk management separately from adaptation.

Table III.6 sets out the definitions of the Rio markers for activities that contribute to the objectives of the United Nations Framework Convention on Climate Change, developed by the OECD Development Assistance Committee.

It is also possible to cross-classify climate-relevant public expenditures. It is particularly interesting to cross the economic classification and the classification by climate objective, in order to identify whether programmes and activities impacting climate change adaptation or mitigation are funded mainly by current or capital expenditure.



**Table III.6**  
Definitions and examples of Rio markers for climate change adaptation and mitigation activities

Activity	Description	Examples
Adaptation	An activity that intends to reduce the vulnerability of human or natural systems to the current and expected impacts of climate change, including climate variability, by maintaining or increasing adaptation and resilience. This encompasses a range of activities from information and knowledge generation, to capacity development, planning and the planning and implementation of climate change adaptation actions.	<ul style="list-style-type: none"> <li>– Research into adaptation, impact and vulnerability assessments, and early warning systems, among others.</li> <li>– Inclusion of adaptation in national and international policies, plans and programmes.</li> <li>– Enhanced regulations and legislation for adaptation.</li> <li>– Water conservation, drought-resistant crops and water-saving irrigation methods.</li> <li>– Forest management, ecological restoration, park and wetland management.</li> <li>– More sustainable fishing practices.</li> <li>– Flood prevention and management (watershed management, reforestation, wetland restoration).</li> <li>– Disaster prevention and preparedness.</li> <li>– Widening and deepening of canals.</li> <li>– Management of coastal areas and port infrastructure.</li> <li>– Construction and defences (dams).</li> <li>– Adaptation in the tourism sector.</li> </ul>
Mitigation	An activity that contributes to the objective of stabilization of greenhouse gas (GHG) concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system, by promoting efforts to reduce or limit GHG emissions or to enhance GHG sequestration.	<ul style="list-style-type: none"> <li>– Renewable energies.</li> <li>– Energy efficiency measures.</li> <li>– Waste management and wastewater treatment.</li> <li>– Technology and capacity-building for control, reduction and prevention of GHG emissions.</li> <li>– Sustainable management of forests, oceans and other ecological systems.</li> <li>– Preparation of national GHG inventories, national plans and legislation on climate change; institutional capacity-building.</li> <li>– Education, training and awareness-raising on climate change.</li> </ul>

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Organisation for Economic Co-operation and Development (OECD), *OECD DAC Rio Markers for Climate Handbook*, 2016.

## D. Government spending on environmental protection

As explained in section III.A, the environmental protection function is one of the 10 functional categories established in the *Government Finance Statistics Manual 2014* (IMF, 2014) and includes items and activities whose primary purposes is waste management, wastewater management, pollution abatement, protection of biodiversity and landscape, or research and development relating to environmental protection.

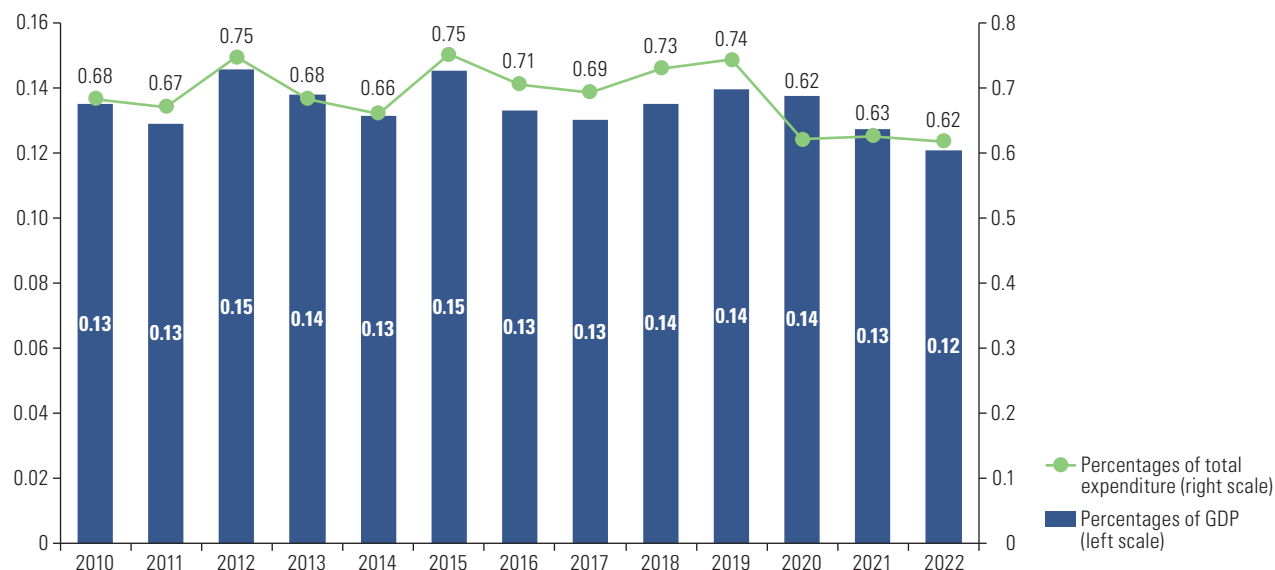
Average public spending on environmental protection by the central government in 16 Latin American countries was very insignificant in the period 2010–2022, in relation both to total spending and to GDP. What is more, it has not shown any appreciable change, remaining at between 0.12% and 0.15% of GDP and representing under 1% of total central government expenditures (see figure III.1).

Although the overall resources allocated to environmental protection have remained relatively stable in the past decade, their composition has changed in the 10 countries with disaggregated data available. Resources allocated to activities concerning wastewater management have decreased, while those aimed at pollution abatement or protection of biological diversity and landscape have risen as a share of total expenditure on this function of government (see figure III.2).

At the same time, the levels, evolution and structure of expenditure on environmental protection are highly diverse in the countries of the region (see figure III.3). Although levels of environmental spending have been relatively stable in most of the countries, some, such as Honduras and Panama, have reduced their allocations to this government function over the past decade. Moreover, most of the region's countries spend less than 0.1% of GDP on environmental protection, while Peru stands out with 0.44% of GDP (although its statistics refer to the general government, that is, they include regional and local governments).

**Figure III.1**

Latin America (16 countries): central government expenditure on environmental protection, 2010–2022  
(Percentages of GDP and percentages of total expenditure)

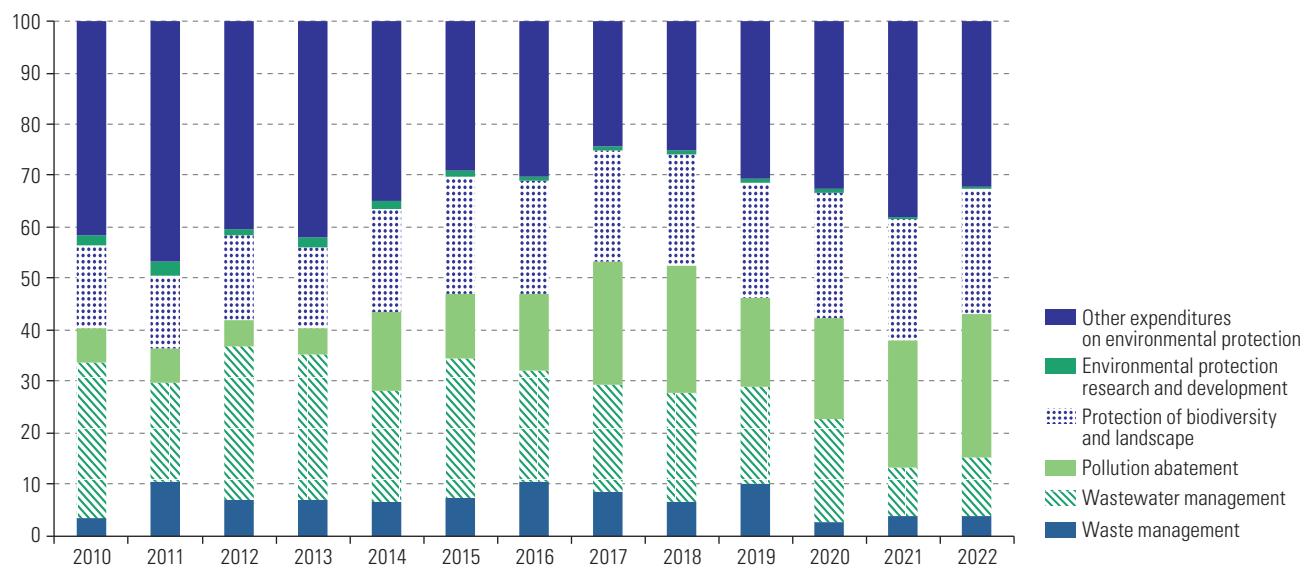


**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of CEPALSTAT database.

**Note:** Refers to the simple average for 16 countries with available data: Argentina, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru and Uruguay.

**Figure III.2**

Latin America (10 countries): central government expenditure on environmental protection by division, 2010–2022  
(Percentages of expenditure on environmental protection)



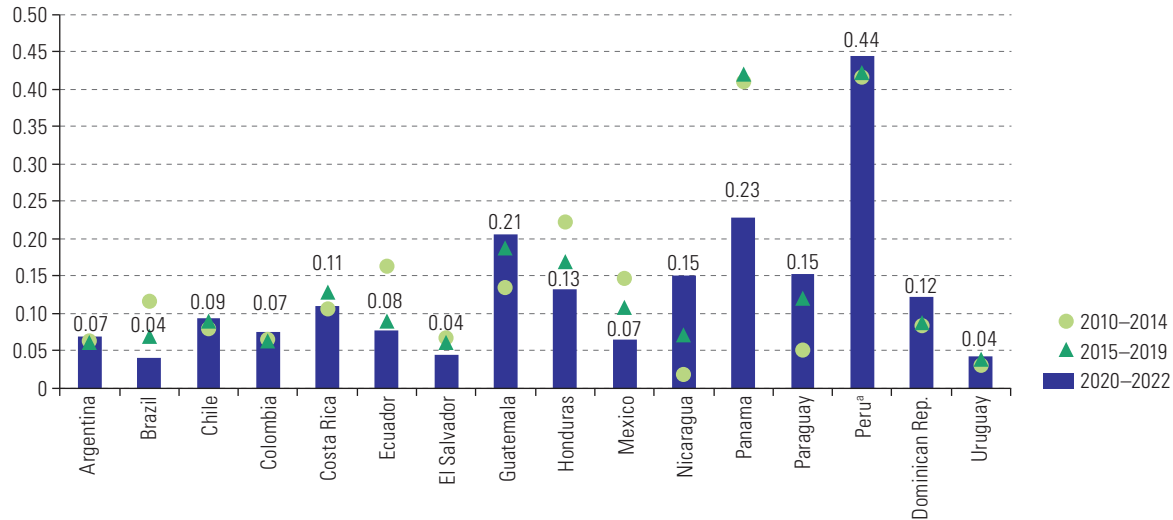
**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of CEPALSTAT database.

**Note:** Refers to the simple average for 10 countries with available data: Brazil, Chile, Colombia, Dominican Republic, Ecuador, Guatemala, Honduras, Mexico, Panama and Peru.



**Figure III.3**

Latin America (16 countries): central government spending on environmental protection by country, 2010–2022  
(Percentages of GDP)



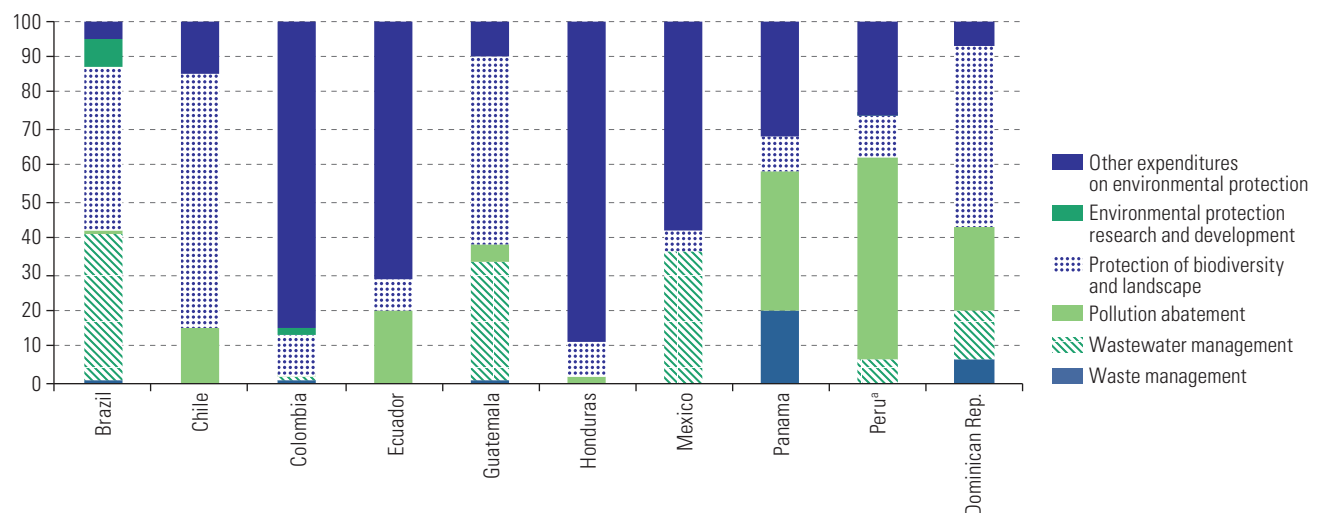
**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of CEPALSTAT database.

<sup>a</sup> The coverage for Peru refers to the general government.

The composition of spending on this function of government also varies from one country to another (see figure III.4). Some Latin American countries, such as Brazil, Chile, the Dominican Republic and Guatemala, allocate around 50% or more of environmental protection resources to finance programmes aimed at protecting biological and landscape diversity. In Panama and Peru, however, a greater proportion of spending is allocated to pollution abatement. This item is also significant in Chile, the Dominican Republic and Ecuador. Conversely, resources aimed at financing wastewater management are important in Brazil, Guatemala and Mexico.

**Figure III.4**

Latin America (10 countries): distribution of central government expenditure on environmental protection by division, 2022  
(Percentages of total expenditure on environmental protection)



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of CEPALSTAT database.

<sup>a</sup> The coverage for Peru refers to the general government.

As has been noted, however, the classification of government expenditure by function is based on the primary purpose of each item or activity. As a result, the analysis of expenditure on the environmental protection function does not cover all climate-relevant public spending, given that climate issues cut across the diverse areas and functions of government.

Accordingly, section III.E below offers a comprehensive analysis of cross-cutting climate-relevant public spending in six countries in the region.

## E. Quantification of cross-cutting climate-relevant public expenditure in six Latin American countries

The analysis of official figures reveals a notable disparity in public spending on climate change adaptation and mitigation across the six selected countries in the region. These differences refer to both the level and composition of expenditures and the relevance of the different programmes and activities involved. To a large extent, this divergence reflects the methodological differences mentioned earlier, which make comparison between countries difficult and limited.

It is also important to note that the figures presented below could be adjusted as countries make improvements to their methodologies and more detailed access to official data becomes available.

### 1. Analysis of cross-cutting climate expenditure by function of government

Around 2022–2023,<sup>16</sup> public expenditure on climate change adaptation and mitigation was less than 1% of GDP in Argentina, Colombia, Mexico, Nicaragua and Peru. Conversely, it came to over 9% of GDP in Honduras, where it represented 24% of total non-financial public sector expenditure. In the other five countries, this category of public expenditure accounted for 3% or less of total spending (see table III.7).

Various components of the methodology described above are involved in these widely varying figures, including the criteria used to classify an item of expenditure as being related to climate change, the scope of governmental and sectoral coverage, and the use of figures for the executed, current or approved budget.

In the particular case of Honduras, the methodology is based on programmes and activities in a wide range of sectors, including health and education, and the tagging is done at the budget formulation stage, so the published information refers to the approved budget (which may be larger than the executed budget) and includes the national government plus decentralized institutions. According to the official figures, 61% of the approved climate budget for 2022 corresponded to entities of the national government and the rest to decentralized institutions. According to information from the Secretariat of Finance, 72% of the approved climate budget was executed in 2023.

<sup>16</sup> The data are from 2022 for Colombia, Honduras and Nicaragua and from 2023 for Argentina, Mexico and Peru.

**Table III.7**

Latin America (6 countries): public expenditure associated with climate change, by functions of government, around 2022 and 2023  
(Percentages of GDP and of total expenditure)

	Argentina	Colombia	Honduras	Mexico	Nicaragua	Peru
General public services	0.006	0.000	0.054	0.001	0.000	0.000
Defence	0.000	0.000	0.020	0.000	0.000	0.000
Public order and safety	0.005	0.000	0.101	0.000	0.000	0.005
Economic affairs	0.032	0.058	3.916	0.501	0.430	0.154
Environmental protection	0.066	0.054	0.052	0.006	0.050	0.246
Housing and community services	0.228	0.014	0.106	0.009	0.000	0.111
Health	0.000	0.000	2.143	0.001	0.106	0.022
Education	0.000	0.001	2.833	0.011	0.001	0.000
Social protection	0.000	0.000	0.365	0.107	0.031	0.000
<b>Climate change expenditure</b> (Percentages of GDP)	<b>0.34</b>	<b>0.13</b>	<b>9.59</b>	<b>0.64</b>	<b>0.62</b>	<b>0.54</b>
<b>Climate change expenditure</b> (Percentages of total expenditure)	<b>1.59</b>	<b>0.60</b>	<b>24.17</b>	<b>2.10</b>	<b>3.02</b>	<b>2.43</b>

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of CEPALSTAT database.

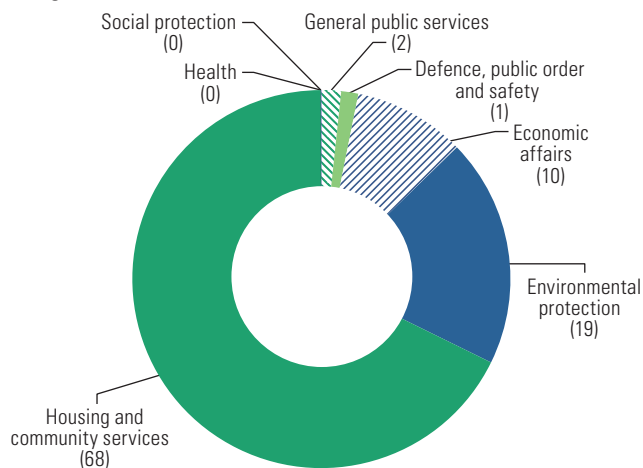
**Note:** Figures refer to executed expenditures in 2022 for Colombia, Honduras (approved budget) and Nicaragua; for 2023, they refer to the current budget for Argentina, the revised budget for Mexico and the executed budget for Peru. In Argentina, government-level coverage refers to the national public administration (central government, social security institutions and decentralized agencies); in Colombia, it includes the national government and the general royalties system; in Honduras, it encompasses the non-financial public sector (national government and decentralized institutions but not local governments); in Mexico, coverage includes the federal government (federal government entities and State-owned production enterprises); in Nicaragua, it includes the central government; and in Peru, it takes in the general government.

In contrast, Colombia takes a more conservative, exclusionary approach to the application of this methodology. When a measure related to climate change or a measure that plays an important role in mitigation or adaptation also has an adverse impact on the environment and society, it is not included, so the methodology excludes measures that have negative externalities. For example, the National Planning Department (DNP, 2021) states that it has tracked large investments in mass transit systems but it has not included them in its estimates of public climate finance because it is not feasible to disaggregate the information at the level that would be necessary to determine how much of that investment actually has an impact in terms of a reduction in emissions and how much may have negative spillovers (owing, for example, to the impacts of the required grey works and infrastructure). It is also important to bear in mind that Colombia only tracks capital expenditure; it does not tag current expenditure associated with climate change.

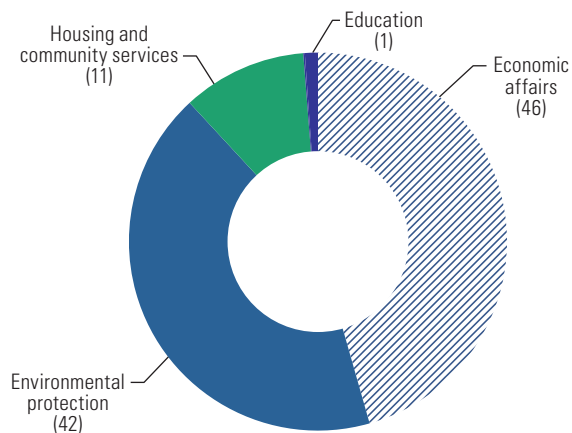
A cross-cutting analysis of disbursements for climate change adaptation and mitigation, disaggregated by function of government, indicates that programmes related to economic affairs are the largest climate expenditure category in four countries: Colombia, Honduras, Mexico and Nicaragua. In Argentina, on the other hand, spending on housing and community services represents the lion's share of climate expenditure, while, in Peru, the largest share goes to environmental protection (see table III.7 and figure III.5).

**Figure III.5**  
Latin America (6 countries): shares of different functions of government in total public expenditure associated with climate change, around 2022 and 2023  
(Percentages)

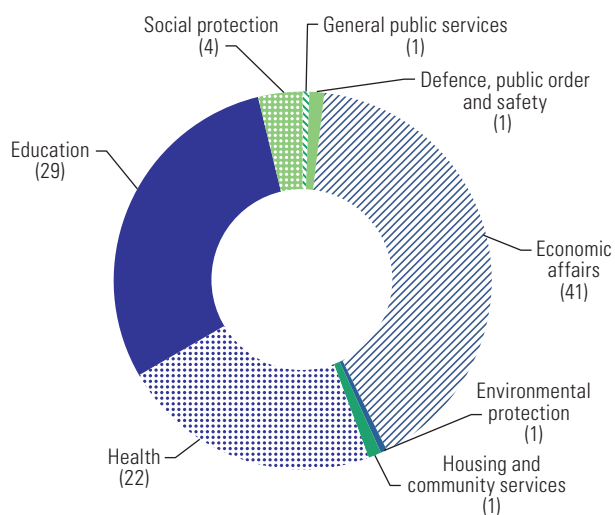
**A. Argentina**



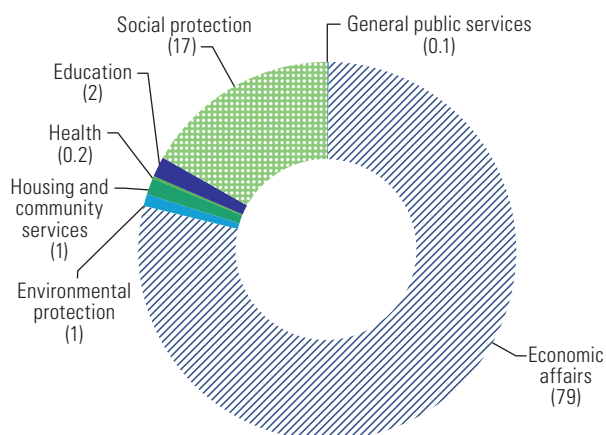
**B. Colombia**



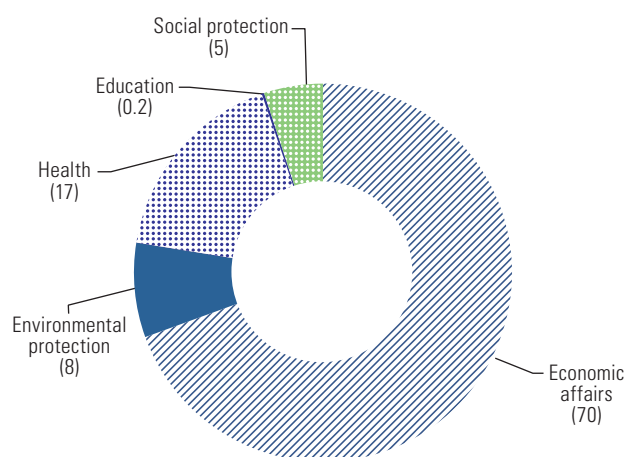
**C. Honduras**



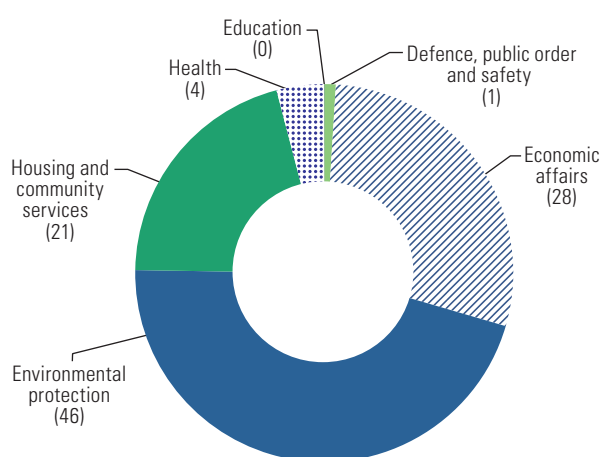
**D. Mexico**



**E. Nicaragua**



**F. Peru**



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official data from the countries.



While the category of economic affairs is the largest for Mexico, Nicaragua, Colombia and Honduras, the size of that share is quite different in each case. In the first two of these countries, 70% or more of total climate spending goes to this function of government, whereas, in the last two, the share is around 40%.

In Colombia, within that functional category, energy-sector activities were especially prominent in 2022, particularly those related to the generation of electricity, the expansion of access to this power source and improvements in energy efficiency. Examples include the supply of electricity to rural areas or areas that had previously not been connected to the grid and the implementation of sustainable energy projects in off-grid areas that chiefly use renewable energy sources or hybrid generation systems. These projects also provided training on energy efficiency and rational energy use to the surrounding communities. There has also been a substantial amount of investment in solar energy, such as the construction of photovoltaic energy systems in off-grid areas as a way of supplying electricity to rural locations. Considerable resources have been allocated to the agricultural sector and rural development, including the introduction of production units for self-consumption for poor and vulnerable populations, the establishment of kitchen gardens in different areas as a means of bolstering food security, the start-up of sustainable production initiatives, technology transfers and the introduction of innovative farming techniques, and the technical, productive and commercial upgrading of aquaculture ventures. The transport sector has also seen a great deal of activity in urban development and mass transit systems and the maintenance and upgrading of rail and river transport networks, in particular. Another focus has been the construction and improvement of bike paths.

In Mexico, in 2023 the functional category of economic affairs accounted for nearly 80% of all resources used for climate change adaptation and mitigation, with three budget items representing the bulk of that amount. The first is mass transit projects focusing primarily on furthering the economic development of the south-eastern part of the country by improving its transportation system and building railroad infrastructure, especially the intercity Tren Maya. The objective here is to improve the quality of life of the population while protecting the environment and to ramp up industrial activity, employment and tourism in that region. The second item concerns the transport of natural gas by the Federal Electricity Commission (CFE) and includes the purchase of fuel for subsidiaries. The third is the Natural Disaster Fund (FONDEN), which finances the reconstruction of infrastructure damaged by natural disasters.

In Nicaragua, the records for 2022 show that economic affairs accounted for 70% of climate spending, with the largest share of those resources being used to boost installed capacity for the generation of electrical power while increasing the percentage of power that is generated using renewable fuels and installing energy-efficient technologies. Other major components were road construction and maintenance and resource transfers to the Nicaraguan Institute of Agricultural Technology (INTA), which develops and transfers agricultural technologies that boost yields and improve the population's quality of life.

Although, in Honduras, at 41%, the economic affairs category represented the largest share of climate spending in 2022, other functions of government also figured prominently, such as education and health, which represented 30% and 22% of climate-related expenditure, respectively. The main components of expenditure in the economic affairs category dealt with boosting energy efficiency, curbing energy demand and promoting the use of renewable energy sources. Other climate objectives for which a somewhat smaller share of funds was allocated were the promotion of irrigation infrastructure and agricultural water use management and programmes aimed at encouraging producers to use climate-friendly cropping and stock-raising technologies and inputs.

Economic affairs is not the category that represents the largest share of climate spending in Argentina or Peru, but it nonetheless absorbs a significant percentage of these funds. The 10% of total spending on environmental sustainability and climate change devoted to this category in Argentina in 2023 included three principal line items: policies focused on increasing production and the productivity of agricultural chains on a sustainable basis; fisheries research and development; and the design and implementation of policies on electrical power (particularly the development of renewable energy projects). More specifically, the work being done under the “*Avanzar Productivo*” programme, which is included in the first item mentioned above, is a highly important part of this function of government. Its purpose is to provide financial assistance to strengthen the capacity of small and medium-sized soy and maize producers, with the amount of such assistance being determined on the basis of the size of the parcel being worked and the volume of each producer’s harvest. The producers, who must make a commitment to help to conserve biodiversity and improve the quality of natural resources, use these funds to buy fertilizers and seeds that will help them increase their output and attain higher levels of productivity.

The economic affairs category of climate spending by Peru in 2023 included three main initiatives. One of these was the dredging of irrigation channels and ditches and the development of agricultural techniques for dealing with hydrometeorological hazards as part of the line item for reducing vulnerability to natural disasters and coping with emergencies caused by such disasters. Another was action aimed at shortening travel times and reducing the environmental costs of urban transport systems while also making them safer. This area of effort encompasses the operation and maintenance of the urban railway transport system and of bus system infrastructure. A third item for which a somewhat smaller but still considerable amount of funding was allocated was the competitiveness and sustainable use of forest and wildlife resources, which includes: the reclamation of deforested areas, degraded land and soil, and ecosystems; the restoration of environmental services through sound water management; initiatives for improving and expanding sustainable cropping capacity; improving the quality of forest species; and developing agroforestry production capacities.

The function of government to which Peru allocated the most climate-related funding was environmental protection, with one of the main components being solid waste management (collection, transport, optimization, treatment and final disposal of municipal solid wastes; street sweeping and cleaning of public spaces; and public education and awareness-raising regarding solid waste management). Another line item is the conservation and sustainable use of ecosystems, which includes ecosystem restoration and enhancement, the expansion and restoration of forest cover and the enforcement of environmental laws and regulations. Funding for the conservation of biodiversity and the sustainable use of natural resources was also considerable and was directed towards the sustainable use of protected natural areas and studies on disaster risk assessment (reduction of vulnerability to natural disasters and measures for coping with emergencies caused by such disasters), which provide information useful in monitoring the risk of hydrometeorological and other weather-related hazards, as well as risks associated with El Niño. This line item also includes the development of measures for providing physical protection in hazardous situations.

Environmental protection spending levels are also considerable in Argentina, Colombia and Nicaragua.

In Argentina, some of the largest budget allocations in this functional category are for the sustainable development of the Matanza-Riachuelo Basin, environmental monitoring, financial assistance for State-owned companies and other bodies, the conservation and management of protected natural areas and environmental policies dealing with natural resources. Examples of specific activities include fire management, urban solid



waste management, implementation of systems for protecting and conserving natural and cultural resources, oversight of the public use made of these resources, scientific research and environmental education, the monitoring and eradication of exotic species, measures for combating deforestation and sustainable forest management.

In Colombia, the work being done in the area of environmental protection mainly focuses on biodiversity conservation and forest governance. More specifically, areas of effort include the conservation of ecosystem services; the implementation of surveillance and control systems for protecting water resources, biodiversity and the environment in general; underwater works for the conservation of marine ecosystems; and the reclamation and reforestation of degraded areas. Work is also being done in the areas of irrigation management and climate-related disaster management, with the latter primarily taking the form of the construction and maintenance of retaining walls or structures and flood defences. Work is also being done on water resource management, use and treatment. Examples of specific activities include water treatment and management works in priority watersheds and other related activities (optimization, construction of wastewater treatment plants, the construction of modern sewerage networks and the development of individual basic sanitation solutions). Research work is being done with a view to building up the country's low-carbon, climate-resilient biodiversity management capacity; hydrological, meteorological and environmental knowledge-building; and the use, reuse and management of solid waste.

In Nicaragua, the functional category of environmental protection includes a line item for the deconcentration of environmental management as a means of enhancing the regulation, surveillance and policing of protected areas through the construction of infrastructure works, the dissemination of good practices and the control of illegal trafficking in flora and fauna. It also includes general environmental management and the conservation and regulation of protected areas, biodiversity and natural resources both within and outside the scope of the National System of Protected Areas. Steps are also taken to promote alternative, nature-based economic activities at the community level and to support natural regeneration, restoration of the ecological landscape and the establishment of natural windbreaks.

By contrast, housing and community services receive the largest allocation of climate-based funds in Argentina, as this line item accounts for 68% of national public administration expenditure linked to environmental sustainability and climate change. This item includes financial assistance for public and other water companies, technical and financial assistance for the development of drinking water and sanitation infrastructure, and the development of hydraulic infrastructure. Capital transfers are made to the State-owned water and sanitation company, Agua y Saneamientos Argentinos (AySA), and the Matanza-Riachuelo Basin Authority (ACUMAR) for the construction and operation of waterworks (drinking water supply and sewerage networks). In addition to the operation of waterworks in urban areas, it includes the construction of aqueducts, sewage treatment systems and drinking water distribution networks. Other components include investment in waterworks in various provinces, in works called for under the country's plan for adapting to extreme weather events and in the prevention and mitigation of water-related disasters.<sup>17</sup>

Albeit on a smaller scale, expenditure in Colombia on housing and community services also includes some drinking water supply and sewage treatment projects. This function of government accounts for 11% of climate-change expenditure, with the main components being financial support to facilitate access to drinking water services, the

<sup>17</sup> In the methodology used by Argentina, government expenditures on drinking water systems and on wastewater treatment are not differentiated from one another. In this study, these two items of expenditure are both included in the category of housing and community services, since it is not feasible to separate out programmes dealing exclusively with sewage treatment in order to place them in the separate category of environmental protection.

treatment of wastewater in both urban and rural areas and reconstruction of areas and infrastructure damaged by La Niña events. It also includes projects for strengthening climate change management components in land use planning schemes for improving urban planning and public spaces, including the incorporation of LED technologies and solar energy systems in public street lighting networks.

The line item for housing and community services in Peru includes national urban and rural sanitation programmes involving improvements in drinking water supply and the implementation and maintenance of sewerage systems. It also includes the reconditioning of housing to make it more disaster-resistant as part of a broader effort to reduce vulnerability to disasters and strengthen emergency disaster-relief services.

As mentioned earlier, Honduras devotes a considerable share of its climate-related expenditure to education and health. In the field of education, funding is allocated for instruction, primarily at the preschool, primary and secondary levels, in the development of effective responses to climate change and for building capacity in that respect. In the health sector, expenditure is channelled into cross-cutting human health programmes and activities, responses to climate-related health emergencies, and the prevention and containment of vector-borne diseases. The bulk of these funds are directed to medical and hospital services, but funding is also provided for preventive and promotional health programmes.

In Nicaragua, 17% of climate-related expenditure goes to the health sector, and almost all of these funds are used for health promotion and disease prevention within the framework of an inter-agency, intersectoral approach to health care.

Finally, the functional category of social protection receives 17% of total climate-related spending in Mexico. One of the main initiatives in this connection is the “Sowing Life” (“Sembrando Vida”) Programme, which focuses on countering rural poverty and environmental degradation. Under this programme, technical agricultural support in the form of economic and in-kind assistance is provided to farmers to help them achieve food self-sufficiency on the basis of agroforestry activities that contribute to the recovery of the environment.

## 2. Climate spending, by economic classification and by climate action<sup>18</sup>

Where the necessary information is available, this analysis distinguishes between current and capital expenditure as a basis for an evaluation of climate change adaptation and mitigation efforts.

Drawing a distinction between current expenditure (operating and maintenance costs) and public investment (capital expenditure) is helpful in order to identify the scale of budget allocations for longer-term projects dealing with such things as resilient infrastructure and green technologies.

The reason why it is important to differentiate between these two types of expenditure is that public investment expenditure focuses on sustainable projects that can make a more effective contribution to the mitigation of climate change and to building communities’ adaptive capacity. This metric is also essential in order to assess the extent to which countries are fulfilling their international commitments, such as those made under the Paris Agreement, which sets specific targets for the reduction of greenhouse gas emissions and the promotion of sustainable development.

<sup>18</sup> The reader is reminded that the information analysed here is from 2022 for Colombia, Honduras and Nicaragua and from 2023 for Argentina, Mexico and Peru.



An analysis of the economic classifications of climate spending in the five countries where current and capital expenditures are disaggregated shows that only two of them devote more funds to capital expenditure than to current spending. In both Argentina and Mexico, 65% of total climate spending (0.22% and 0.41% of GDP, respectively) takes the form of capital expenditure. In Colombia, all climate spending is capital expenditure, since current spending is not classified as climate-related expenditure, but that total, measured as a percentage of GDP (0.13%), is less than it is in Argentina and Mexico.

**Table III.8**

Latin America (6 countries): climate-related public expenditure, by economic classification and by climate action, around 2022 and 2023  
(Percentages of GDP)

	Argentina <sup>a</sup>	Colombia <sup>b</sup>	Honduras	Mexico	Nicaragua <sup>c</sup>	Peru <sup>d</sup>
<b>Current expenditure</b>	<b>0.117</b>	<b>0.000</b>	<b>8.747</b>	<b>0.223</b>	<b>0.355</b>	<b>0.503</b>
Adaptation	...	0.000	...	...	0.200	0.076
Mitigation	...	0.000	...	...	0.004	0.255
Disaster risk management	...	0.000	...	...	...	0.126
Combined objectives or other	...	0.000	...	...	0.150	0.047
<b>Capital expenditure</b>	<b>0.219</b>	<b>0.128</b>	<b>0.844</b>	<b>0.413</b>	<b>0.264</b>	<b>0.035</b>
Adaptation	...	0.033	...	...	0.062	0.028
Mitigation	...	0.040	...	...	0.100	0.002
Disaster risk management	...	0.017	...	...	...	0.002
Combined objectives or other	...	0.039	...	...	0.102	0.003
<b>Total expenditure</b>	<b>0.337</b>	<b>0.128</b>	<b>9.591</b>	<b>0.636</b>	<b>0.619</b>	<b>0.538</b>
Adaptation	0.058	0.033	2.598	...	0.263	0.104
Mitigation	0.023	0.040	3.531	...	0.104	0.257
Disaster risk management	...	0.017	0.185	...	...	0.128
Combined objectives or other	0.015	0.039	3.400	...	0.252	0.049
Not classified	0.240	...	...	...	...	...

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official data from the countries.

**Note:** The figures refer to accrued expenses in 2022 for Colombia, Honduras (approved budget figures) and Nicaragua; the figures are for 2023 for Argentina (current budget), Mexico (revised budget) and Peru (accrued expenses). In Argentina, they refer to the national public administration (central government, social security institutions and decentralized agencies); in Colombia, they include the national government and the general royalties system; in Honduras, they refer to the non-financial public sector (national government and decentralized institutions, excluding local governments); in Mexico, they refer to the federal government (the agencies forming the federal government and State-run production enterprises); in Nicaragua, they refer to the central government; and in Peru, they refer to the general government.

<sup>a</sup> In Argentina, the disaggregation of the figures into the categories of “mitigation” and “adaptation” is done only for the portion of the budget linked to climate change, which is a subheading within the cross-cutting category of “environmental sustainability and climate change”.

<sup>b</sup> In Colombia, disaster risk management constitutes a subcategory within the category of “adaptation” and could therefore be separated out.

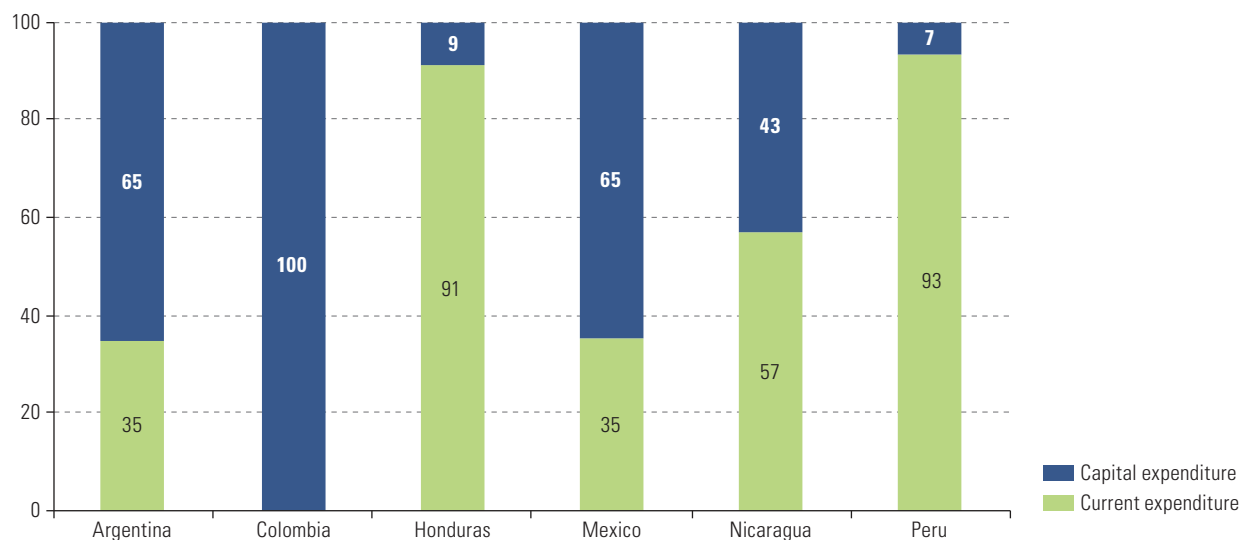
<sup>c</sup> In Nicaragua, the methodology is applied in such a way that expenditures on adaptation to climate change and on disaster risk reduction are placed in a single category. “Combined objectives or other” includes losses and damage and environmental management in general.

<sup>d</sup> In Peru, disaster risk management is classified under “adaptation” and could therefore be separated out.

In Honduras, Nicaragua and Peru, on the other hand, more of the funds devoted to climate spending fall into the category of current expenditure than into that of capital expenditure, with the latter category accounting for just 9%, 43% and 7% of total climate spending, respectively (see figure III.6). However, when measured in relation to the size of these countries’ economies, it is seen that climate-related capital expenditure amounts to 0.84% of GDP in Honduras and to 0.26% of GDP in Nicaragua, with that latter figure being similar to the figure for Argentina.

Figure III.6

Composition of climate-relevant public expenditure, by economic classification, around 2022 and 2023  
(Percentages of total climate-relevant expenditure)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official data from the countries.

In Argentina, nearly half of all capital expenditure takes the form of financial assistance for public enterprises and other bodies, and virtually all of that corresponds to transfers to the State-owned water and sanitation company, AySA, with the remainder going to the Matanza-Riachuelo Basin Authority (ACUMAR) for drinking water and sewerage works, as mentioned earlier. Technical and financial assistance for the development of sanitation infrastructure also includes transfers to institutions at the provincial and municipal levels to finance capital expenditures on water and sanitation infrastructure; funds are also allocated for public works (the expansion or construction of drinking water systems, wastewater treatment plants, aqueducts, among others). Capital is, in addition, transferred to provincial and municipal agencies, trusts and other institutions for the development and operation of hydraulic infrastructure and other waterworks under the country's plan for adapting to extreme weather events and for the construction of both private and public dikes, aqueducts, reservoirs and the like.

In Honduras, land use management, infrastructure and housing constitute a main line item in the capital budget. This includes, in particular, investment in climate-resilient infrastructure. Examples include disaster recovery projects launched in the wake of a tropical cyclone that channel resources into reconstruction, to building resilient public and community infrastructure and to restoring public utilities and other services; projects for building and maintaining infrastructure to further local development; and works designed to improve living conditions in vulnerable urban neighbourhoods. Other components include the construction and upgrading of hydroelectricity generating plants and other public facilities in the energy sector, particularly those that will boost energy efficiency and contain demand. Components in the agricultural sector include investment in the rehabilitation, construction and modernization of irrigation facilities and areas under the country's irrigation programme and the purchase of machinery and other production equipment for the agricultural and forestry industries.

Capital expenditure in Mexico is primarily composed of public works and investments made in mass transit systems and, to a lesser extent, investments made by the Natural Disaster Fund (FONDEN). In Nicaragua, capital expenditure chiefly takes the form of investments in electrification and renewable resources and in highway and road construction and maintenance.



Most of the capital expenditures made by the Peruvian government consists of grants and transfers to finance capital expenditures by local governments to implement national urban and rural sanitation programmes. Other major components include the acquisition of machinery, equipment and vehicles for use in programmes for reducing vulnerability and strengthening disaster response capacity and funding for solid waste management efforts.

Current expenditure accounts for a particularly large part of the climate budget in Honduras and Peru, where more than 90% of total public expenditure relating to climate change is of this type. In Honduras, current climate-relevant spending amounts to 8.7% of GDP, whereas current expenditure related to climate change in the other countries covered in this study is equivalent to less than 0.5% of GDP.

In Argentina, current spending in connection with environmental sustainability and climate change represents 0.12% of GDP. As in the case of capital expenditure, the lion's share of these funds go to resource transfers in the form of financial assistance for public enterprises and other offices or units of the Ministry of Public Works. Current expenditure aimed at boosting the sustainable production and productivity of agro-industrial chains is also substantial. Current transfers to the private sector take the form of production incentives and assistance for the development of small and medium-sized producers, regional economies and other agricultural producers under the "Advancing Production" Programme. Lesser amounts of funding are channelled into policymaking concerning extensive and intensive agricultural activities (transfers to the private sector) and concerning the fisheries and aquaculture sectors (mainly transfers to provincial and municipal institutions, but also including transfers to private-sector ventures).

The main reason why the level of current climate-relevant expenditure in Honduras is so high is because such a large share of these funds is allocated for personal and non-personal services. The personal services category is especially significant in the areas of education and health. In the case of education, the largest component is teachers' salaries, since estimates of climate-related expenditure in Honduras includes part of the salaries of teachers of natural science classes, where students learn about climate change and the importance of taking action to combat global warming and reduce greenhouse gas emissions. In the health sector, both personal and non-personal services (including wages and medical services) are large items of expenditure, as are materials and supplies, energy, medicines, vaccines, reagents and other medical inputs. In the energy sector, the biggest item is payments for non-personal services made by the government-owned electrical power company, Empresa Nacional de Energía Eléctrica (ENEE), which include the purchase of electrical power for resale and, to a lesser extent, the maintenance and repair of civil works, facilities, equipment and machinery.

Almost half of total current climate-relevant spending in Mexico is for production subsidies under the "Sowing Life" Programme. Another considerable item is the purchase of fuel for plants powered by natural gas. Yet another component is the irrigation support programme, under which investment subsidies are paid out to agricultural ventures and municipalities. This programme seeks to promote the sustainable development of the agricultural sector by supporting the maintenance, restoration, technological modernization and expansion of agricultural irrigation systems and waterworks.

In Nicaragua, the bulk of current expenditure goes to its health and disease prevention programme, transfers to the Nicaraguan Institute for Agricultural Technology (INTA) and outlays by the Nicaraguan Institute of Territorial Studies (INETER) on the collection of basic cartographic, surveying, meteorological, hydrological, geological and other types of data and on physical research aimed at furthering socioeconomic development and reducing vulnerability to disasters. Subsidies and other allocations are also provided

for the National System for Disaster Prevention, Mitigation and Relief, which works to keep families together during emergency situations and to help them to recover from natural and socio-natural disasters.

A full 40% of current climate-related expenditure in Peru goes to solid waste management (professional and technical services, rent, waste treatment, administrative service contracts, etc.). Disaster risk management and relief is another major line item of expenditure, with funds under this heading going to the procurement of goods (such as animal feed inputs and products) and professional and technical services.

Information on climate-relevant public expenditure can also be analysed from the standpoint of its contribution to the achievement of climate policy objectives based on the category or type of expenditure (adaptation, mitigation, or combined or other objectives). In this analysis, spending on disaster risk management will be treated as a separate category from adaptation for those countries where the data are detailed enough to make this possible (Colombia, Honduras and Peru).

Information permitting the classification of expenditure by type of climate action is available for most of the countries but not for Mexico. As mentioned in section III.B, although that country's methodological manual does cover this categorization system, the necessary information was not yet available in its official database as of the time of this writing, and an analysis of this type can therefore not be provided for Mexico here.

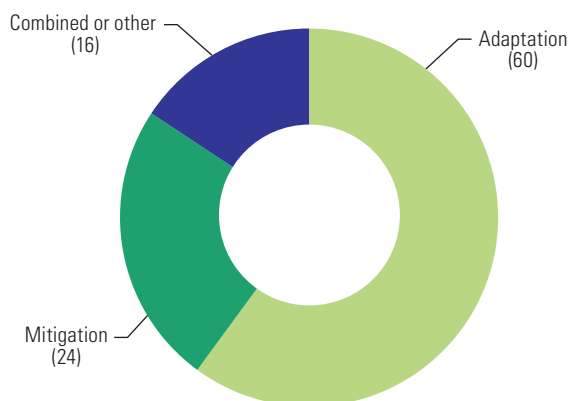
The information for Argentina does not cover all expenditure related to environmental sustainability and climate change, as the information entered under the subheading of "climate change" is broken down only into "adaptation," "mitigation" and "both".

The relative scale of actions focusing on adaptation, mitigation or a combination of the two differs from one country to the next. For example, in Argentina and Nicaragua, larger shares of climate-related actions are focused on adaptation to climate change (60% and 42% of total climate spending, respectively). By contrast, larger shares of activities are designed to further the mitigation of climate change in Colombia, Honduras and Peru (31%, 37% and 48% of total climate spending, respectively) (see figure III.7).

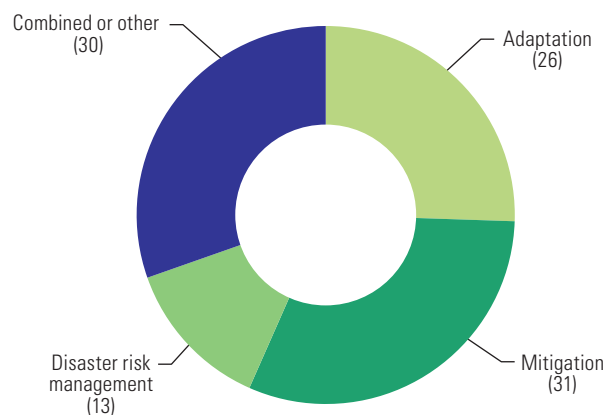
**Figure III.7**

Composition of public expenditure related to climate change, by type of climate action, around 2022 and 2023  
(Percentages of total climate expenditure)

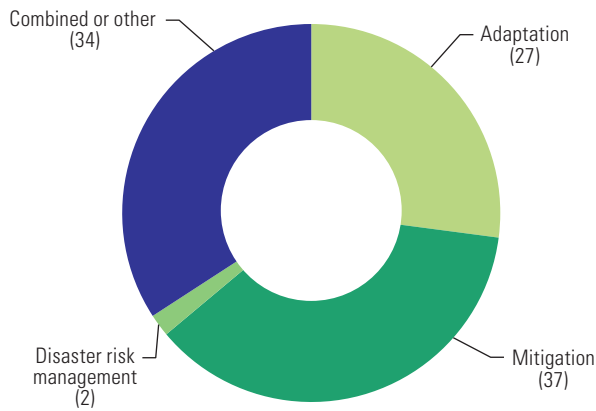
**A. Argentina**



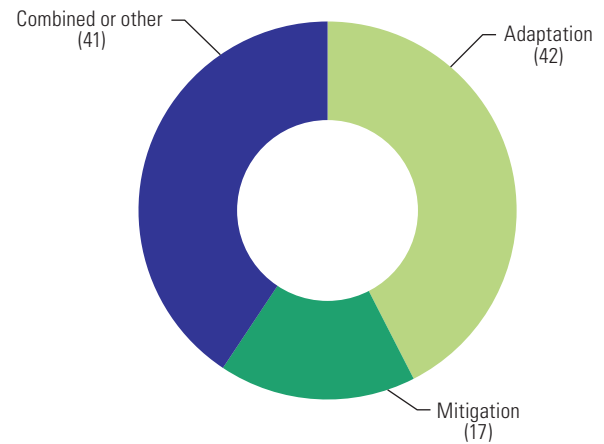
**B. Colombia**



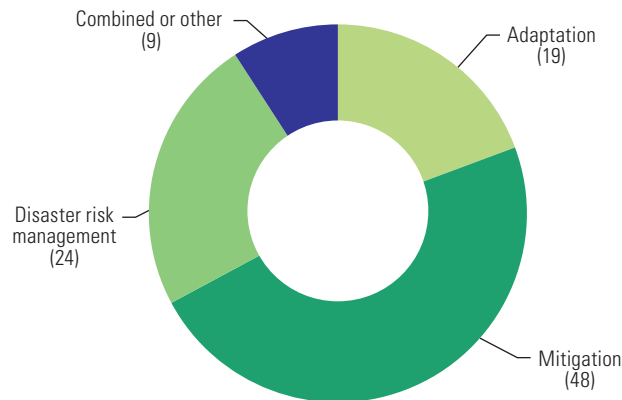
## C. Honduras



## D. Nicaragua



## E. Peru



**Source:** Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official data from the countries.

Spending on measures designed to promote adaptation to climate change in Argentina focuses on the development of hydraulic infrastructure and specifically on the expansion of water and sanitation infrastructure in different provinces and the expansion of works to support adaptation to extreme weather events. Funds are also allocated for programmes dealing with the expansion of networks of high-tension power lines, financial assistance to public enterprises, and technical and financial assistance for the development of sanitation infrastructure.

For the analysis of expenditure by type of climate-related measure in Colombia, the available information for the “adaptation” category is disaggregated enough to distinguish between disaster risk management and relief activities and other adaptive measures, with the results showing that 26% of total climate-relevant spending was for adaptation, while 13% was for disaster risk management. The former includes measures for promoting biodiversity conservation; water resource management and conservation in vulnerable zones; and wastewater sanitation, utilization and management. Some adaptive measures are sited in the agricultural sector and involve rural development activities involving the introduction of kitchen gardens as a way of boosting agricultural production and contributing to food security in vulnerable regions. A majority of the funds spent on disaster risk management go for the construction and maintenance of flood prevention and containment works and the reconstruction of districts where flooding has occurred. A particular focus has been on rebuilding areas and infrastructure damaged by the La Niña phenomenon.

In Honduras, programmes focused entirely on adaptation account for 27% of total climate spending, while expenditure on climate-related disaster risk management amounts to just 2%. Most of the funds allocated for adaptation to climate change come under the cross-cutting subheading of human health and include activities aimed at the coordination, alignment and coverage of health services; administrative health services; guidance and coordination of the delivery of hospital and health-care services; and health promotion. Funds are also channelled into such activities as the promotion of climate-resilient infrastructure; the development of irrigation systems and water resource management in the agricultural sector; and the promotion of climate-resilient crops. Activities dealing with climate-related disaster management include disaster prevention and relief measures; measures aimed at wildfire prevention and the provision of support for firefighting activities; emergency response capacity for dealing with damage to roadways; and recovery from emergencies caused by tropical cyclones.

In Nicaragua, the methodology is applied in a way such that expenditures on adaptation to climate change and on disaster risk reduction are grouped together. The two other headings, in addition to the categories of “adaptation” and “mitigation”, are “losses and damage” (ex post investments) and “general environmental management”. These last two categories are aggregated under the “combined or other” heading.

An analysis of the programmes or activities focusing on climate change adaptation in this country shows that the largest share of funding goes to INTA, followed by transfers for INETER and for the country’s family farming development initiatives, which include efforts to promote family-based agriculture in rural and peri-urban areas by supporting various socio-productive programmes dealing with the production of healthful foods, natural medicines, coffee, basic grains, sesame seeds, beekeeping, and large- and small-scale stock raising, among other activities. Other initiatives include road construction; the National System for Disaster Prevention, Mitigation and Relief; and the work of the National Forestry Institute (INAFOR) focusing on the formulation of policies and regulations governing the management and use of forestry ecosystems, with priority being placed on small-scale producers, Indigenous Peoples and persons of African descent.

In Peru, disaster risk management and response are classified as aspects of adaptation to climate change and can therefore be identified separately. The category of adaptation accounts for 19% of public climate spending, while disaster risk management accounts for 24% of that amount. Major components of the category of adaptation to climate change include urban and rural sanitation programmes and programmes to combat metaxenic and zoonotic diseases by introducing protective measures at the individual household level in areas at high or very high risk of these maladies in order to shield families from the main risk factors. The line item on reducing vulnerability to natural disasters and strengthening emergency disaster relief capabilities deals with a wide array of activities, such as the retrofitting of buildings to make them more resistant to the impacts of natural disasters, emergency relief work, the implementation of protective works (for example, the maintenance of channels, drainage systems and other public safety structures) and the development of agricultural techniques for protecting production units from hydrometeorological hazards. Studies are also conducted to assess disaster risks, with the main focuses being on the generation of data and the monitoring of hydrometeorological and other climate-related hazards, including those associated with El Niño.

Some of the main components of mitigation efforts in Argentina are environmental programmes dealing with natural resources (particularly the protection of native forests), the conservation and management of protected natural areas (national parks such as



the Parque Nacional Iguazú, Parque Nacional Lanín, Parque Nacional Nahuel Huapi), technical and financial assistance for the development and operation of sanitation infrastructure (such as the construction and expansion of wastewater treatment plants in various provinces) and environmental programmes involving the construction and management of urban solid waste treatment plants and those designed to strengthen inclusive community-based and local circular economies.

Mitigation activities in Colombia are concentrated in the energy sector and focus on energy efficiency and generation and on upgrading electrical power systems and improving access to them. Work in these areas includes, for example, the construction and operation of off-grid photovoltaic energy systems in different provinces and the development of sustainable energy projects in areas that are not connected to the grid. Mitigation actions are also being pursued in the transport sector, where work is being done to build, upgrade and maintain railway and waterway transport infrastructure.

Mitigation efforts in Honduras include measures for promoting energy efficiency, curbing demand and expanding the use of renewable energy sources. Work is proceeding along much the same lines in Nicaragua under the budget item for electricity and renewable resources, which is aimed at expanding installed capacity for generating electrical power using renewable sources and introducing more efficient technologies in the electricity sector.

Mitigation efforts in Peru account for 48% of all climate-related spending and include a solid waste management programme and an urban transport programme aimed at cutting travel times, improving the system's safety and reducing its environmental impacts.

In Argentina, the activities that are classified under the heading "combined or other" chiefly have to do with environmental monitoring programmes and with the formulation and application of electrical energy policies.

In Colombia, 30% of climate spending is for activities that combine climate change adaptation and mitigation efforts. Over one third of these resources are devoted to initiatives dealing with the promotion and conservation of biodiversity and the reinforcement of forest governance. The country is also pursuing family farming initiatives, as mentioned earlier. Cross-cutting activities include research and capacity-building for sustainable development in keeping with the climate challenges being faced, along with climate-aware land-use planning, management and development and the promotion of sustainable production processes and consumption patterns.

In Honduras, 34% of public climate spending is allocated for programmes dealing with combined aspects of adaptation, mitigation and/or climate-related disaster management. The lion's share of these resources go to programmes on climate change education and capacity-building programmes focusing on climate change, while a smaller share is channelled into the promotion of climate-smart agricultural technologies and inputs and into coordination, planning and innovation by ENEE, the State-owned electrical power company.

Combined activities in Nicaragua include general environmental management efforts conducted under the budget item for health promotion and disease prevention and ex post investments made to replace and repair lost and damaged infrastructure, as in the case of roadway maintenance works and highway construction projects.

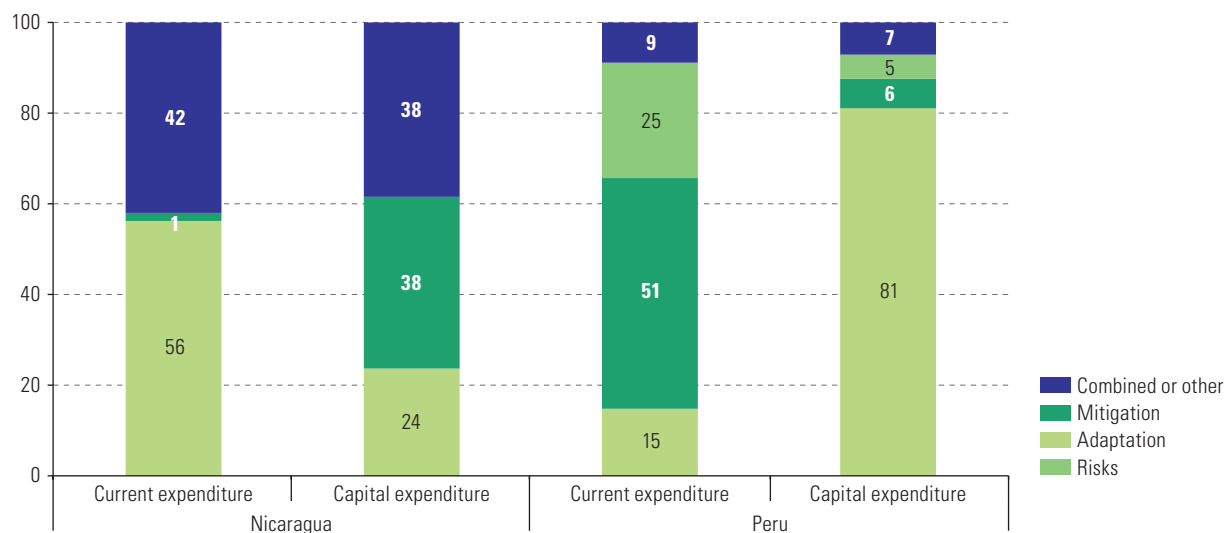
Activities falling into the "combined" category in Peru are funded under the budget items for competitiveness and the sustainable development of forestry and wildlife resources and for the conservation of ecosystems and the sustainable use of ecosystem services. The latter encompasses the recovery and improvement of ecosystem services;

the expansion and rehabilitation of forest cover; forest plantings; and inspections, and the imposition of penalties and the use of incentives for the fulfilment of environmental commitments and the enforcement of environmental laws and regulations.

Given the information currently available, a cross-tabulation of the economic categories of public climate spending with the objectives of different climate action can be conducted only for two of the six countries covered in this analysis: Nicaragua and Peru (see figure III.8).

**Figure III.8**

Nicaragua and Peru: cross-tabulation of economic categories and objectives of climate action for items of public climate-relevant expenditure, around 2022 and 2023  
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official data from the countries.

In Nicaragua, public spending on adaptation to climate change (including disaster risk reduction) represents the largest share (56%) of current climate-relevant expenditure. This is chiefly composed of transfers to INTA, expenditures made by INETER and allocations and subsidies for the National System for Disaster Prevention, Mitigation and Relief and the National Forestry Institute (INAFOR). However, in the case of public capital expenditure relating to climate change, mitigation and combined measures account for the largest shares, with each of those categories representing 38% of the total. In the case of the former, the main investments are in the country's electricity and renewable resources programme while, in the case of the latter, the main investments are for the replacement and repair of road infrastructure and maintenance.

In contrast, a cross-tabulation of the economic classification and objectives of spending on climate-related measures in Peru shows that public climate spending on mitigation programmes is the largest category of current expenditure. This reflects the procurement of goods and services for the country's solid waste management programme and its urban transport programme aimed at cutting travel times, improving the system's safety and reducing its environmental impacts, with maintenance, refurbishment and repairs being the major items of expenditure in this latter connection. On the other hand, adaptation measures represent the largest share of capital expenditures and are largely composed of grants and transfers for financing investments by local government agencies in the national urban and rural sanitation programmes mentioned above.





## F. Conclusions and observations

The Latin American and Caribbean region is particularly vulnerable to the impacts of climate change because of its abundance of biodiversity, the importance of climate-sensitive economic sectors such as agriculture and tourism and the fact that a large proportion of its population lives in coastal zones that are prone to flooding and exposed to other extreme weather events.

Rising temperatures and changing hydrometeorological conditions that trigger droughts, floods and changes in precipitation patterns pose a threat to the population's food security, the productivity of the agricultural sector and coastal infrastructure, all of which has an adverse effect on the region's economic growth potential.

Climate change adaptation and mitigation strategies have to be adopted to counteract these impacts, meet the climate challenges facing the region and safeguard its sustainable economic and social development processes over the long term.

In the face of these phenomena, it is essential to measure public climate spending, in general, and public climate investment, in particular, in order to be able to assess the actual impact of government climate mitigation and adaptation policies.

The measurement of these types of expenditures is also necessary in order to gauge how well countries are fulfilling their national plans for addressing climate change and their international commitments, and specifically those commitments made in their nationally determined contributions. National budgets will have to be clearly aligned with ambitious climate goals if the countries are to fulfil the global climate change commitments delineated in the Sustainable Development Goals and the Paris Agreement, and this will entail the mobilization of very significant amounts of resources. Climate budget tagging can facilitate that process.

In the Latin American context, the identification, quantification and tracking of public climate expenditure can be essential tools for helping to improve climate change management and to project the fiscal, social and economic costs of failing to take action to mitigate and adapt to climate change in the region.

Given the magnitude of the social, economic and environmental challenges posed by climate change, the accurate identification and evaluation of public climate-relevant spending provides crucially important information for improving government decision-making. It can also help to improve the quality of expenditure, increase its transparency, promote more effective targeting of available resources, pinpoint financing gaps that are holding back efforts to attain climate-related goals and support the mobilization of additional resources.

These tools can also be used to advance possible budgetary changes aimed at creating more environmentally friendly fiscal systems, avoiding actions that could have an adverse impact in relation to climate change and contributing to the achievement of the Sustainable Development Goals.

Given the complexity of all the different yet interconnected areas related to climate change, a cross-cutting approach needs to be taken to the measurement of public climate spending. This is an issue that transcends traditional budget classifications, as mitigation and adaptation policies and measures deal with many different government functions, including public order and safety, economic affairs, environmental protection, housing and community services, education, social protection and many more. Public climate spending can therefore not be effectively measured using conventional budget analysis approaches, since the relevant budget items are not confined to allocations handled by the Ministry of the Environment but are instead also found in the budgets of

ministries or other public institutions responsible for such matters as energy, agriculture, transport, public works, housing, civil defence and others. This is why a cross-cutting approach to budgetary matters is required, since public expenditure relating to climate change is not properly reflected in traditional administrative, programmatic or functional budgetary classifications.

In recent years, the Latin American countries covered in this analysis have made inroads in the development of cross-cutting systems for measuring climate-related fiscal expenditure. The methodological approaches used by these countries do vary, however, as does the way in which they disaggregate and publish the corresponding information, as discussed throughout this study.

Because these countries' practices and methodologies differ, their measurements of public climate spending do as well. These differences extend to what kinds of expenditures are classified as climate-related disbursements, what sectors are included, what levels of government are covered, the timing of expenditure tagging (for example, if items of expenditure are tagged at the time that the disbursement is budgeted or at the time that the liability is accrued), the use of weightings or not, the way in which expenditure is categorized in terms of climate action (in terms of adaptation, mitigation, disaster risk management or other headings) and the varying classifications used for public climate spending.

Consequently, the methodologies and results are not entirely comparable across countries. The absence of a standardized approach for the identification and classification of public spending related to climate change and of an agreed international definition of the criteria to be used in determining if a given item of expenditure contributes to climate change adaptation and/or mitigation gives rise to the divergent definitions that have been adopted by different countries. Caution must be used in attempting to develop international comparisons, since these methodological differences place limits on the possibility of arriving at an accurate, standardized assessment of different countries' efforts and results in the area of public climate spending.

Based on an examination of the main international approaches and the methodologies adopted by different countries, interviews with major climate actors in the countries covered in this study and an analysis of the inherent challenges involved in measuring public expenditure relating to climate change, a series of guidelines are offered in the following paragraphs for consolidating and ensuring the continuity of statistical data in this area in the countries of Latin America and the Caribbean.

These guidelines are of a general nature, however, since specific recommendations concerning the design of climate budget tagging methodologies and the accompanying institutional arrangements will necessarily vary depending on the objectives of each national system and the chosen strategies and plans for achieving them, as well as the particular institutional and political situation in each country.

Mainstreaming public climate budget tagging will be essential in order to ensure the effectiveness, accuracy and continuity of this approach in all the countries. Key institutions, such as the countries' finance, planning and environmental ministries, need to play an active role in designing and implementing this valuable tool. The coordination of this tool's use should be the responsibility of the agencies or offices in the economic or finance ministries or national budget offices that head up the budget formulation process because they are the ones that will be able to ensure that tagging procedures are properly applied by all government agencies throughout the budget cycle. The environmental ministry or the agency that performs those functions should also be involved in the coordination of the application of this tool in order to ensure that tagging procedures are aligned with national plans for addressing climate change and international



commitments in that respect and to ensure that all programmes related to climate change adaptation and mitigation are included. Other ministries and agencies, such as those responsible for public works, economic affairs, agriculture, energy, drinking water and sanitation, transport, health and others, also have an important role to play. More specifically, depending on the institutional configuration of each country, the planning or budget offices, in coordination with the climate change units of these institutions, should assume responsibility for budget tagging procedures, since they are the ones that have the clearest overall picture of the relevant in-house budgets, programmes and activities. They will, however, need to have the support of finance and environmental ministries in order to ensure that the various government agencies implement budget tagging procedures and methods in a coordinated and standardized way.

The continuity and effectiveness of these initiatives will largely depend on the leadership capabilities of finance and planning ministries and on the active engagement of the lead agency in each case, which is likely to be each country's environmental ministry. Effective coordination among the relevant ministries within the framework of the pertinent budgetary standards will also be crucial in order to ensure the effective implementation of a public climate budget tagging system. In the final analysis, however, the most crucial elements are the political commitment, solid leadership and clear definition of roles and responsibilities in ensuring the implementation and sustainability of these practices over the long run.

The training of the personnel entrusted with public climate budget tagging is another crucial component in the effective design and implementation of this approach in the countries of the region. Staff need to be trained in the conceptual aspects and application of tagging methodologies and must understand the underlying purpose of climate budget tagging, the underlying policy objectives and the uses of the information that this tool generates. Since tagging is an inherently subjective process, clear-cut guidelines will need to be devised by finance ministries, working in conjunction with environmental ministries and other offices, in order to limit the subjectivity of the process. The publication and ongoing updating of those guidelines for offices and other bodies that are using climate budget tagging procedures are therefore essential in order to produce a consistent, effective cross-cutting analysis of public climate expenditure.

Capacity-building initiatives, together with the formulation of clear-cut guidelines, are fundamental factors for successful implementation since they are the best way to address common problems such as staff turnover and a lack of familiarity on the part of new staff with climate-related activities and budget tagging methods. If staff are not properly trained, data quality and availability may suffer.

Budget tagging is feasible only when budget classification systems clearly identify different programmes, projects and activities. It is important for climate-related resources to be tagged at the level of the activity, facility or lowest-order programmatic category so that the budget items corresponding to climate change adaptation and mitigation can be identified. In addition, having data disaggregated at the level of activities, initiatives or other works can be used to develop more accurate estimates and more appropriate classifications for climate action or other categories. Countries that are not yet publishing information disaggregated by type of climate action would do well to focus on developing a means of accurately distinguishing among items of public expenditure on adaptation, mitigation or a combination of the two.

Budget tagging at the activity level provides important information that can contribute to national climate policy implementation and efforts to honour international commitments. The alignment of the definitions of climate-relevant activities and disbursements with national climate change policies and strategies is essential in order to generate the data needed to monitor and enforce those policies. Linking up the climate budget with the

Sustainable Development Goals and their corresponding targets and indicators also facilitates efforts to track the advances being made by the countries towards fulfilling the commitments they have assumed under the 2030 Agenda.

In order to optimize the achievement of climate policy goals and ensure their effective alignment, it is important to review budget lines on a regular basis. These reviews will also permit more accurate tagging and will help to ensure the inclusion of all relevant programmes and activities in the public climate expenditure accounts as defined in the selected methodology.

Reviews of this sort can be used to determine how well spending is aligned with climate change strategies, how efficient the expenditures are and what impact they are having in terms of adaptation and/or mitigation. The analysis can also assess the design, implementation and outcomes of given budget lines and the programmes included in them. When climate change indicators are incorporated into the relevant logical framework matrices, they can be a very useful tool for measuring the contribution that budget items are making and how effectively public climate spending is in terms of the achievement of climate-related goals.

Another important consideration is the coverage of public climate budget tagging. The selected methodologies should incorporate all disbursements related to climate change made in all sectors and by all government bodies. This should be a comprehensive budget analysis and should therefore covers activities that have a negative impact, as well as those having a positive one.

Implementation can be conducted gradually, with governments beginning with high-priority sectors such as agriculture, energy, transport and environmental affairs and then expanding the coverage of their reviews over time. Another possibility is to start by tagging activities of the central government first and then gradually integrating the expenditures of subnational governments and public enterprises into the tagging system, since their activities also have a significant influence on climate-related outcomes. In countries that have federal or highly decentralized systems, subnational governments could tag public climate spending in their own budgets, although it would be better if they all agree to use the same approach and coordinate with each other so that their results can be aggregated and the information can then be consolidated and compiled for the country as a whole.

It is important for the tagging system to cover not only measures that have a positive impact in terms of climate change but also those that have adverse climate-related impacts because they contribute to a net increase in greenhouse gas emissions or to activities that are not aligned with climate policy objectives. The inclusion of these types of expenditure will increase the complexity of the process but it will also provide a much more complete picture of the climate-related effects of the public budget. In addition, this approach will promote transparency and facilitate a debate around sensitive issues such as fossil fuel subsidies, as well as being in alignment with the objectives of the Paris Agreement.

Generally speaking, tagging has chiefly been focused on budget expenditures, leaving aside tax expenditures and fiscal revenues as climate change policy tools. Countries can also expand their public climate budget tagging systems to include tax expenditures (tax deductions, tax credits, exemptions, tax deferrals, among others), since these kinds of expenditures can also support activities that may have either a positive or a negative impact on the climate. It is also feasible to identify and analyse fiscal income that contributes to climate objectives, such as revenues from carbon taxes and from taxes on fossil fuels and vehicles that use conventional fuels, as well as revenues from the royalties paid by natural resource development projects. This would enrich both the budget analysis and the debate around climate-related fiscal policy.

It is very important for public climate budget tagging systems to be transparent in order to prevent greenwashing, as when government agencies apply a climate tag to a wide range of budget items that do not all necessarily bear a relation to climate action, or when they exaggerate the accounting value of given items. On occasion, this is done in an effort to make the amount of expenditure devoted to climate-related measures seem larger than it actually is in order to secure more funding for certain programmes or projects. This is why it is important for tagging procedures to be checked by in-house and external auditors and for results-based indicators to be used so that it will be possible to determine whether and, if so, how public climate spending is having the desired impacts.

The use of clear-cut, accessible methodologies and the application of a full disclosure policy enable civil society and other stakeholders to evaluate and check the authenticity of the information that is provided. Transparency acts as a safeguard against the manipulation of information, since it is what will ensure that the tagging of government actions as environmentally sustainable or supportive of mitigation and/or adaptation to climate change is accurate and is backed up by verifiable data. Having clear guidelines, green taxonomies for identifying activities relating to climate change objectives and ongoing review and oversight procedures will help to maintain the consistency of the information that is obtained and to prevent greenwashing.

Another important aspect of this undertaking is the integration of climate tagging throughout the budget cycle in order to optimize its usefulness in the allocation of resources for addressing climate change. Climate budget tagging should be used at every stage of the budget cycle, starting from the initial preparation of the draft budget and continuing on through the congressional debate and enactment of the budget, the execution, monitoring and evaluation stages and the accountability phase. In order to accomplish the effective integration of climate tagging into the entire budget cycle, the process will need to be automated by incorporating climate tags into the relevant financial management information systems. This will make it possible to track climate-related budget allocations more efficiently and more accurately.

Publishing the information generated by the climate budget tagging system will promote transparency, commitment to climate goals and debate around climate policy. In order for the system's impact to extend beyond the government itself, this information must be made available to the public and be integrated into key budgetary documents, such as the presidential message issued prior to the budget's approval, the draft budget act, the budget when it is enacted into law by Congress, the participatory citizen-based budget, quarterly budget reports and the annual reports that provide an accounting of the budget's execution.

Official climate expenditure monitoring reports must be prepared and issued so that budget execution can be tracked and compared against the budget as originally approved. Ideally, quarterly and annual budget management reports should be prepared that detail and explain the reasons for any differences between the original budget and the executed budget. The issuance of these reports should follow a previously announced publication timetable, and they should provide complete, consolidated information for all relevant agencies and institutions and, insofar as possible given the organizational structure of each country's institutions, should include information for the various levels of government.

Monitoring and reporting systems should cover both the financial and the physical execution of climate-related line items and activities and should provide detailed information on the outputs and outcomes achieved. The information produced by these results-based systems will provide decision-makers with a valuable tool for determining whether or not public climate spending is having the impact that it is expected to have.

It is also crucial for countries to post all the information related to the climate budget on their budget transparency portals. The portals should provide files in open-source formats that can be easily accessed and downloaded as databases or spreadsheets. These platforms should allow users to download consolidated files that provide a full picture of public climate spending by the various levels of government, including the central government, decentralized agencies, intermediate levels of government and local governments, over a number of different fiscal periods.

Transparency portals should, in addition, incorporate metadata that make it easier for users to understand how the databases are structured and to interact with the available information. They should also include a detailed description of the tagging methodology used and full information about the tagged line items and activities, including their objectives and expected results, and about how they relate to the issue of climate change. It is useful to include links to other data sources for users who wish to learn more, to indicate when the data were last updated and when the next update will be, and to provide a change tracking history for the databases and the methodology.

In order to facilitate international comparisons of public climate spending, the countries of the region could coordinate their efforts and establish common criteria and definitions for their tagging methodologies. It is especially important to work towards adopting a shared definition for public expenditures relating to climate change in order to standardize the criteria used to determine if the funding for a given activity should be tagged as a climate-related expenditure or not. It is also important to define an appropriate scope of coverage that is similar for all the countries. Ideally, general government expenditures and those of all the sectors within that category should be covered. Efforts should also be made to work towards the standardization of the approach used to estimate public climate expenditure, the classification system used and the way in which the compiled data is presented.

Public climate budget tagging can serve as a strategic tool for mobilizing funds coming from outside sources as well. Countries can use the information generated by their tagging systems when approaching multilateral lenders, financial institutions and donors interested in funding climate change adaptation and/or mitigation work. Tagging can serve as a basis not only for identifying programmes and projects that may help to meet the challenges posed by climate change but also for backing the issuance of green sovereign bonds. If, in addition, the tagging system is aligned with the Green Bond Principles, this will provide a more solid foundation for the selection of activities or sectors and investment in projects in line with the climate objectives of the Paris Agreement.

Finally, it is important to underscore the fact that public climate budget tagging is essential in order for the impact of government action on climate change to be measured, since the linkage of such expenditures to specific policies for addressing climate change issues makes it possible to establish a more direct connection between public investment and its possible impacts. Yet, although the use of budget tagging systems to identify and measure climate-related spending is a crucial first step, it is not enough in and of itself. Progress has to be made in the programmatic analysis and evaluation of outcomes in order to gain an understanding of how effective given climate policies are, and this requires more than simply tagging and quantifying public expenditures associated with climate change. That understanding will provide a sound basis for strategic decision-making that will maximize the positive impact of public investment in the fight against climate change.

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## Annex III.A1

**Table III.A1.1**

Latin America (selected countries): sources of information about public expenditure on climate change

Country	Type of information	Links to sources
Argentina	Open-source data	<a href="https://www.presupuestoabierto.gob.ar/sici/datos-abiertos#">https://www.presupuestoabierto.gob.ar/sici/datos-abiertos#</a>
	Tagging of environmental and climate-related expenditure in the national budget	<a href="https://www.argentina.gob.ar/jefatura/evaluacion-presupuestaria/coordinacion-presupuestaria/seguimiento-del-gasto-vinculado-al">https://www.argentina.gob.ar/jefatura/evaluacion-presupuestaria/coordinacion-presupuestaria/seguimiento-del-gasto-vinculado-al</a>
Colombia	Domestic public expenditure figures	<a href="https://mrv.dnp.gov.co/Financiamiento_en_cifras/Paginas/publico_cifras.aspx">https://mrv.dnp.gov.co/Financiamiento_en_cifras/Paginas/publico_cifras.aspx</a>
	Analytical reports on climate financing	<a href="https://mrv.dnp.gov.co/casosdeusodelmrv/Paginas/evaluacion.aspx">https://mrv.dnp.gov.co/casosdeusodelmrv/Paginas/evaluacion.aspx</a>
Honduras	Approved budget for 2024	<a href="https://www.sefin.gob.hn/formulacion-y-aprobacion/">https://www.sefin.gob.hn/formulacion-y-aprobacion/</a>
Mexico	Open-source databases (cross-cutting annexes)	<a href="https://www.transparenciapresupuestaria.gob.mx/Datos-Abiertos">https://www.transparenciapresupuestaria.gob.mx/Datos-Abiertos</a>
	Annex 16 to the 2023 federal expenditure budget (PEF 2023)	<a href="https://www.ppef.hacienda.gob.mx/work/models/8uLX2rB7/PPEF2023/mo2h2PK/docs/16/r16_apurog.pdf">https://www.ppef.hacienda.gob.mx/work/models/8uLX2rB7/PPEF2023/mo2h2PK/docs/16/r16_apurog.pdf</a>
	PEF 2023. Methodology for preparing cross-cutting annexes. Resources for climate change adaptation and mitigation	<a href="https://www.pef.hacienda.gob.mx/work/models/atbnZdy0/PEF2023/ktp8ldcM/docs/Anexos/metodologia_cambioclimatico.pdf">https://www.pef.hacienda.gob.mx/work/models/atbnZdy0/PEF2023/ktp8ldcM/docs/Anexos/metodologia_cambioclimatico.pdf</a>
Nicaragua	General budget end-of-cycle report, 2022	<a href="http://www.hacienda.gob.ni/documentos/presupuesto/informes/2022">http://www.hacienda.gob.ni/documentos/presupuesto/informes/2022</a>
Peru	Climate change adaptation and mitigation database	<a href="https://apps5.mineco.gob.pe/cambioclimatico2023/Navegador/default.aspx">https://apps5.mineco.gob.pe/cambioclimatico2023/Navegador/default.aspx</a>

**Source:** Economic Commission for Latin America and the Caribbean (ECLAC).



In 2023, the fiscal environment in Latin America and the Caribbean reflected deteriorating global and regional microfinancial conditions. Fiscal deficits widened in Latin America as tax collection weakened owing to lower aggregate demand and falling international commodity prices. In the Caribbean, primary surpluses increased on the back of primary spending cutbacks. Public debt in the region remained high and the rise in interest payments is exerting more pressure on fiscal accounts.

Given the context of low economic growth and the increasing recognition of the key role that the public sector must play in driving productive, sustainable and inclusive development, it is essential to analyse the role of fiscal policy in addressing the challenges of climate change. This edition of the *Fiscal Panorama of Latin America and the Caribbean* explores how a carbon tax can be used as an instrument to finance the major climate investments needed. It also analyses progress made in the quantification of public sector climate spending.



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