

CHAPTER 3

The distributional effects of the tax and transfer system



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KEY MESSAGES

THE DISTRIBUTIONAL EFFECTS OF THE
TAX AND TRANSFER SYSTEM

- The tax and transfer system plays a key role in reducing poverty and inequality by redistributing the benefits of economic growth among the poorest and most vulnerable.
- Solid macroeconomic fundamentals allowed Peru to implement one of the largest stimulus packages in the region against Covid-19 and to observe a strong recovery of public finances in 2021. Cash transfers for the poor and vulnerable partially served as a buffer against the reduction in labor incomes, and, in the absence of a government response, the impact of the pandemic on poverty would have been more devastating.
- Fiscal policy has a limited redistributive capacity in Peru relative to other upper-middle-income countries.
- Tax revenues remain below potential due to the narrow tax base, high levels of informality, and low efficiency in tax collection. Moreover, high dependence on indirect taxes, which are regressive, and tax exemptions that benefit those in the upper level of the income distribution also explain the limited redistributive capacity on the revenue side.
- Although all public transfers are clearly progressive, they suffer from leakages to the higher end of the income distribution, which reduces their overall impact on inequality. Fiscal resources and policies should be carefully directed toward greater benefits to those people most in need.
- To improve the redistribution of the benefits of economic growth among the poorest and most vulnerable, a package of complementary reforms should be adopted.

3.1. The fiscal system in Peru: revenue and expenditure aggregates

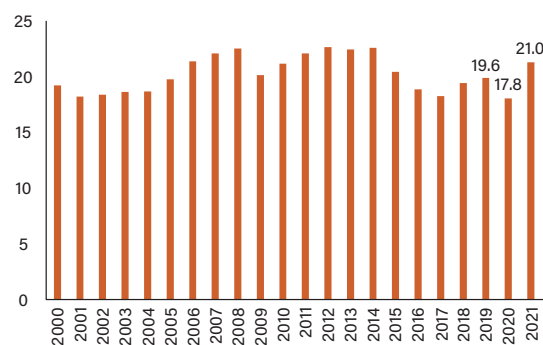
3.1.1 Tax revenues

Over the two decades previous to the COVID-19 crisis, tax revenues as a proportion of gross domestic product (GDP) in Peru experienced a modest increase despite reforms that supported a process of economic growth. General government revenue did increase by a factor of 4.6 in the years beginning in 2000 in nominal terms, but, as a share of GDP, it only grew from 18.9 percent in 2000 to 19.6 percent in 2019, before the COVID-19 pandemic.¹ The share also did not change much between 2017 and 2019 despite several reforms to the tax system aimed at combating noncompliance and expand the tax base (Figure 1). Thus, Peru's tax revenues remain relatively low compared with countries at a similar level of GDP per capita and similar tax rates, such as Peru's peers in the Pacific Alliance (Figure 2).²

Solid macroeconomic fundamentals allowed Peru to implement against Covid-19 one of the largest stimulus packages in the region and to observe a strong recovery of public finances in 2021. In 2020, general government revenues decreased to 17.8 percent of GDP, but low fiscal deficits and public debt before the pandemic allowed the country to adopt an unprecedented stimulus package against Covid-19. Between March 2020 and September 2021, Peru implemented one of the largest economic plans in the region, amounting to 21.6 percent

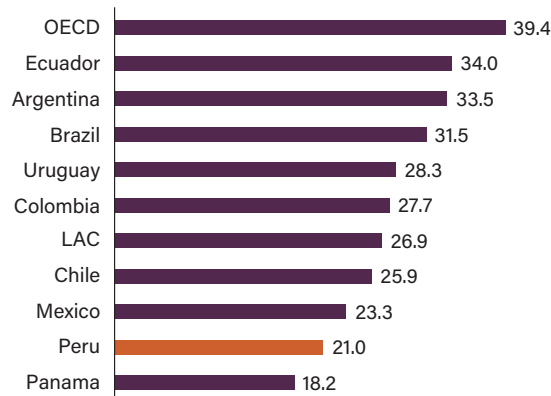
of GDP. In 2021, general government revenues reached 21 percent of GDP due to the recovery of activity economy, including a favorable price cycle in export minerals and the collection of extraordinary revenues (Figure 1). The country stood out as the fourth registering the greatest deficit reduction in 2021 (from 8.9 in 2020 to 2.5 percent in 2021) and, according to the Ministry of Economy and Finance (MEF), was one of the first to approve short-term fiscal rules after the pandemic.

Figure 1. General government revenue, 2000–21
% of GDP



Source: BCRP.

Figure 2. Latin America and Caribbean: general government revenues, 2021
% of GDP



Source: MEF (2022), MMM 2023-2026.

1. Tax revenues also increased significantly, reaching 14.8 percent of GDP.

2. This is explained by structural factors, such as high labor informality and low productivity, that result in a lower tax base. Thus, the levels of tax noncompliance—28 percent of the potential collection of the value added tax (IGV) and 33.1 percent in the third category of the personal income tax in 2021—are among the highest in economies of the Pacific Alliance and cost the country around 7.5 percent of GDP. The general government is composed by consolidated central government and local governments. This means that it includes the set of entities constituted by the ministries, offices and organisms that are dependencies or instruments of the central authority of the country. Moreover, it also includes other institutions of the central government such as EsSalud, ONP, Fonahpu, FCR, regulatory bodies, registry offices and charity societies. Total general government includes tax and nontax revenue (oil royalties and canon and other income such as own resources, transfers from public entities, interest, income from regulatory bodies, supervisors and registry, among others). The following analysis focuses on tax revenue only.

Indirect taxes are the main source of tax revenue in Peru; the value added tax (IGV) corresponds to almost half of tax collection. Pre-COVID, in 2019 (Table 1), total tax revenue of the general government, including social contributions to EsSalud and ONP, represented 16.9 percent of GDP, and indirect taxes accounted for 9.3 percent. IGV revenue accounted for almost half of total tax revenue. In contrast, personal income tax and corporate income tax accounted for 10.5 and 18.2 percent of total revenue and 1.8 and 3.1 percent of GDP, respectively.

Table 1. Total tax revenue of general government, 2019

Component of tax revenue structure	Peruvian sol, Millions	% of GDP
Total Tax Revenue	131,031	16.9
Direct taxes of which	44,015	5.7
Personal income tax	13,819	1.8
Corporate income tax	23,834	3.1
Other direct taxes	6,363	0.8
Indirect taxes	71,721	9.3
IGV	63,504	8.2
Domestic	37,892	4.9
IGV - Customs and import duties	25,613	3.3
ISC - Excise tax	8,216	1.1
ISC - Fuel	3,212	0.4
ISC - Others	5,005	0.6
Customs and import duties	1,424	0.2
Other taxes	-3,391	-0.4
Social security contributions EsSalud and ONP	17,262	2.2

Source: BCRP.

Tax revenues remain below potential due to various reasons, such as a narrow tax base, high levels of informality, low efficiency in tax collection, and several exemptions. Informality exacerbates the deficiencies of fiscal policy design, which are more evident in personal income tax. The high threshold for labor income tax exempts nearly 80 percent of occupied workers from contributing. However, as informality accounts for more than a third of occupied workers, only 30 workers in 100 are potential taxpayers, which, combined with the threshold eligibility for paying labor income tax, means only 8 of those 30 workers effectively contribute. Moreover, the levels of tax noncompliance—28 percent of the potential collection of the IGV and 33.1 percent in the third category of the personal income tax in 2021—are among the highest in economies of the Pacific Alliance and cost the country around 7.5 percent of GDP.

3.1.2. Government expenditures

Pre-COVID, Peru also experienced a modest increase in government expenditures. Although general government expenditure, both capital and current spending, increased over the 2000–19 period (about 4.5 times nominal levels), it did not change much as a share of GDP over the same period as it stayed around 20 percent (Box 1). Over this period, current expenditure (wages, payments for goods and services, and current transfers) has continuously represented more than three-quarters of total expenditure even though the capital expenditure component plays a critical role in increasing productivity, generating employment, and promoting economic growth.³

The fiscal response to the pandemic substantially increased government spending as a share of GDP, which declined along with the process of economic recovery in 2021. Government spending as a percentage of GDP reached an historical maximum in 2020 at 24.7 percent of GDP which included transfers to the vulnerable population due to Covid-19 (Box 1); along with disbursements for the health response to the crisis (hiring health personnel, acquisition of medical supplies and equipment) and expenses for reactivation such as the Arranca Perú Program⁴ and a major credit guaranteed program to ensure companies' payment chains, Reactiva.

Box 1. Cash transfers for the poor and vulnerable partially served as a buffer for the reduction in labor income

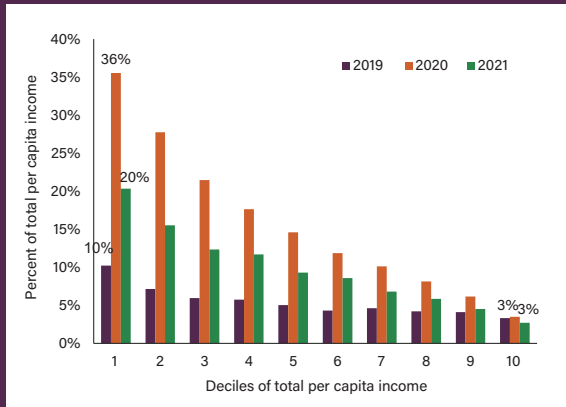
A total of six cash transfer programs were rolled out to mitigate the effect of the pandemic.^a In total, 72.6 percent of households received at least one type of benefit. The incidence among poor households was 84.1 percent, while, among extreme poor households, it was of 85.7 percent. Figure 3 shows that, for households in the lowest decile, transfers represented more than a third of income per capita in 2020, an increase of 26 percentage points relative to a regular year (2019). For households in the top decile, transfers represented only 3 percent of their incomes in 2019 and 2020. Figure 4 shows a similar pattern. Labor income per capita decreased across all deciles by around 9 percent. However, per capita nonlabor income (which includes transfers) rose 6 percent among households in the lowest deciles, which mitigated the fall in total per capita income among poor households. Although transfers served as a buffer, the poor still experienced a decrease in household incomes that pushed more people into poverty.

3. Tax revenues also increased significantly, reaching 14.8 percent of GDP.

4. BCRP, 2021.

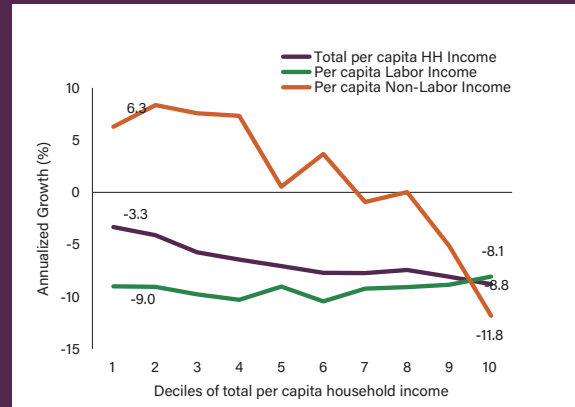
a. The cash transfers to mitigate the pandemic were the Bono Yo me quedo en casa, the Bono Independiente, the Bono Rural, the Bono Familiar Universal, the Bono 600, and the Bono Yanapay (Gob.pe, 2022).

Figure 3. Per capita social transfer, % of total per capita income, 2019–21



Source: Estimates based on SEDLAC data.
Note: Transfers include CCT and non-CCT. Total per capita income excludes imputed rent.

Figure 4. Growth incidence curve, by income component, 2019–21



Source: Estimates based on SEDLAC data.
Note: Total per capita income excludes imputed rent. Nonlabor income includes transfers, pensions, capital income, and other sources of income such as donations.

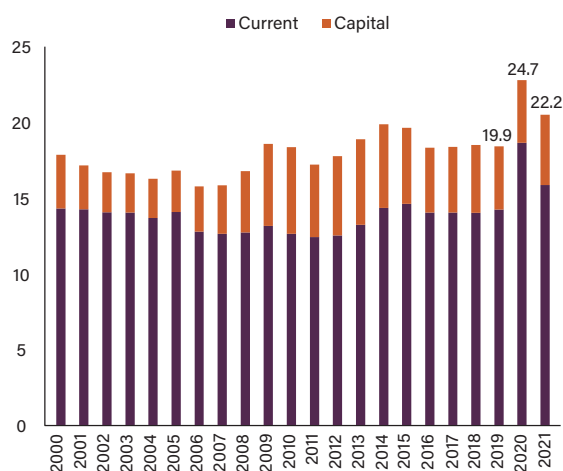
In the absence of government’s response, the pandemic would have been more devastating in terms of poverty, especially among those living in rural areas and among indigenous and afro Peruvian population. Estimates using ENAHO 2020 show that poverty would have been 3.6 percentage points higher in the absence of the benefits.^b Poverty in urban areas would have been 3 percentage points higher, while in rural areas it would have been close to 5.5 percentage point higher. Although the biggest mitigation measures were given in 2020, the government continued its efforts in 2021. The Bono Yanapay covered 67 percent of the total households. As a result, in 2021 poverty would have been 2 percentage points higher in the absence of the benefits. Poverty in urban areas would have been 2 percentage points higher, while in rural areas it would have been close to 3 percentage points higher in the absence of the emergency mitigation measures. The bonuses were also effective in avoiding higher poverty impacts for indigenous and afro Peruvian population, as the mitigation measures prevented additional 3.3 and 2.4 percentage points increases in poverty in 2020 and 2021 respectively.^c

b. Estimates using the 2017 purchasing power parity (PPP) international poverty lines of \$6.85/day and ENAHO.

c. Estimates using the 2017 PPP international poverty line of \$6.85/day. A person is considered indigenous or Afro-Peruvian if they live in a house where the household head considers themselves as Quechua, Aimara, Amazonian, or Afro descendant because of customs or ancestors.

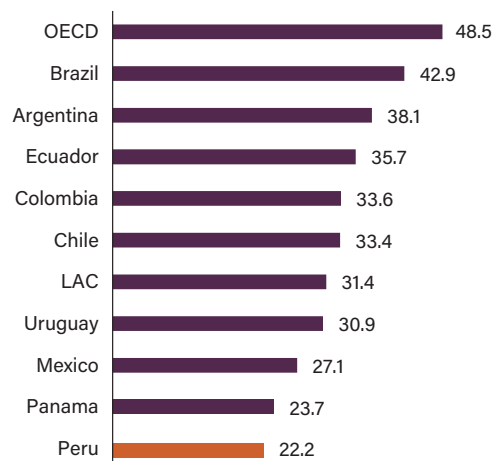
Despite the fiscal stimulus during the pandemic, Peru continues to lag its peers in terms of expenditures as a share of GDP. In 2021, general government expenditure declined by 2.5 percentage points relative to 2020 and reached 22.2 percent of GDP—above pre-pandemic levels—mainly due to the higher capital spending in the context of the restart of activities and projects paralyzed in 2020, still higher spending on health related to the pandemic, and the recovery of expenditures not related to Covid-19 (Figure 5). Nonetheless, despite higher levels of expenditures compared with before the pandemic, Peru has one of the lowest government expenditures among its peers with respect to members of the Pacific Alliance and the region (Figure 6).

Figure 5. General government expenditure, 2000–21
% of GDP



Source: BCRP.

Figure 6. Latin America and Caribbean: general government expenditure, 2021
% of GDP



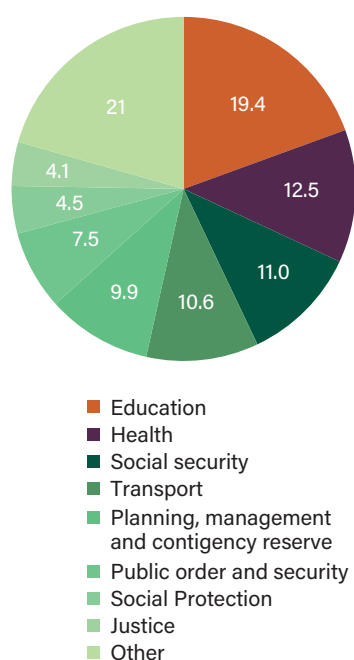
Source: OECD, IMF WEO.

The spending categories on education, health, and social security correspond to the largest share of the government budget. Education constitutes the largest share of government expenditure, representing almost a fifth of total expenditure (and 5.3 percent of GDP). Health expenditure is the second-largest budget category, at 12.5 percent of total expenditure and 3.4 percent of GDP (Figure 7). Likewise, social security—comprised of financial coverage of the payment and assistance to the insured and beneficiaries of the public pension system and social security health care—constituted 11 percent of total expenditure and 3 percent of GDP. Other nonsocial spending includes transport, planning, management, contingency reserve, and public order and security, which amount to 27.9 of total expenditure.

Although regional and local government execute about 40 percent of the total government expenditure in Peru, there are barriers to effective implementation of these resources. As of 2019, regional and local governments represented almost two-fifths of

total expenditure, which represented 4.3 and 3.1 percent of GDP, respectively (Table 2).⁵ In particular, subnational governments receive resources from the Canon System. However, the formula of distribution is linked to the proximity of municipalities to mines, which creates an unequal distribution of fiscal resources (Box 2). Furthermore, there is evidence of heterogeneous institutional capacity by local authorities that are linked to low execution of the budget. Between 2015 and 2019, the national government executed only 78 percent of the public investment budget, while regional and local governments executed only 65 and 62 percent of the total budget, respectively. Furthermore, the development of pre-investment studies and technical files of low or medium quality end in paralyzed works and unfinished public investments.⁶ Deficient operations and maintenance cause a high degree of uncertainty and discontent in the population due to low quality of public goods and services.

Figure 7. Government expenditure by function, 2019
% of total expenditure



Source: MEF – Consulta amigable.
Note: Total expenditure excludes public debt spending.

Tabla 2. Government expenditure by function, 2019

Component of general government expenditure	Peruvian sol, Millions	% of GDP
Total expenditure	154,385	19.9
National government	96,882	12.5
Regional government	33,211	4.3
Local government	24,292	3.1
Current	119,362	15.4
Wages	49,151	6.3
Goods and services	45,301	5.8
Transfers	24,911	3.2
Capital	35,023	4.5
Gross capital formation	30,440	3.9
Other capital expenditures	4583	0.6

Source: BCRP.

5. This is the result of the decentralization process that started in the early 2000s and was conceived as an opportunity for giving more attributions to subnational governments in a context in which government expenditure increased by 4.5 times in nominal terms between 2000-2019.

6. According to the Contraloría General de la República (CGR) there are over 2,000 unfinished public works throughout the country. CGR, 2022. Obras y proyectos paralizados. Comisión de Vivienda y Construcción.

Box 2. The unequal distribution of transfer of tax revenues from mining: The case of Peru's Canon System

The public health measures during the COVID-19 pandemic as well as the contraction of global demand that resulted in lower the decrease of prices for many minerals and metals during the first half of 2020, strongly impacted the mining sector in Peru during 2020.^a For instance, copper production decreased by 12.4 percent in 2020 (compared to only 0.9 percent in Chile) and so, mining revenues fell 24.4 percent in US dollar terms.^b However, the recovery of mining sector after the second half of 2020 allowed mining revenues to reach about 3 percent of GDP in 2021. The quick recovery after progressive reopening of operations in May 2020 and the increased demand from industrial activity in China since the second half of 2020 could not overcome the overall negative impact of 2020. Nevertheless, the recovery of international prices in 2021 allowed the mining sector to increase its maximum levels over the last 15 years. According to the IMF, revenue collection from mining fluctuates with mineral prices and as such, it went from about 1 percent in 2020 to around 3 percent of GDP in 2021.

High volatility in prices of minerals and metals such as the experienced in the last three years have raised concerns on how resource-based transfers such as The Canon System affect the predictability of the financing of investments by regional and local governments. This system explain most of the rise in fiscal revenue experienced by subnational governments which more than tripled during the last decade.^c As a response to its high dependence on commodity prices (see Figure 8) which was also evident during the pandemic, the government has recently announced the evaluation of a mechanism for stabilizing resource-based transfers.

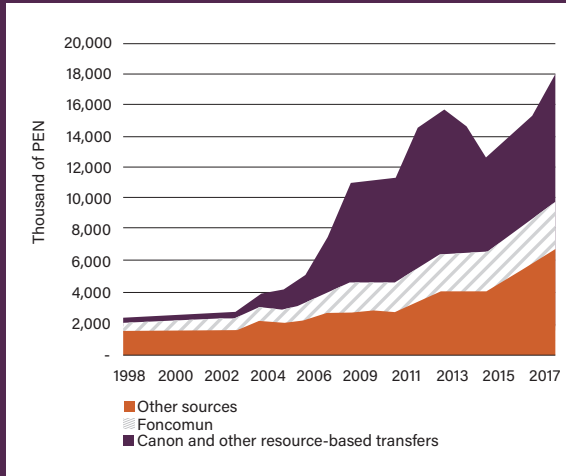
In addition to the high volatility of the Canon System, its formula of distribution linked to the proximity of municipalities to mines creates an unequal distribution of fiscal resources (see Figure 9; **Error! No se encuentra el origen de la referencia.**). The top 10 percent of districts municipalities receive a per capita canon that is almost nine times the amount of the median municipality. A recent evaluation of this program by Aragón and Winkler (2022) has shown no evidence on significant improvements in access to public services, poverty nor inequality due to this system.

a. Between 2009 and 2018, mining revenues accounted for 20 percent of total revenues from third category.

b. According to the IMF, total collection for the mining sector decreased from about 1.2 percent of GDP in 2019 to almost 1 percent in 2020.

c. The canon works under a revenue-sharing scheme in which half of the corporate tax paid by mining firms is allocated to regional and local governments based on its proximity to the mine. In particular, it is only distributed to municipalities located where the mine is and so, adjacent municipalities can receive a substantially different amount of transfers depending on their side of the regional boundary.

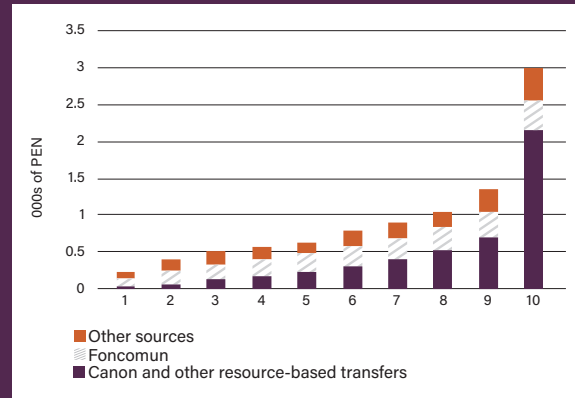
Figure 8. Average municipal revenue by source, 1998-2008
thousands of soles



Source: Aragón & Winkler (2022).

Note: Figure depicts annual revenue (in thousands of PEN) in period 1998-2016 for the average district municipality. Sample includes all district municipalities.

Figure 9. Municipal revenue per capita by canon deciles, 1998-2016
thousands of soles



Source: Aragón & Winkler (2022).

Note: Figure depicts annual revenue per capita (in thousands of PEN) in period 1998-2016 for the ten deciles of canon per capita. Deciles obtained using average canon per capita in period 1998-2016 and sample of municipalities included in regression analysis. Decile 10 corresponds to municipalities with the top 10% highest canon per capita.

3.2. Taxes and transfers are key to addressing poverty and inequality

In the context of limited opportunities for major structural reforms to improve inclusive growth, fiscal policy can be a powerful instrument in reducing poverty and inequality in Peru. The significant fiscal stimulus package implemented during the crisis was critical in attenuating the negative distributional impacts of the pandemic, including through the expansion of existing social programs. International experience has shown that public spending that is targeted on poor and vulnerable households can achieve a broader distribution of the benefits of economic growth.⁷ At the same time, as in most of LAC, an imperative policy will be to carry out some form of fiscal adjustment coming out of the crisis. This could be

achieved both through the government's overall fiscal position—avoiding a loose fiscal policy that could lead to macroeconomic instability and higher inflation, which is the worst tax on the poor—and more directly through tax policy and public spending carefully targeted because of distributional implications.

Fiscal incidence analysis is useful in illustrating who pays and how benefits are distributed in the tax and transfer system. The analysis in this chapter follows the Commitment to Equity (CEQ) methodology for 2018, a rigorous and standardized fiscal incidence methodology developed by the CEQ Institute,⁸ to systematically analyze the distributional impact of taxes and public spending on poverty and inequality in Peru and elsewhere.⁹ It uses a common framework

7. Defined as those vulnerable to falling into poverty and the lower bound of the middle class in Latin America based on estimates of Lopez-Calva and Ortiz (2014), that is, those whose annual incomes per capita fall between US\$11.50 and US\$57.60 PPP based on estimates of the CEQ Institute.

8. Lustig, 2018.

9. CEQ assessments have been implemented in over 60 countries.

that is comparable across countries and over time in which specific fiscal policy elements, programs, expenditures, or revenue collections are allocated to individuals and households appearing in a micro-level socioeconomic survey. The main questions that this work aims to respond include How much inequality and poverty reduction is being accomplished through taxes, social spending, and subsidies? Who are the net payers/beneficiaries in the fiscal system? What is the net impact across the income distribution? Are taxes and social spending equalizing and pro-poor? What reforms could reduce fiscal deficits while minimizing the impact on poorer households? The analysis in this report was performed based on the tax and spending structure in 2019, to avoid the impact of the Covid-19 crisis, for which it also utilizes the ENAHO 2019 (Box 3).

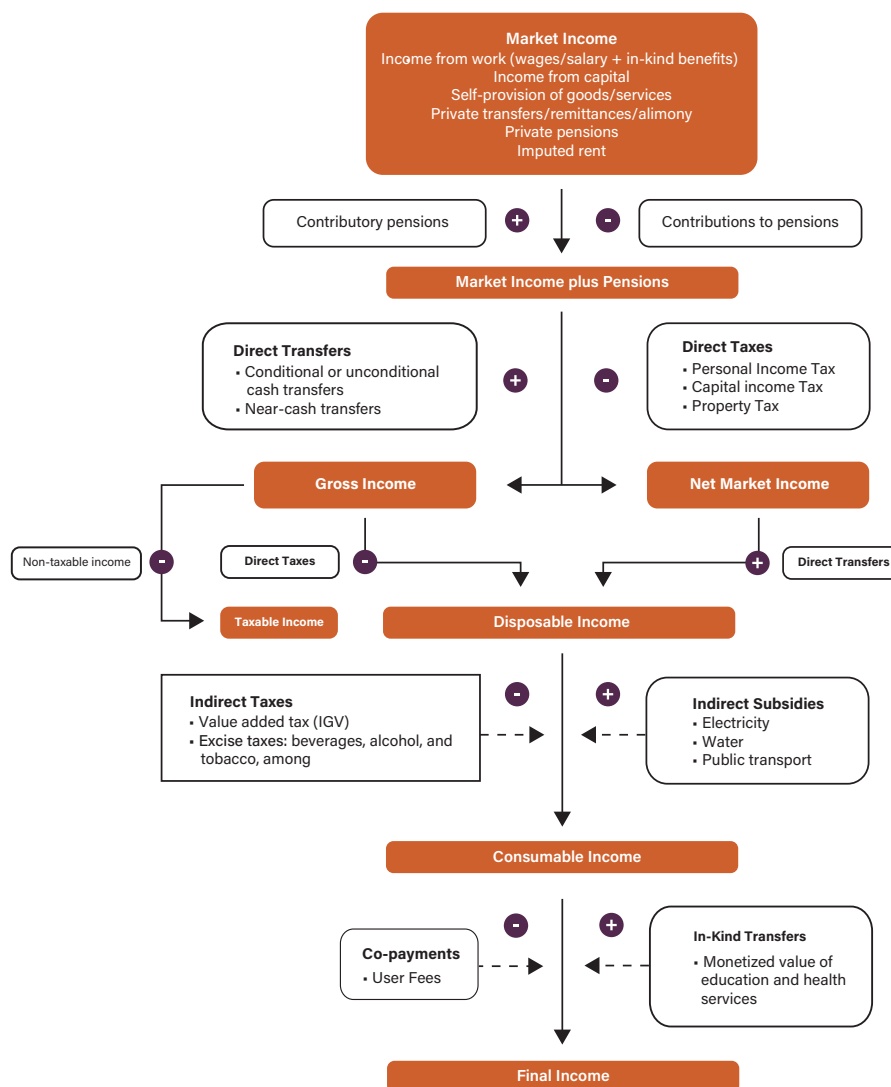
Box 3. Data used for fiscal incidence analysis in 2019

This study departs from the National Household Survey (ENAHO) for 2019, with a sample of 36,994 private dwellings, corresponding to 23,346 households in urban areas and 13,648 households in rural areas. The ENAHO is a nationally representative survey, also representative of the 24 regions of the country and in the Constitutional Province of Callao. It provides detailed information on dwelling characteristics and those of household members such as education, health, employment, and income, as well as household expenditures, social programs, governance, democracy, and transparency in a total of 18 modules. One of the main advantages of the ENAHO relative to other national surveys in fiscal incidence analysis is that it includes a comprehensive vector of consumption items (most of them with information on the places of purchase), income sources and subsidies, social programs, pensions, contributions, and other income concepts.

Information that complemented survey data included budget and administrative data for 2019 as well as a national-level input-output table for the estimation of indirect effects. Administrative data sources used in this analysis are i) government statistics and budget reports from the Ministry of Finance, ii) revenues and spending data for the general government from the BCRP, iii) SUNAT reports on tax rates and exemptions, iv) MIDIS information on expenditures and beneficiaries of social programs, v) MINEDU information on government expenditure per student in public education, vi) government information on expenditures in public health and beneficiaries, and vii) the INEI input-output matrix for 2019. Most of this information is provided for 2019, but, among the exceptions, the latest available information is considered.

Fiscal incidence analysis is useful in understanding the progressivity/regressivity of fiscal policy between market income and final income that monetarizes public services such as education and health. The building block of fiscal incidence analysis is the construction of income concepts. The analysis creates eight measures of income—or income concepts—to examine the amount of redistribution accomplished and, thus, the impact of the fiscal system on poverty and inequality (Figure 10)¹⁰ Once all the fiscal instruments and income concepts are constructed, the analysis measures inequality and progressiveness, poverty and impoverishment, and the amount of redistribution accomplished on the income concepts that exclude (pre fiscal) or include (post fiscal) these fiscal policy element.

Figure 10. Definition of CEQ Income Concepts in Peru’s Incidence Analysis



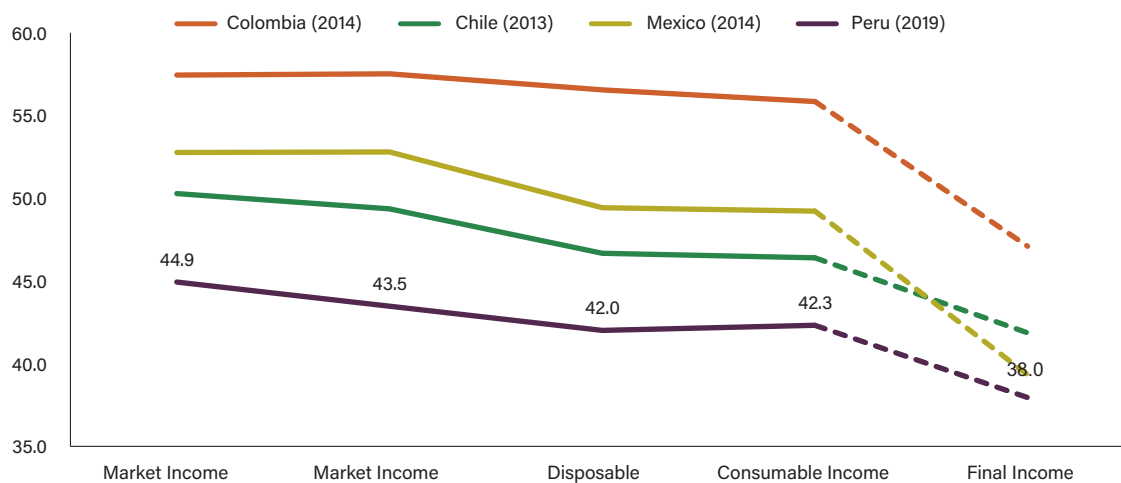
Source: Elaboration adapted from Lustig 2018.

10. As there is no agreement on how pensions from pay-as-you-go contributory system should be treated the analysis estimates at least two scenarios: if pensions are treated as deferred income, the pre-fiscal income shall be called Market Income plus Pensions; and, if pensions are treated as government transfers, the pre-fiscal income shall be called Market Income. Thus, in the analysis there will always be two different pre-fiscal incomes by which individuals are initially ranked for the same country.

3.3. Distributional effects of the fiscal system in Peru

In 2019, the tax and transfer system in Peru had only a modest impact on inequality. In 2019, the tax and transfer system in Peru contributed to a reduction in inequality of 2.6 Gini points, from 44.9 to 42.3 from market income to consumable income.¹¹ Moreover, inequality slightly increases if indirect taxes are included (from disposable to consumable income), which is explained by the regressivity of these taxes, while direct transfers (from net market income to disposable income) have only a slight impact on inequality (0.8 Gini points). Furthermore, the overall impact increases to 7 Gini points if the monetized value of education and health is included (dashed lines in Figure 11). However, even though education and health services provided by the government can be monetized, this does not accurately reflect the low quality of provision. Although the magnitude of the reduction of inequality from market income and consumable income is relatively similar, peers of the Pacific Alliance depart from a higher level of income inequality.

Figure 11. Inequality (Gini index) based on pre- and post-fiscal income concepts
0 represents perfect equality

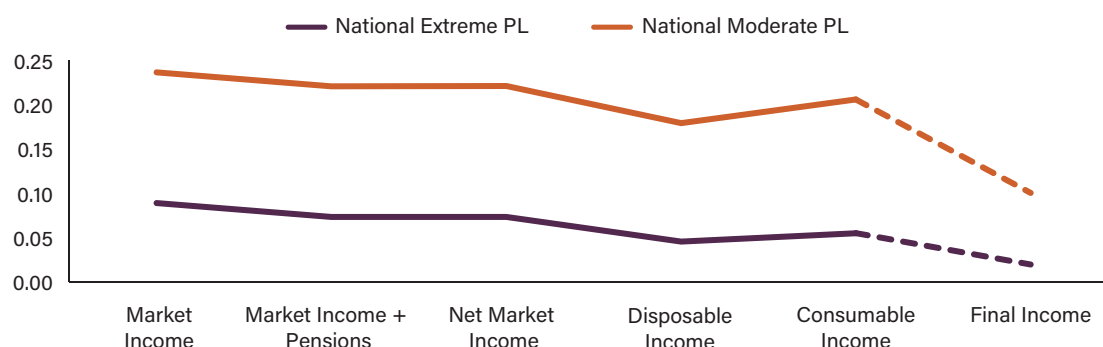


Source: Estimates based on INEI- ENAHO.

Fiscal policy in Peru also contributed to a reduction in poverty and extreme poverty in 2019. Fiscal policy contributed to a decline in moderate poverty (based on the national poverty line) from 24 percent at market income to 21 percent at consumable income, a decline of 3 percentage points. Regarding extreme poverty, it declines from 9 to 5 percent (also based on the national poverty line), a 4 percentage point reduction. As the reduction from market income, plus pensions, to net market income shows (Figure 12), direct taxes do not increase or decrease poverty. Furthermore, indirect taxes increase moderate poverty by 3 percentage points and poverty at US\$3.2 purchasing power parity (PPP) and US\$5.5 PPP per day, by 1 and 2 percentage points, respectively.

¹¹ Under the CEQ methodology, market income refers to earned income and income from capital (rents, profits, dividends, interest, and so on), private pensions, private transfers (remittances and other private transfers, such as alimony), imputed rent for owner-occupied housing, and the value of own production. Consumable income refers to the last income category, which includes all taxes and transfers before the inclusion of the monetized value of public health and education services as well as copayments.

Figure 12. Moderate and extreme poverty estimates from Net Market Income
% of total population



Source: Estimates based on INEI-ENAH0.

Table 3. Impact of fiscal policy by poverty lines

Income concept	National Moderate Poverty Line	National Extreme Poverty Line	USD 1.90 PPP	USD 3.20 PPP	USD 5.50 PPP
Market Income	24%	9%	5%	11%	24%
Market Income + Pensions	22%	7%	3%	9%	23%
Net Market Income	22%	7%	3%	9%	23%
Gross Income	18%	5%	2%	6%	19%
Taxable Income	41%	22%	15%	24%	39%
Disposable Income	18%	5%	2%	6%	19%
Consumable Income	21%	5%	2%	7%	21%
Final Income	10%	2%	1%	3%	12%

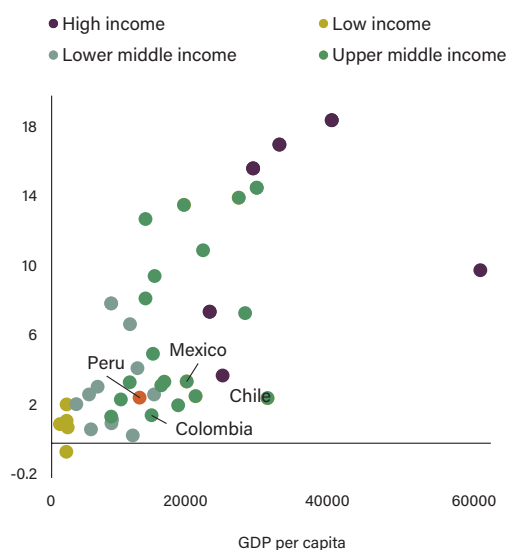
Source: Estimates based on INEI- ENAH0.

Fiscal policy has a limited redistributive capacity in Peru relative to other upper-middle-income countries. Figure 13 (panel a) displays the reduction in inequality, measured in Gini points, from market income to consumable income (excluding the monetized value of education and health services). It shows that the Peruvian tax and transfer system is among those with the lowest impact on reducing inequality, especially relative to other upper-middle-income countries. Although this impact is higher compared with Colombia (1.6 Gini points), it is below Chile (3.9 Gini points), Mexico (3.5 Gini points), and other countries with similar per capita GDP.

This occurs even though Peru's peers in the Pacific Alliance start from a higher level of income inequality. In contrast, Figure 13 (panel b) shows the impact of the tax and transfer system on reducing total poverty measured under the \$3.20 per person per day 2011 PPP line is relatively higher compared with other upper-middle-income countries. In Peru, poverty fell by 3.5 percentage points (from market income to consumable income), a decrease significantly higher compared with Chile and Colombia (2.1 and 2.5 percentage points, respectively), but below the one registered in Mexico (3.8 percentage points).

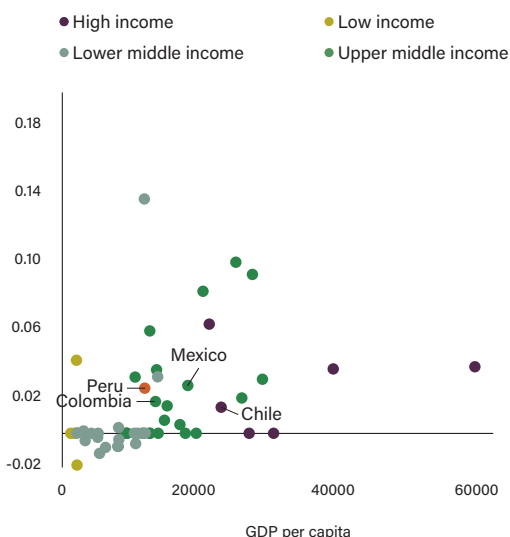
Figure 13. International comparison: Impact of fiscal policy vs. GDP per capita
 GDP per capita in PPP, constant 2017 international \$, poverty based on \$3.2 per person per day 2011 PPP line

a. Redistributive effect from Market Income to Consumable Income (Gini points)



Source: CEQ Institute 2022; World Bank.

b. Poverty reduction from Market Income to Consumable Income (percentage points)



Source: CEQ Institute 2022; World Bank.

3.4. Effects of taxes and transfers

3.4.1. Progressivity and indirect effects

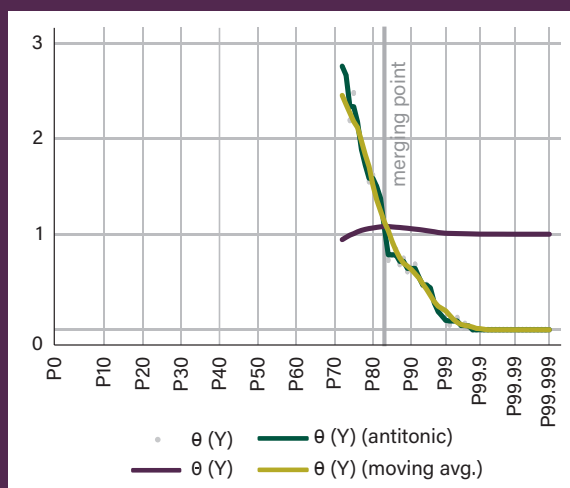
Peru's direct taxes are progressive except for property taxes. The personal income tax is clearly progressive, and labor income tax accounts for most of this progressivity. In aggregate, households in the lowest decile pay about 0.3 percent of their market incomes on personal income taxes, while households in the highest decile, which account for about 70 percent of total revenue from labor income taxes, pay 3.8 percent. In contrast, property taxes, which is one of the most progressive taxes in theory, are regressive in that less than 4 percent of households pay a higher amount than the average (S/ 40 per year). Households in the poorest decile paid only S/ 23 in 2019, but this represents a higher proportion of the S/ 152 per year paid in the highest decile represented by their market income.

Box 4. Distributional effects of the personal income tax in Peru after adjustment for top incomes

As household surveys fail to capture the top tail of the income and wealth distribution, it is important to integrate this information with administrative records of taxes to recover a more realistic value of income inequality. The method proposed by Blanchet et al. (2019) precisely allows for this by replacing observations at the top of the income distribution from the household data by a distribution generated from tax data. This correction improves the accuracy and precision of distributional estimates from survey data and thus provides a more representative framework for exploring the impact of fiscal policy on inequality and poverty.

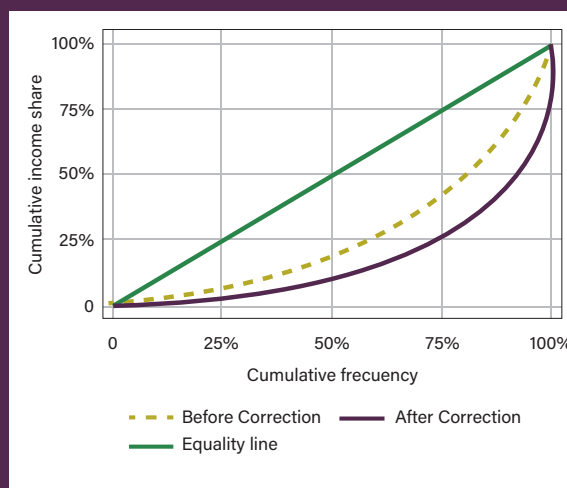
For the case of Peru, the analysis uses tax administrative data provided by SUNAT for 2019. The tax data provide information for the total income distribution by UIT brackets. Likewise, it includes the number of taxpayers in each bracket and the total amount of labor, rent, and capital income and the corresponding taxes. At this point, the report uses the generalized Pareto interpolation developed by Blanchet, Fournier, and Piketty (2017) that allows for the expansion of the tabulated income values into 127 intervals. Using the thresholds of these intervals, it is possible to construct the frequency and cumulative frequency of individuals along the income distribution and identify a merging point between data of the household survey and administrative data, which, in the case of Peru, lays between percentiles 80 and 90 (Figure 14). Moreover, the Lorenz curve, which illustrates the inequality in the income distribution in the country, significantly shifts to the bottom right, which is associated with a higher income concentration (Figure 15).

Figure 14. Merging point in Peru, 2019



Source: Estimates based on INEI- ENAHO and administrative tax data from SUNAT.

Figure 15. Lorenz curve, 2019



Source: Estimates based on INEI- ENAHO and administrative tax data from SUNAT.

After the adjustment, the Gini coefficient significantly increases from 48.1 to 63.1. Moreover, before the correction, according to the household survey, the top 10 percent of the income distribution concentrated about a third of total income, while, after the correction for top incomes, the share of income for this group increases to more than half of total income. Likewise, concentration of the top 0.1 percent increases from 2.6 to 11.6 percent after implementing the correction (Table 4).

Table 4. Income concentration before and after correction

Statistic	Unadjusted	Adjusted
Gini Index	48.1	63.1
bottom 50% share	18.10%	12%
middle 40% share	47.20%	35.20%
top 10% share	34.70%	52.80%
top 1% share	8.24%	21.70%
top 0.1% share	2.59%	11.60%

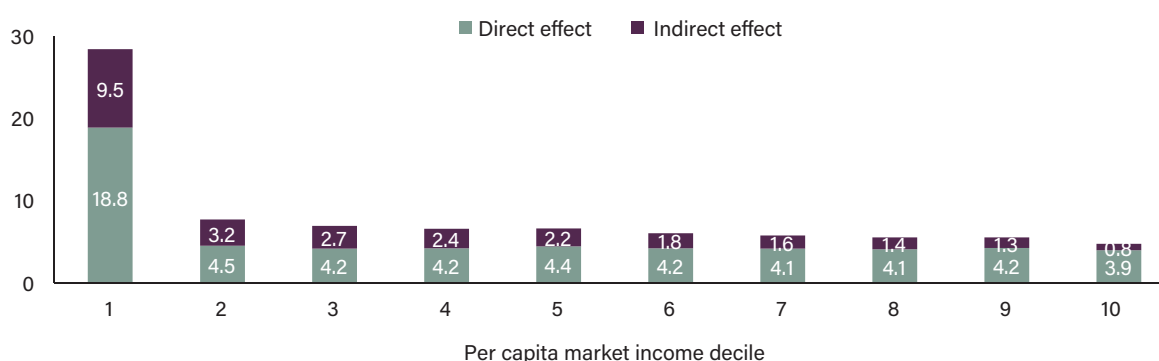
Source: Estimates based on INEI- ENAHO and administrative tax data from SUNAT.

In addition, once Peru's income distribution is corrected for the top incomes, the progressivity of the personal income tax increases substantially. Results show that, while workers in the lowest decile now pay about 0.23 percent of their total income (labor, rent, and capital) on income taxes (vs 0 percent before correction for top incomes), those in the highest decile pay 6.7 percent in income taxes (versus 4 percent before correction by top incomes).

In contrast, indirect taxes, particularly the IGV, are regressive, corresponding to almost a fifth of the effective expenditure of households in the bottom decile of the distribution. Effective IGV expenditure is only 3.9 percent of market income for households in the 10th decile, while it amounts to 18.8 percent in the poorest decile. Without IGV exemptions and IGV non payments due to purchases in informal markets, IGV expenditure in the poorest decile may rise to 50 percent of total market income compared with 10 percent at the high end. Furthermore, as in the case of IGV, ISC is not progressive as in the highest decile it amounts to 0.1 percent of market income, while in the poorest decile it amounts 0.3 percent.

The regressivity of the IGV increases significantly if the indirect effects are included. As IGV affects the intermediate good and service prices across the whole economy, producer prices are affected by IGV both directly and indirectly. As producers pass some of these higher or lower input prices on to other intermediate producers or to final consumers, households will bear more of a total burden or enjoy a larger total benefit than the direct impact alone would indicate.¹² In the case of Peru, if indirect effects are included, this regressivity significantly increases (Figure 16) because the poorest households allocate a greater part of their market income on IGV indirectly paid than richest households. Direct IGV payment amount to 3.9 percent of market income among the richest households compared with 18.8 percent among the poorest households. However, indirect IGV payments represent about 0.8 percent of market income for households in the top decile and 9.5 percent for households in the lowest decile.

Figure 16. IGV expenditure: direct and indirect effects by per capita market income decile, 2019
% of market income



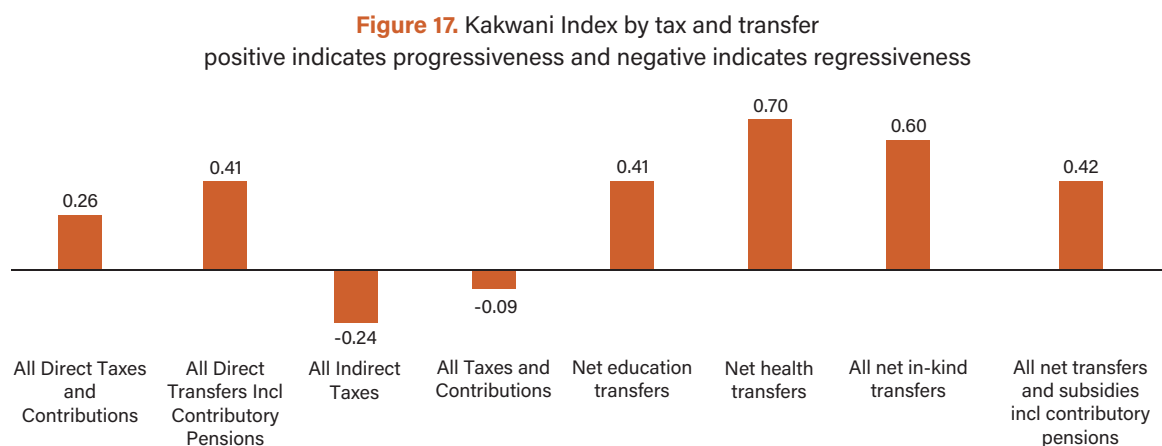
Source: INEI- ENAHO.

Government expenditures, including taxes and the value of public education and health, are mostly progressive. Direct government transfers are clearly progressive and account for 211 percent of market income for poorest household, while, for the richest decile, this share corresponds to 3 percent.¹³ Likewise, other government social assistance programs and in-kind transfers in the form of free or subsidized services in education and health are also part of redistribution policies, among other subsidized programs, are also progressive. In particular, education is the most important in-kind benefit for all expenditure levels, and both health and public education in-kind benefits amount to 121.5 percent of market income for the poorest decile and to 0.5 percent in richest decile.

¹². On a intend to generate a more comprehensive estimate of the total impact of the value added tax on poverty on inequality, indirect effects are estimated using the Price-shifting Model which uses information on the structure of the Peruvian economy at current levels of production. This is reflected in the input-output matrix (IO) for 2019 from the INEI. The model defines three sectors: (i) cost-push sector in which higher input prices are pushed fully onto output prices; (ii) traded/non-cost-push sectors in which output prices are fixed (possibly because they are determined by world prices) and therefore higher domestic input prices are pushed backward onto lower factor prices (or profits); and (iii) controlled sectors in which prices are controlled by the government. More detail on these sectors can be found in Lustig (2018). Nevertheless, it is important to note that indirect effects should not be confused with general equilibrium effects because the indirect effects measured with input-output tables still do not incorporate behavioral responses to changes in relative prices.

¹³. Includes cash transfers from Juntos, Pensión 65, Beca 18 and Bono gas' social programs and in-kind transfers which are composed by public donations of food, clothing and footwear, rental, furniture, among others.

The most progressive fiscal instrument in Peru is net health transfers, followed by net education transfers and all direct transfers, including contributory pensions. According to the Kakwani index, a well-known summary indicator to reflect progressivity, despite the high progressivity of in-kind transfers, all indirect taxes are regressive and that plausibly explains the regressivity of all taxes and contributions (Figure 17).¹⁴



Source: Estimates based on INEI- ENAHO.

3.4.2. Incidence and marginal contributions¹⁵

While all taxes in Peru are poverty-increasing, direct taxes are inequality-reducing, and indirect taxes have the largest effect in increasing inequality.¹⁶ Indirect taxes are regressive (Figure 18, panel a), with 27 percent of the tax paid by the richest decile (Figure 18, panel b), and its inclusion in the system at final income increases the Gini by 2 points. In contrast, direct taxes are highly concentrated in the highest decile (84 percent of total taxes paid), but have an almost negligible effect on inequality.

Likewise, although all public transfers are poverty reducing, not all are inequality reducing. While all transfers are clearly progressive, they are not necessarily concentrated in the lowest deciles, but are distributed among different levels of prefiscal income. This explains why transfers increase the Gini. Figure 18, panel c, illustrates the incidence of each of the direct transfers and shows that, in aggregate, they benefit households in the lowest decile more relative to households in the highest decile. However, the fact that the concentration shares are not only in the lowest deciles evidences the leakages of government transfers for those in the highest deciles.

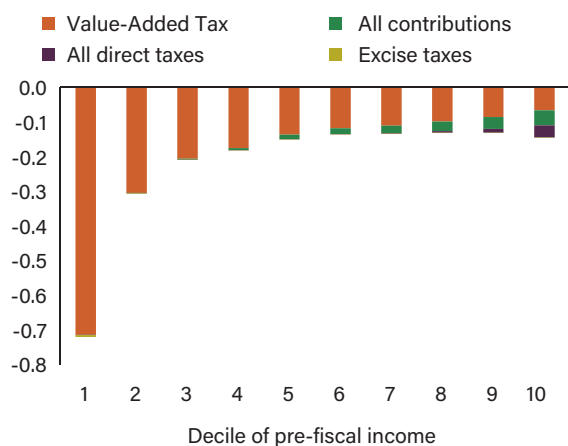
¹⁴. The Kakwani Index is a summary statistic of progressivity. It is calculated for taxes by subtracting the concentration coefficient from the Gini coefficient, and for transfers by subtracting the Gini coefficient from the concentration coefficient. A value greater than zero represents a progressive tax or transfer, while a value below zero represents a regressive tax or transfer. The minimum and maximum values of the Kakwani Index depend on the size of the Gini coefficient.

¹⁵. Marginal impacts are a summary statistic of the incidence of taxes or transfers, where incidence indicates the benefit or burden of the tax as a share of income. Marginal impacts consider both the progressivity and the size of an instrument and are calculated by measuring the change in the poverty / inequality with and without the tax/transfer of interest. A positive marginal contribution indicates that the tax or transfer is inequality- or poverty-reducing. In this section we first examine the incidence and concentration shares of taxes and transfers and then, the marginal contributions of both.

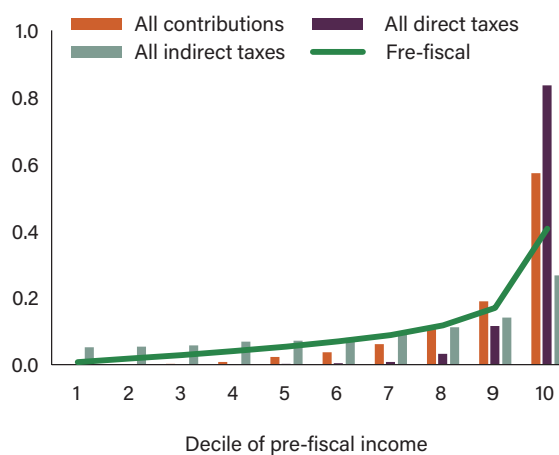
¹⁶. The impact of taxes can only be either poverty-increasing or null.

Figure 18. Tax revenue and expenditure: incidence and concentration shares

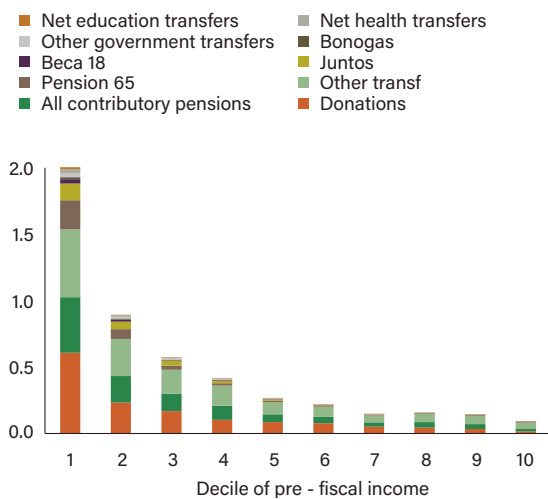
a. Incidence: tax revenue and contributions



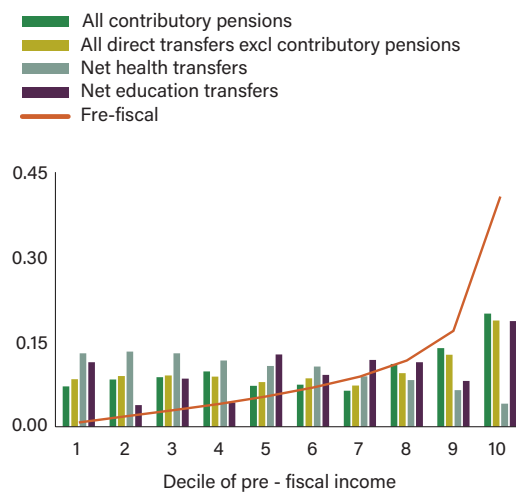
b. Concentration shares: tax revenue and contributions



c. Incidence - transfers



b. Concentration shares - transfers



Source: Estimates based on INEI- ENAHO.

Note: Measuring the incidence of taxes and transfers by decile shows the total size of a tax or transfer relative to the total size of income in that decile. Incidence therefore provides a measure of size, and of the distribution relative to a reference income. In this sense, a positive bar represents a transfer, while a negative bar represents a tax.

3.5. Distributional effects of fiscal policy reform

Although the tax and transfer system has a lower impact on reducing poverty and inequality than economic growth, there is a high potential for increasing its redistributive capacity. This section illustrates four policy options that aim to address some of the constraints that fiscal policy faces in redistributing the gains of economic growth, such as expanding the tax base, increasing progressiveness, and replacing tax expenditures with well targeted compensation mechanisms. Additionally, the section also presents the potential impact of the introduction of a carbon tax in Peru. All these simulations are based on partial equilibrium analysis and do not incorporate behavioral responses, induced effects, or changes in relative prices.¹⁷

3.5.1. Equity effects of lowering the threshold of the labor income tax

Labor income tax is subject to an exemption of seven tax units (UITs), a reference unit set annually by the Peruvian Ministry of Economy (MEF) to determine taxes, and then it is taxed on a progressive scale. Income generated from self-employment (fourth category) is subject to a 20 percent deduction up to the limit of 24 UITs.¹⁸ This income, net of deductions, is added to the income generated by dependent work¹⁹ (fifth category), and the result is subject to deductions of up to 10 UITs. The first seven UITs are exempted from tax,

and it is established that, as of January 2017, three additional UITs may be deducted as expenses for rent, medical and dental fees, professional services, consumption in bars, restaurants, and hotels, and contributions to ESSALUD carried out by employers for domestic workers to determine the labor income tax.²⁰ Foreign income by domiciled individuals is added to net income from work after exemptions, determining the amount on which a progressive cumulative scale is applied with the rates of 8, 14, 17, 20, and 30 percent (Figure 19).²¹

The threshold for personal income tax in Peru is almost double the average in OECD countries (in PPP terms) and exempts around 80 percent of formal workers. Due to the high threshold of seven UITs, most taxpayers who receive income from work do not pay income tax. In particular, the personal income-tax eligibility threshold in Peru, measured in US\$ PPP, is almost double the average in OECD countries and exceed the average in the region.²² According to SUNAT, about 80 percent (5.7 million) of taxpayers are within the unaffected section of the seven UITs, declaring annual average income between S/ 1,711 (average monthly income of S/ 143) and S/ 26,012 (average monthly income of S/ 2,168).²³ As Figure 20 shows, the ENAHO provides a close estimate of this proportion, which becomes more accurate after correcting the income distribution with administrative tax data.

22. World Bank, 2015.

23. Although these estimates correspond to 2017, in 2020 the MEF reported that the proportion was expected to remain around 80 percent for 2020.

17. For labor income tax, it is assumed that the three additional deductions for expenses (3 UITs), the ITF (financial transaction tax), donation expenses and income from foreign sources are equal to zero. The correction to the ENAHO follows Blanchet et al. (2019), considers the composition of total income from rentals, capital and income from work (4th and 5th category) and uses ENAHO and administrative data for 2019 and UIT value for 2021 (4,400 soles). Moreover, informal workers do not report any labor income, but all individuals fully report their capital income. IGV is fully paid by final consumers and expenditure in informal markets or in exempted goods do not pay IGV only in the last stage of the chain value.

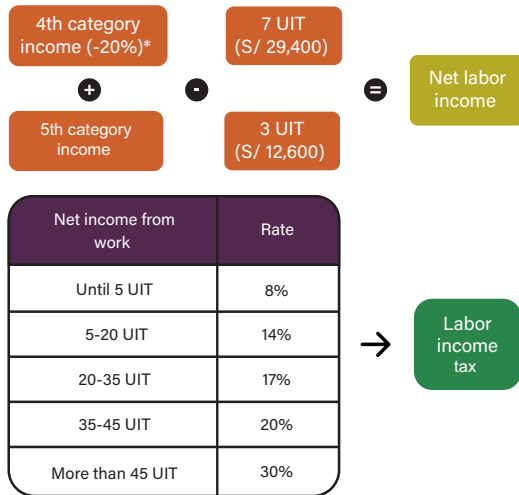
18. Except for the income of directors of companies, trustee, representative, manager of business, executor and similar activities.

19. In the case of dependent work, it is worth noticing that among others, income from labor compensation, for death or disability; the compensation by time of services; life annuities; pensions and allowances due to temporary disability, maternity and lactation are unaffected by the income tax.

20. The Ministry of Economy and Finance, by supreme decree, may include other expenses considering as criteria evasion and formalization of the economy.

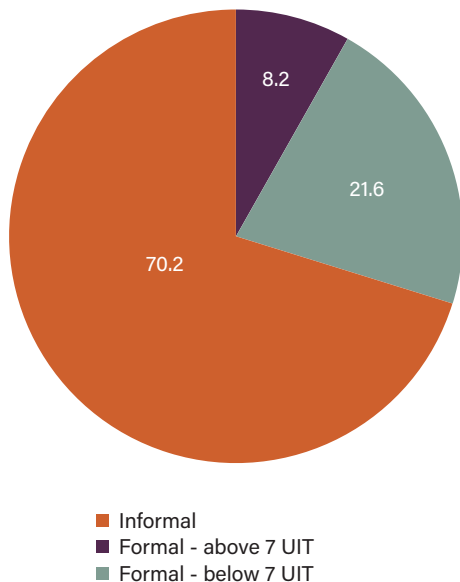
21. Income tax on non-domiciled employees is imposed at a flat rate of 30 percent on their gross Peruvian-source income. No deductions or credits apply to non-domiciled individuals.

Figure 19. Tax rate over labor income, 2019



Source: SUNAT.
* 20 percent deduction up to the limit of 24 UITs.

Figure 20. Taxpayers for earned income, 2019
% of the employed population



Source: INEI-ENAH0.
Note: Based on net labor income. Estimates from the ENAH0 corrected according to Blanchet et al. (2019).

Reducing the threshold of personal income tax will increase progressivity, although policies to increase labor formality will be important in increasing the tax base. Total labor income tax relies on the top 8 percent of the employed population (based on the distribution of total personal income) according to analysis using data that integrate household survey information with tax records following Blanchet et al. (2019). Reform scenarios to reduce the tax threshold to five UITs (US\$5500 approximately) are expected to increase the tax base to cover 15 percent of formal workers with labor income higher than S/22,512 per year. Reducing the eligibility threshold also increases the progressivity of the labor income tax. For instance, consider a worker with personal income before deductions of S/450,000. As Table 5 shows, the reduction of the eligibility tax threshold increases the taxable income, and, as a result, the taxes paid in the highest bracket of the scheme increases by 4 percent. Overall (Figure 21), the reduction in the eligibility tax threshold reduces the Gini index for both the total employed population and the formal workforce. In particular, it shows that, if the eligibility tax threshold is reduced to 5 UITs, the Gini coefficient of net labor income for total employed population goes from 58 to 57.8, while the one for formal workers decreases from 52.7 to 52.5.

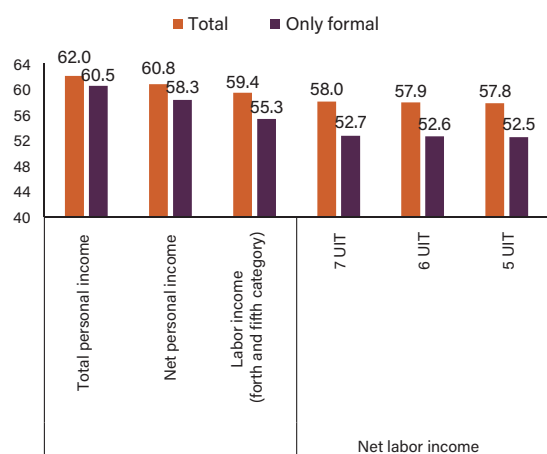
Table 5. Simulation of labor income tax if tax eligibility threshold is reduced to 5 UITs

4th category (net of 20 percent deductions) + 5th category income		450,000	
Deductions		-7 UIT	-5 UIT
Net income from work	Rate	419,200	428,000
Until 5 UIT	8%	1,760	1,760
5-20 UIT	14%	9,240	9,240
20-35 UIT	17%	11,220	11,220
35-45 UIT	20%	8,800	8,800
More than 45 UIT	30%	66,360	69,000
Total labor tax		97,380	100,020

Source: Elaboration based on INEI-ENAH0 and administrative data from SUNAT.

Figure 21. Gini index before and after labor income tax, by scenarios

0 represents perfect equality



Source: Elaboration based on INEI-ENAH0 and administrative data from SUNAT.

Note: The figure presents the Gini index for both total employed population and formal workforce under three simulation scenarios for the labor income tax eligibility threshold: 7 UITs, 6 UITs, and 5 UITs. It shows the Gini index before and after taxes for total personal income and labor income.

Lowering the personal income tax threshold could broaden the tax base, but informal work must first be reduced. The impact of this policy is limited by the extent of labor informality as these measures only correspond to less than a quarter of occupied workers. Therefore, measures that increase the benefits of formality and strengthen the enforcement of labor regulations are required. Lowering the exemption threshold may be politically challenging, and the first statutory tax rates must be set at low levels to avoid overburdening the middle class.²⁴

3.5.2. Effects of including capital income into a progressive scheme

Capital income tax in Peru is subject to a low flat rate and receives a preferential treatment compared with income from labor. Income from leasing, subleasing, and the assignment of goods (first category) and profits from principal, dividends, interest, royalties, and so on (second category) are determined annually by applying a 6.25 percent tax rate on net income (after 20 percent of deduction).²⁵ This is equivalent to an effective rate of 5 percent on gross income. In this sense, income from capital receives preferential treatment since it faces a lower rate than the lowest tax rate for labor income (8 percent) and is subject to a deduction of 20 percent even though the costs required to generate capital gains are generally low.²⁶

Moving personal capital income tax from a flat rate to a progressive regime will improve the equalizing effect of the tax system. The actual dual scheme typically benefits top income earners who account for most of the capital gains. According to SUNAT, the top 1 percent of taxpayers concentrate 72 percent of total capital

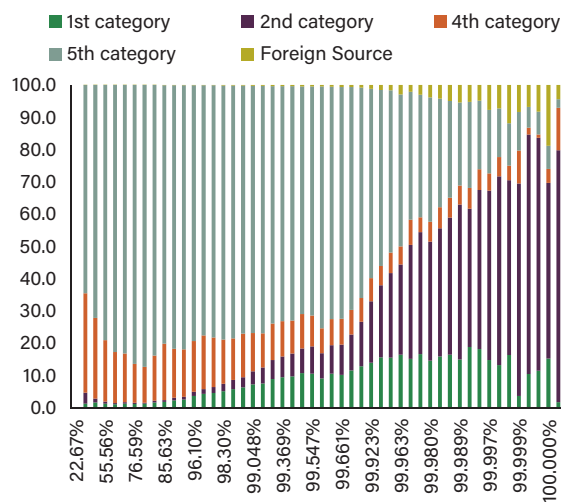
24. See Bergolo et al., 2022, "Taxing the Rich in Developing Countries: Lessons from Latin America"

25. Except dividends and any other form of profit distribution which are taxed at a rate of 5 percent and no deductions or loss compensation are applied.

26. World Bank, 2015

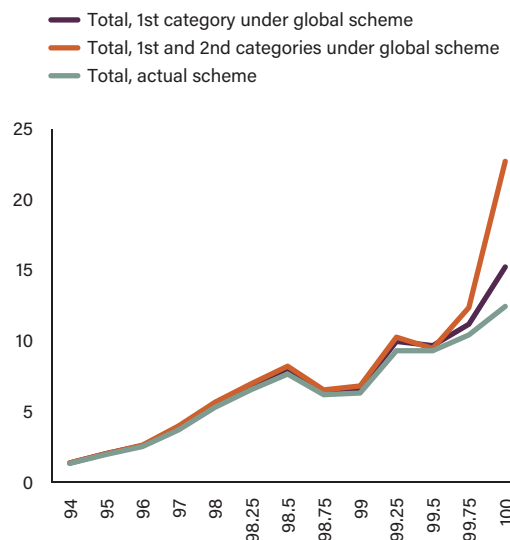
gains. Therefore, the inclusion of the capital income tax—first or second category—into the progressive scale of brackets will improve the equalizing effect of the tax system and is expected to increase the contribution of the highest income earners. As a result, the Gini index for net personal income is estimated to be reduced from 60.8 under the current dual scheme to 60.1 under a progressive scheme, which is higher than the reduction if the threshold of personal income tax is reduced to five UITs (60.6). However, this requires further adaptations of tax policy and administration, such as by introducing deductibles for capital expenses.

Figure 22. Composition of tax collection by income category and tax reform proposal
% of total tax revenue



Source: SUNAT.

Figure 23. Total tax burden by proposed scenario
% of total income



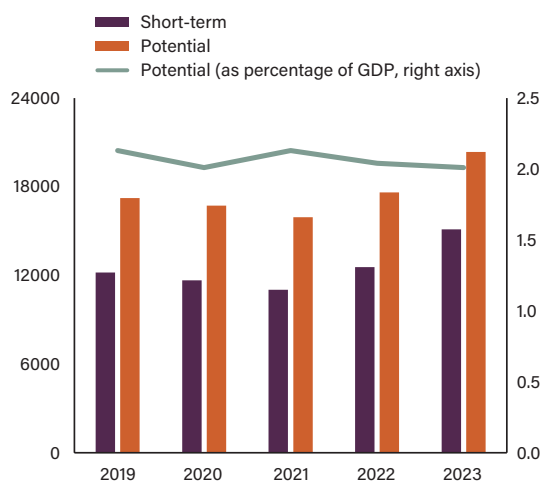
Source: Elaboration based on INEI–ENAH0 and administrative data from SUNAT.

2.5.3. The distributional effects of removing IGV exemptions

Tax expenditures represent about 2 percent of GDP in Peru. Tax expenditures in Peru are classified as exemptions, allowances, credits, rate reliefs, and deferrals. According to estimates, these tax benefits will reach S/20,354 million in 2023, which represents about 2 percent of GDP.²⁷ Figure 24 shows how tax expenditures have remained at this level over the last five years (as a percentage of GDP) but are projected to increase by 11 and 16 percent in 2022 and 2023, respectively. According to the MEF, this is explained by the extension of IGV tax benefits²⁸ that expired in 2021, that amount to S/2,594 million in the short term and S/5,708 million (0.56 percent of GDP) if effective mechanisms of fiscal control are applied.

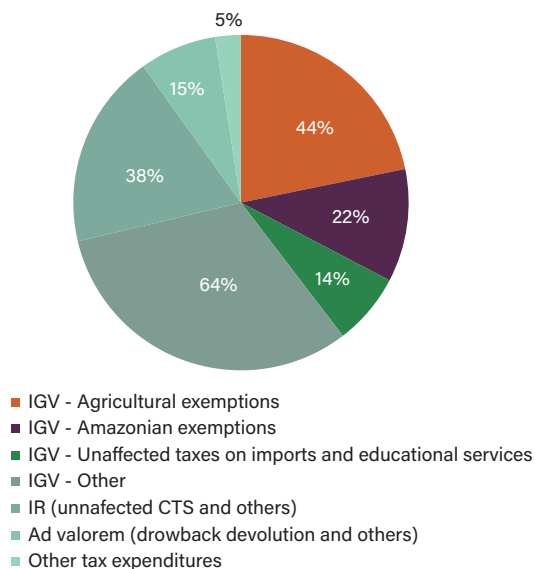
IGV exemptions correspond to about 70 percent of tax expenditures. Figure 25 shows that the IGV represents 71 percent of total tax expenditure (expected in 2023), mainly explained by IGV exemptions on agricultural products, equivalent to 0.62 percent of GDP, and almost full exemption of IGV in the Amazon. Estimates of the OECD show that, although Peru's IGV efficiency-consumption index²⁹ has increased, it remains one of the lowest in the region. This means that IGV exemptions, tax evasion, or both are higher in Peru than in peer countries.

Figure 24. Tax expenditures, short-term and potential, 2019–23
millions of soles



Source: MEF (2022).

Figure 25. Tax expenditure by type of tax, 2023
% of total tax expenditure



Source: MEF (2022).

Removing tax exemptions will likely increase the burden of the IGV on the poorest, although a well-designed transfer scheme to compensate the poor could improve the overall progressivity of the tax and transfer system. Figure 26 shows that IGV exemptions are mostly progressive. Some of them benefit households in the highest decile, and most of the IGV that is not paid by the poorest households corresponds to IGV not paid due to purchases in informal markets. In this sense, removing IGV exemptions will increase the burden of IGV tax on the poorest deciles of the welfare distribution, despite the fact that these groups purchase a larger amount of goods and services in informal markets. Specifically, this will correspond to a relative welfare loss of 16.7 percent of total market income for those in the poorest income decile compared with a 2.7 percent loss among the top income decile (Figure 27). Moreover,

27. In this sense, the gap between these two measures is explained by the restrictions that the tax authority would face to collect the resources that the government is not receiving due to tax benefits (MEF, 2022).

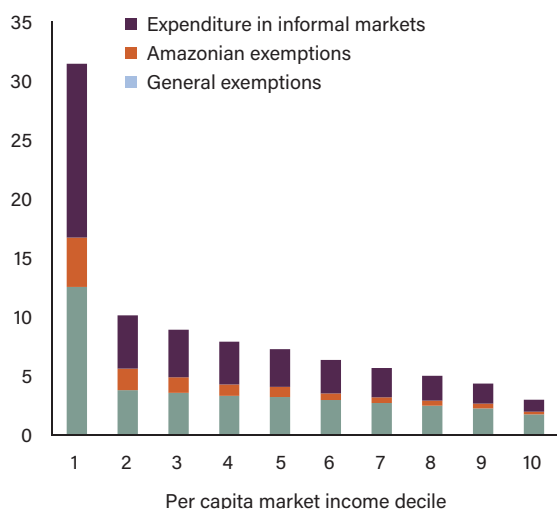
28. About 91 percent of these IGV benefits corresponded to agricultural products and inputs, followed by public passenger transport system (except air transport), first sale of real estate, income received by the MIVIVIENDA fund, construction and repair of units of the forces naval companies and live guinea pigs.

29. The IGV efficiency-consumption index is equal to zero if IGV collection is equal to private consumption multiplied by tax rate. In this case, private consumption is fully taxed with IGV and there are no exemptions and evasion rate is zero percent.

according to the MEF, the direct allocation of public expenditures is a more efficient and effective fiscal policy compared with providing tax benefits.³⁰ This is consistent with findings in a recent study of Escobal (2017), which shows that, after the San Martín region decided to substitute tax benefits by direct transfers to finance public investment, its GDP growth increased by an additional 2.6 percentage points each year after 2006. Other policy options to improve the overall progressivity of the tax and transfer system of removing IGV exemptions include compensating poor and vulnerable households for their losses through a well-targeted transfer system.

Figure 26. IGV not paid due to exemptions and purchases in informal markets by per capita market income decile, 201

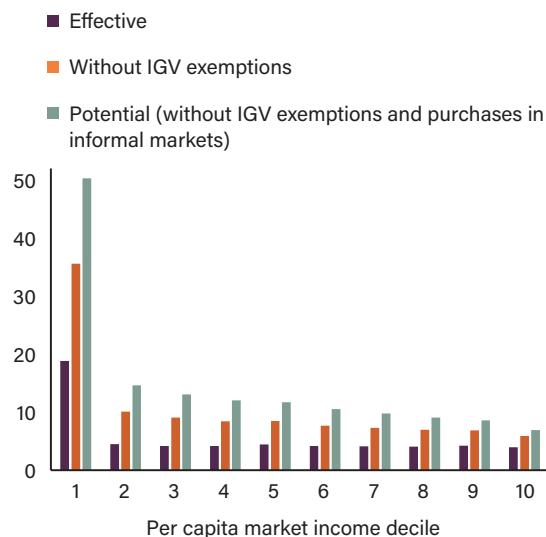
% of per capita market income decile



Source: Elaboration based on INEI-ENAH0.

Figure 27. IGV burden without IGV exemptions and purchases in informal markets, 2019

% of per capita market income decile



Source: Elaboration based on INEI-ENAH0.

3.5.4. The distributional effects of a carbon tax

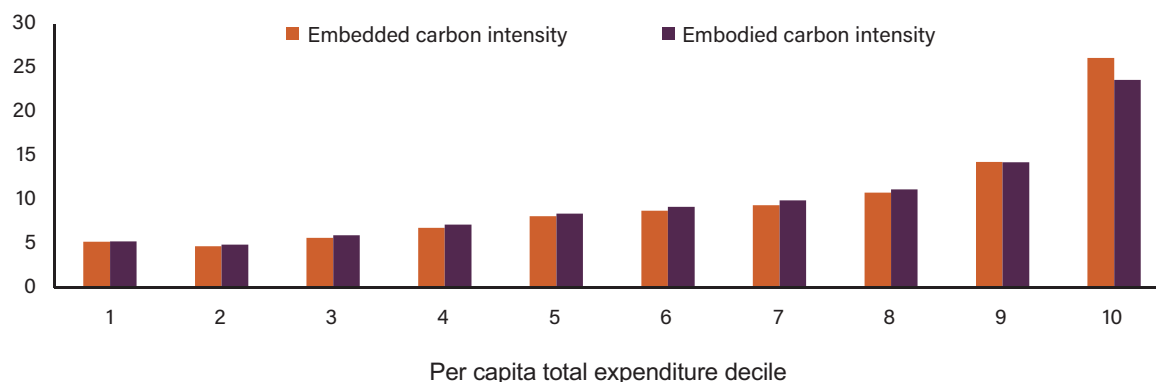
Climate change represents a challenge in the effort to eradicate poverty, and transitions toward carbon neutrality, including through the implementation of carbon taxes, may have significant distributional consequences in both the short and long term. As of 2022, 27 countries had implemented price mechanisms, such as carbon taxes and emissions trading systems, to achieve climate targets, and many others are considering joining them. Studies on lower-middle-income countries have found mixed evidence on the likely distributional consequences of carbon taxes, mainly due to country-specific factors.

A national carbon tax without compensatory mechanisms for vulnerable and poor households will likely have negative distributional effects. There is a consensus on the importance of compensatory measures of

carbon taxes focusing on the poor and vulnerable, because these groups typically spend a higher share of their incomes on carbon-intensive goods and because they also have less capabilities to adjust their consumption to price increases from these policies. Malerba et al. (2021) simulate the distributional impact of a combined reform considering a carbon tax and compensation through cash transfers and find that a national carbon tax, without compensation, would increase poverty, but have no significant impact on inequality. In contrast, if tax revenues are utilized to compensate households in the bottom of the distribution, it is shown that poverty reduction can be achieved.

Households in the highest decile of market income represent about a fourth of the total carbon footprint in Peru. To estimate the carbon footprint of Peruvian households in different parts of the income distribution, this report links estimates of the carbon intensity of sectors with household survey data from 2019 (ENAHO 2019). These estimates consider both embedded and embodied carbon intensity. The first refers to the carbon footprint arising from domestic production only, while the second includes the total carbon content of consumption of goods and services produced in Peru or imported. Figure 28 illustrates that households in the highest decile of market income per capita account for about a quarter of the total carbon footprint in both scenarios, while households in the poorest income decile represent 5 percent of the total carbon footprint.

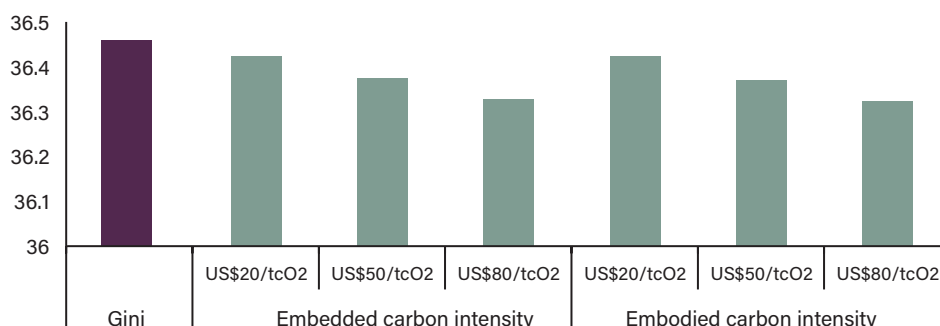
Figure 28. Carbon footprint distribution by carbon intensity scenario and expenditure decile
% of total carbon footprint



Source: Estimates based on INEI- ENAHO and administrative tax data from SUNAT.

A carbon tax based in the carbon footprint of Peruvian households is expected to be progressive and reduce inequality. The amount of the carbon tax to be paid is estimated by multiplying the carbon footprint by the tax rate. Following Malerba et al. (2021), the analysis uses three tax rates: US\$ 20/t CO₂, US\$ 50/t CO₂, and US\$ 80/t CO₂. These rates are applied at the average exchange rate of 2019 according to the BCRP to produce estimates of this tax on income inequality and poverty. Figure 29 shows a slight reduction of about 0.1 Gini points of the tax rate of US\$ 80/t CO₂ for both embedded and embodied carbon intensity.

Figure 29. Effects of a carbon tax on inequality (Gini coefficient)
0 represents perfect equality



Source: Estimates based on INEI- ENAHO and administrative tax data from SUNAT.


In contrast, a carbon tax without targeted compensatory mechanisms will likely increase poverty. A carbon tax with a rate of US\$80/t CO₂ is expected to increase moderate poverty by 1.1 percentage points for embedded carbon intensity and by 1.9 percentage points for embodied carbon intensity. Moderate poverty in rural areas could increase by 1.7 and 2.3 percentage points with the same tax rate. This policy is also expected to increase extreme poverty. For embedded carbon intensity, poverty may increase by about 0.1 percentage points, while, for embodied carbon intensity, it might increase to a maximum of 0.3 percentage points. These results assume no behavioral responses in the consumption pattern of households.


Table 6. Effects of a carbon tax in moderate poverty by per capita total expenditure decile
% of total population


Distribution	Area	Moderate poverty	Embedded carbon intensity			Embodied carbon intensity		
			US\$ 20/tCO ₂	US\$ 50/tCO ₂	US\$ 80/tCO ₂	US\$ 20/tCO ₂	US\$ 50/tCO ₂	US\$ 80/tCO ₂
By per capita total expenditure decile	Rural	40.8	41.4	41.9	42.5	41.6	42.8	43.9
	Urban	14.6	14.8	15.2	15.6	15.0	15.6	16.2
	Total	20.2	20.5	20.9	21.3	20.7	21.4	22.1
By total expenditure decile	Rural	9.8	10.0	10.1	10.3	10.0	10.5	11.0
	Urban	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	Total	2.9	2.9	3.0	3.0	2.9	3.1	3.2

Source: Authors own elaboration based on INEI-ENAHO.

The distributional effects of the tax and transfer system

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