

**POVERTY AND SHARED PROSPERITY 2022**

# Chapter 5 Annexes

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## Annex 5A

# The Redistributive Impact of Old-Age Contributory Pensions

In upper-middle- and high-income economies, government spending on social security pensions can be quite large.<sup>1</sup> Thus, assessing the distributional impact of old-age social security pensions is important. At least four redistributive forces are at play, the first of which is redistribution within the contributory population (intragenerational or within-cohort redistribution). For example, if high-income individuals have a cap on the maximum pension they can receive and there is a minimum pension regardless of contributions, the accumulated contributions of high-income individuals are likely to subsidize pensions of low-income individuals. Because high-income individuals are likely to have higher life expectancy, however, the subsidy may be smaller or nonexistent depending on the case. Second, in pay-as-you-go systems, there can be intergenerational redistribution depending on the economy's demographics and economic growth. In addition to the within-system redistribution, a social security system in deficit will result in redistribution from taxpaying individuals (today or in the future) to the recipients of pensions. Third, in developing economies, where moving in and out of the formal labor market is not uncommon, another channel of redistribution is from workers who contribute to the system but do not reach the minimum required to receive benefits. Finally, developing economies may also have special regimes for privileged groups (for example, the military or public servants); subsidies to support these regimes may be significant. Imputing net benefits from pensions, however, requires life cycle information on the flow of benefits and contributions, but this information is generally not available (see, for example, Forteza 2014). Given the complexities, this chapter does not include an analysis of the redistributive effect of pensions. Results reported by the Organisation for Economic Co-operation and Development exclude the retirement-age population. For the remaining economies, the chapter reports results for the scenario that treats contributory pensions as deferred income—in essence, the scenario treats pension benefits as if they were part of an individualized accounts pension system with no intra- or intergenerational redistribution and no subsidies from taxpayers to pension beneficiaries.<sup>2</sup> In this case, pensions are treated like any other primary income and included in prefiscal income. Contributions to pensions are mandatory savings. The rest of this annex expands on the treatment of pensions in fiscal incidence analysis.

The treatment of contributory pensions is a salient conceptual challenge in static fiscal incidence analysis. Should income from contributory pensions be treated as a government transfer or deferred income and thus added to prefiscal income? Should contributions be treated as a tax or a form of mandatory saving?

In the fiscal incidence analysis literature, one finds both approaches: in some cases contributory pensions are considered deferred or replacement income (Breceda, Rigolini, and Saavedra 2008; Immervoll et al. 2009);<sup>3</sup> in others they are considered a pure government transfer (Goñi, López, and Servén 2011; Immervoll et al. 2009; Lindert, Skoufias, and Shapiro 2006; Silveira et al. 2011). In the former scenario, contributions during active years are treated as a form of

mandatory saving and, thus, subtracted from prefiscal income to avoid double counting. When pensions are considered a government transfer, contributions are treated as any other direct tax. The true situation for many individuals, however, is likely to be in between the two cases. Because contributions to the system during working years can count as mandatory saving, whether an individual receives a transfer depends on the size of the replacement income and her life expectancy. Using cross-section household surveys, however, it is difficult, if not impossible, to identify how much is a pure transfer (or tax) and how much is replacement income.

To address this challenge, several approaches have been followed. The Organisation for Economic Co-operation and Development, for example, reports fiscal redistribution results excluding the population that is 65 years old or above. The CEQ (Commitment to Equity) Institute and the World Bank conduct the fiscal incidence analyses with two scenarios: pensions as deferred income (PDI) and pensions as government transfer (PGT). In the PDI scenario, the income from these pensions is added to factor income to generate the prefiscal income, and contributions to old-age contributory pensions are subtracted from factor income. In the PDI scenario, the prefiscal income (that is, the starting income concept by which households are ranked to calculate the incidence of taxes and transfers) is called “market income plus pensions.” In the PGT scenario, the income from these pensions is added to the rest of government cash transfers, and contributions to old-age contributory pensions are added to direct taxes. In the PGT scenario, the prefiscal income (that is, the starting income concept by which households are ranked to calculate the incidence of taxes and transfers) is called “market income.” Figure 5A.1 shows the definition of income concepts under the two scenarios.

The PDI and PGT scenarios describe two extreme situations. Conceptually, the PDI scenario is closest to a social security system with Individual (or savings) Accounts (as in Chile and Mexico, for example). In such systems, individual contributions are deposited in fully funded defined-contribution pension programs. The accumulated contributions are capitalized and then used to finance pensions when individuals retire. The difference between the Individual Accounts system and the PDI scenario is that the pension benefits (the replacement income) in the latter may not correspond to the pension that would prevail under an Individual Accounts system; one just assumes that they correspond by construction. The PGT scenario implicitly treats beneficiaries as the first cohort of an unfunded program, perpetually. When an unfunded defined-benefits system is initially established, pension benefits to the first cohort come from net transfers from the cohorts that follow. That is, for the first cohort, pensions are indeed a pure government transfer. Even if retirees paid contributions into the system in the past, these contributions are not accounted for. Only the amount received as pensions is included in the exercise. These pensions are funded from taxes, which include the contributions of active formal sector workers in the cross-section. For these individuals, the contributions are subtracted from prefiscal income (as any other tax) to obtain income net of taxes.

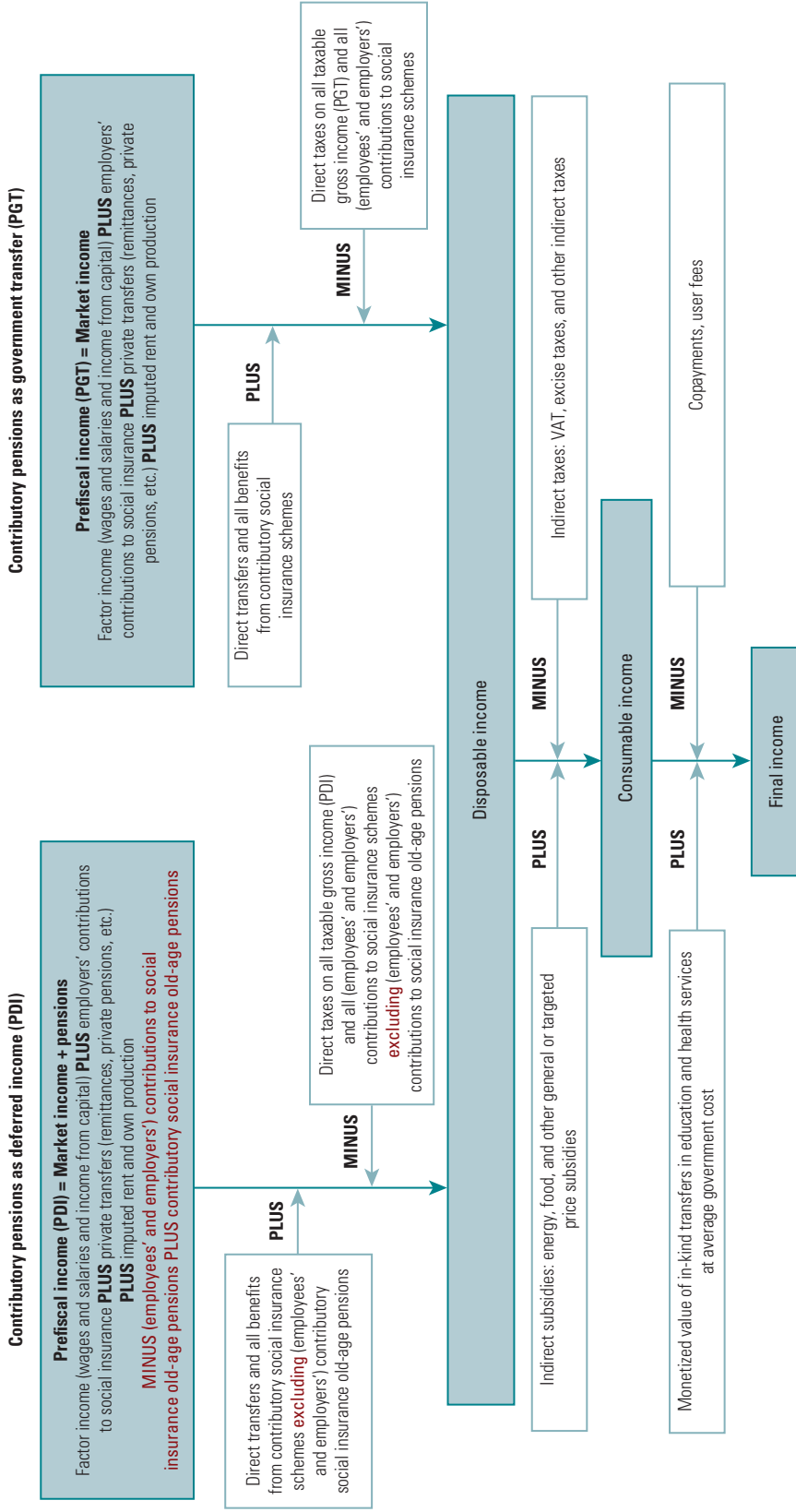
A third option pursued by some researchers is to treat contributory pensions as a transfer only when the social security system is in deficit. In such cases, the deficit can be allocated as a transfer to individuals in proportion to their pension income, for example.<sup>4</sup> Although this approach accounts for the redistribution from taxpayers to pension beneficiaries, it ignores the within-system redistribution.

In practice, contributory pensions are in most cases a combination of deferred income and a government transfer. Grushka (forthcoming) proposes an approach to determine which scenario may be appropriate when one has access to cross-section data only.

Which scenario should one report as the main result? The CEQ Institute and the World Bank have opted to report results for the PDI scenario in most cases, including those analyzed in this chapter.<sup>5</sup> Although neither scenario is an accurate description of the redistributive effect of pensions, the PGT scenario can introduce a significant redistributive bias. In populations with a large proportion of retirees, if pensions are treated as a government transfer, prefiscal income will be zero or close to zero for a large number of individuals. The fiscally induced inequality

**FIGURE 5A.1**

**Income concepts under the two scenarios: Pensions as deferred income and pensions as government transfer**



Source: Lustig, forthcoming.  
Note: VAT = value added tax.

and poverty reduction will then be very large because the system will feature many “false poor” (Lustig 2018).<sup>6</sup> To illustrate, let’s assume a pensioner had been earning a high wage during her working years and that, privately, she could have saved enough so that, at the time of retirement, her pension would have been at a certain percent replacement ratio. Let’s assume that, instead, she receives a pension from the social security system and that this is her only income. If her pension is treated as a pure government transfer, she will have been ranked among high-wage earners during her working years and fall to the prefiscal destitute poor during retirement. Because part or all of her pension income was implicitly generated by her contributions during her working years, her prefiscal income should not be treated as zero even if the pension benefit is her only income. The presence of “false poor” means that in some cases the redistributive effect with PGT is two or three times higher than with PDI. This situation happens for Argentina, Armenia, the European Union, the Russian Federation, the United States, and Uruguay (Lustig 2018). Under the PGT scenario the redistributive (equalizing) effect is exaggerated precisely because it ignores that all or part of the pension of most individuals is deferred income. If pensions are part or all deferred income, the fiscally induced reduction in inequality will be smaller (or nonexistent) than that suggested by the PGT results.

## Notes

1. Annex 5A was written by Nora Lustig.
2. Of course, depending on the rules that apply to the system when the individual dies, there may be some degree of within-system redistribution.
3. See also the World Inequality Database (<https://wid.world/>).
4. Younger and Khachatryan (2017) conduct this exercise as a sensitivity analysis.
5. For most countries, the CEQ Institute Data Center on Fiscal Redistribution reports results for both scenarios. See the CEQ Standard Indicators (<https://commitmenttoequity.org/datacenter>).
6. See Forteza (2018) for a formal description of the bias introduced in the standard PGT scenario because of the “false poor.” Some may argue that, in the absence of a government-sponsored program, individuals would not save enough for their old age and could become much poorer so treating pensions as a transfer makes sense. However, the government’s role could be just that of a “piggy bank” (Barr 2004) forcing individuals to save during their working years to ensure an income stream during retirement. Reflecting this role, many countries place social security in a separate budget, protected from the politics governing other public expenditures.

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## Annex 5B

# Progressivity and Regressivity of Taxes and Transfers

Suppose we observe that income inequality after taxes and transfers is lower than prefiscal income inequality.<sup>1</sup> Can this finding be related to the characteristics of the taxes and transfers in terms of their progressivity and size? To answer this question, the following concepts will be useful: concentration curves, incidence curves, concentration shares, the Kakwani index of progressivity, and the marginal contribution.

### Concentration curves, incidence curves, and concentration shares

A concentration curve is the cumulative distribution of a tax (transfer) with individuals ranked by prefiscal income. In other words, a concentration curve graphs the cumulative percentage of tax (transfer) paid (received) on the vertical axis. The horizontal axis has individuals ranked by prefiscal income from the poorest to the richest. Whether a tax (transfer) is unambiguously progressive, neutral, or regressive depends on whether the concentration curve of the tax lies everywhere below (above), coincides, or lies everywhere above (below) the prefiscal income Lorenz curve. Figures 5B.1 and 5B.2 show concentration curves graphically for taxes and transfers, respectively.

Absolute progressivity occurs when per capita taxes (transfers) rise (fall) with income. In the case of taxes, if they are relatively progressive, they will also be progressive in absolute terms. That is, if the share of taxes increases with income, then the amount per person will rise as well. In the case of transfers, relative progressivity does not imply absolute progressivity. It thus makes sense to distinguish between the transfers that are relatively progressive and those that are progressive in absolute terms. When transfers are progressive in absolute terms, the concentration curve lies above the diagonal (figure 5B.2). In this case, transfers are not only progressive but also pro-poor. Most if not all of the conditional and unconditional cash transfers around the globe are progressive in absolute terms.

Another way to describe progressivity graphically is with concentration shares of a tax or a transfer compared to the distribution of prefiscal income shares.

### Progressivity versus equalizing

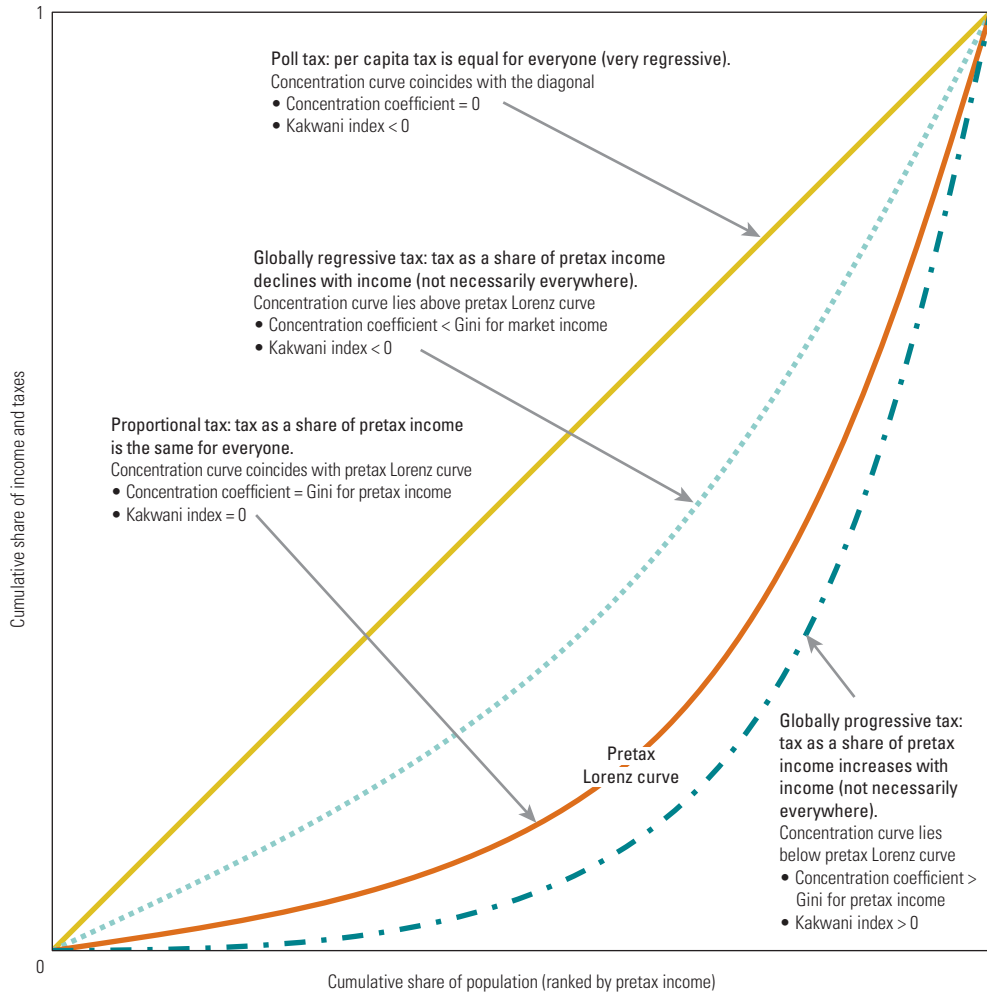
Just as the Gini coefficient can be used to measure the extent of inequality, the Kakwani index of progressivity can be used to determine whether a tax or a transfer is progressive, neutral, or regressive.<sup>2</sup> Kakwani's index of progressivity of tax  $T$  is defined as the difference between the concentration coefficient ( $C_T$ ) of the tax and the Gini coefficient of prefiscal income ( $G_X$ ).

$$Kakwani_T = C_T - G_X$$



**FIGURE 5B.1**

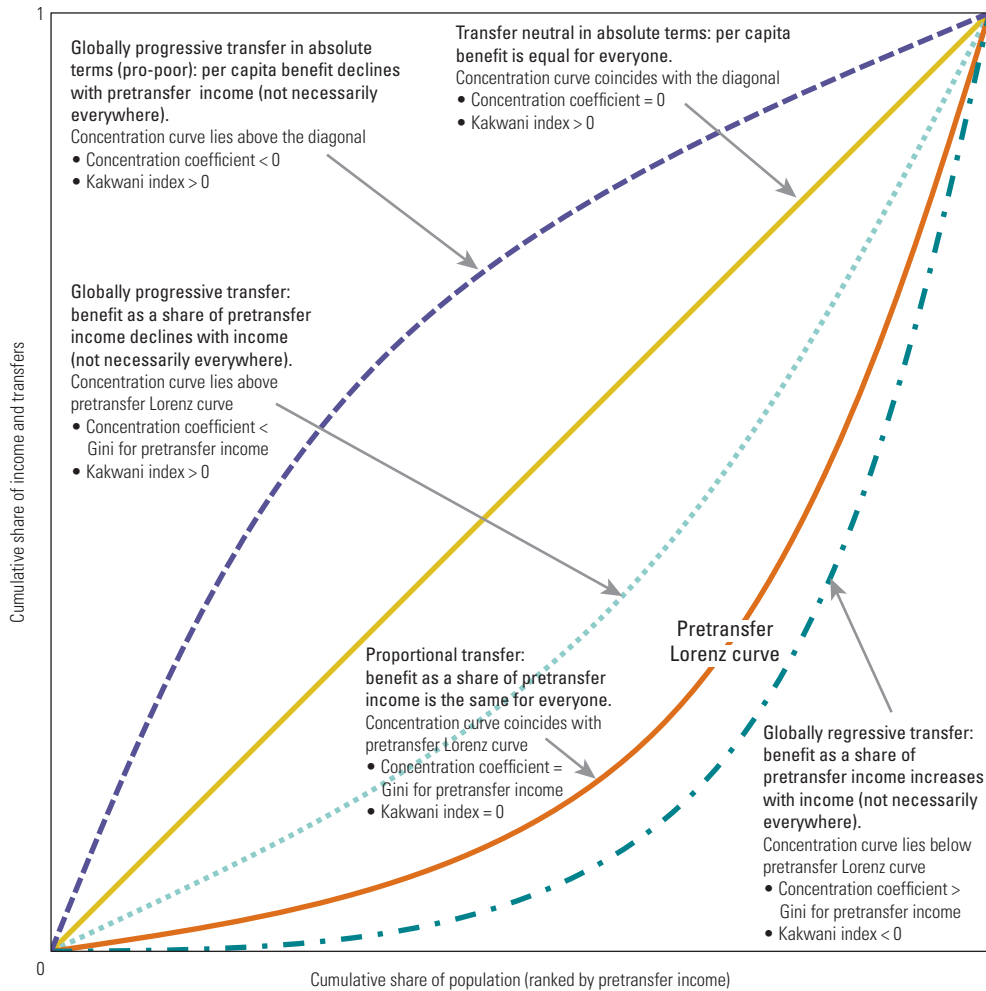
**Concentration curves for progressive, neutral, and regressive taxes**



Source: World Bank, adapted from Lustig 2018.

**FIGURE 5B.2**

**Concentration curves for progressive, neutral, and regressive transfers**



Source: World Bank, adapted from Lustig 2018.

Are progressive (regressive) taxes or transfers unambiguously equalizing (unequalizing)? The answer is unequivocally affirmative but only in the absence of reranking or the so-called Lambert conundrum (see the following discussion). Reranking occurs when individuals are ranked differently with posttax income than pretax income. In the presence of reranking, it is theoretically possible to have a progressive tax that is unequalizing or neutral (Enami 2018).

Is a more progressive tax always more equalizing than a tax that is less progressive? The answer is no. As shown by Duclos and Tabi (1996), a less progressive tax that collects more revenues can be more equalizing. This finding is true even without considering how the higher revenues are spent. Size trumps progressivity. It is also the case with transfers.

Given that the usual indicators of progressivity are not necessarily accurate predictors of whether a tax or a transfer is equalizing, what is the alternative? Enami, Lustig, and Aranda (2018) propose using the marginal contribution. The marginal contribution of a tax (or transfer) is calculated by taking the difference between the inequality (or poverty) indicator without the tax (or transfer) and with it.<sup>3</sup> For example, the marginal contribution of direct taxes is the difference between the Gini for gross income (market income plus transfers) and the Gini for disposable income (market income plus transfers minus direct taxes).<sup>4</sup> A tax (transfer) will be unambiguously equalizing, neutral, or unequalizing if the marginal contribution is positive, zero, or negative, respectively. The marginal contribution takes into consideration not just the structure of a tax or a transfer but also its size, saving the analyst one additional step.

## Notes

1. Annex 5B was written by Nora Lustig.
2. Kakwani was among the first to propose a measure of tax progressivity based on disproportionality, that is, by the extent to which a tax distribution was not proportional to the distribution of pretax income (see Kakwani 1977).
3. Note that, because of path dependency, adding up the marginal contributions of each intervention will not be equal to the total change in inequality. Clearly, adding up the sequential contributions will not equal the total change in inequality either. A suggested approach for calculating the contribution of each intervention in a way that they add up to the total change in inequality is to use the Shapley value. The studies analyzed here do not have estimates for this value.
4. Note that, if certain fiscal interventions come in bundles (for example, a tax that kicks in only if a certain transfer is in place), the marginal contribution can be calculated for the net tax (or the net benefit) in question.

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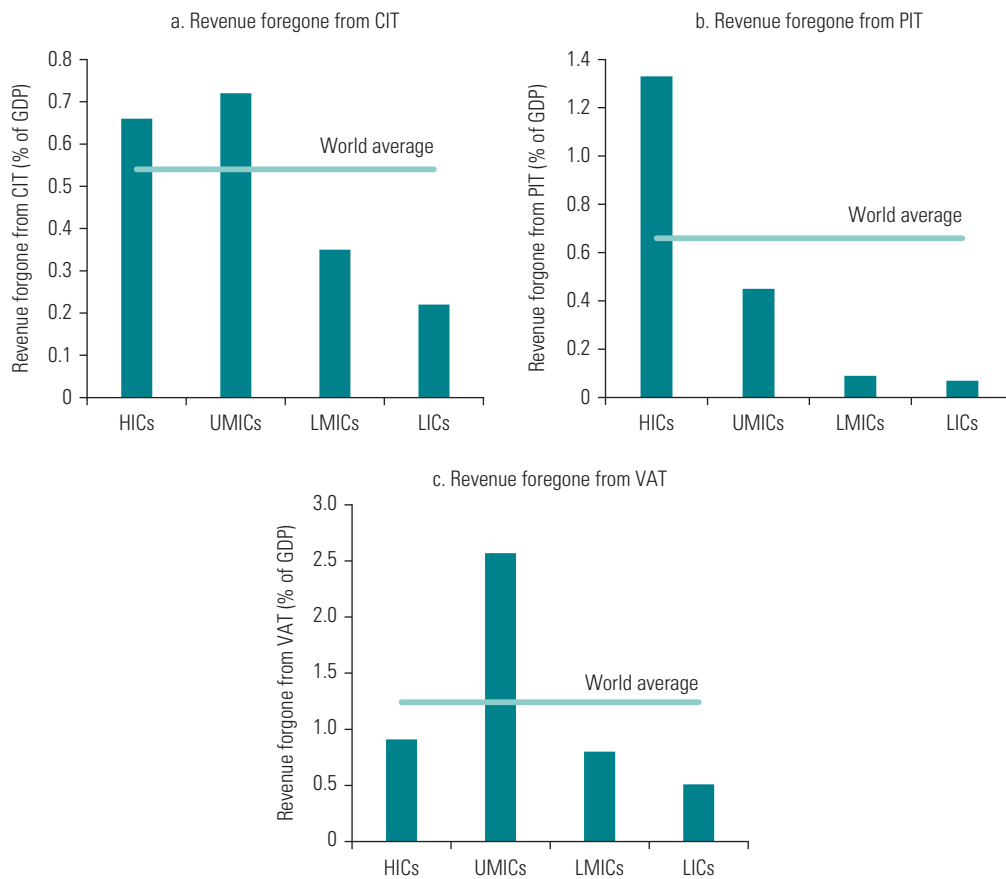
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## Annex 5C

# Tax Expenditure Assessments

**FIGURE 5C.1**

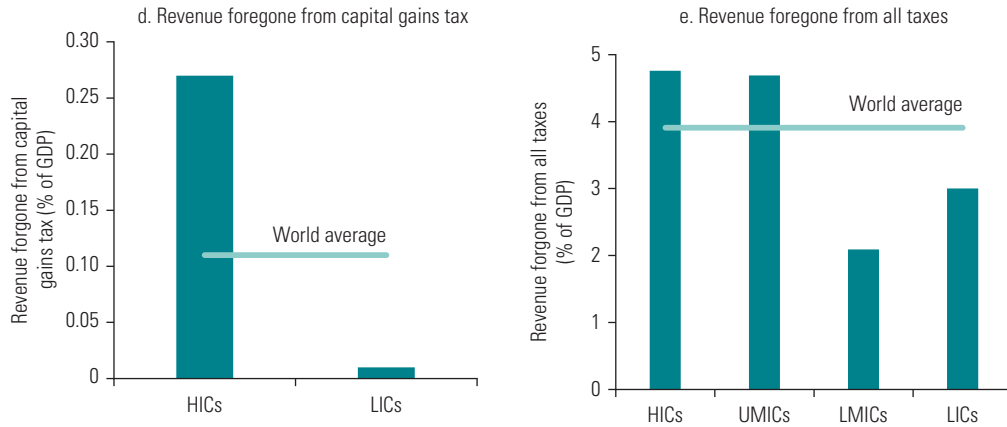
**Tax expenditures, by instrument and economy income level**



*(continued)*

**FIGURE 5C.1**

**Tax expenditures, by instrument and economy income level (continued)**



Source: Global Tax Expenditure Database, gted.net.

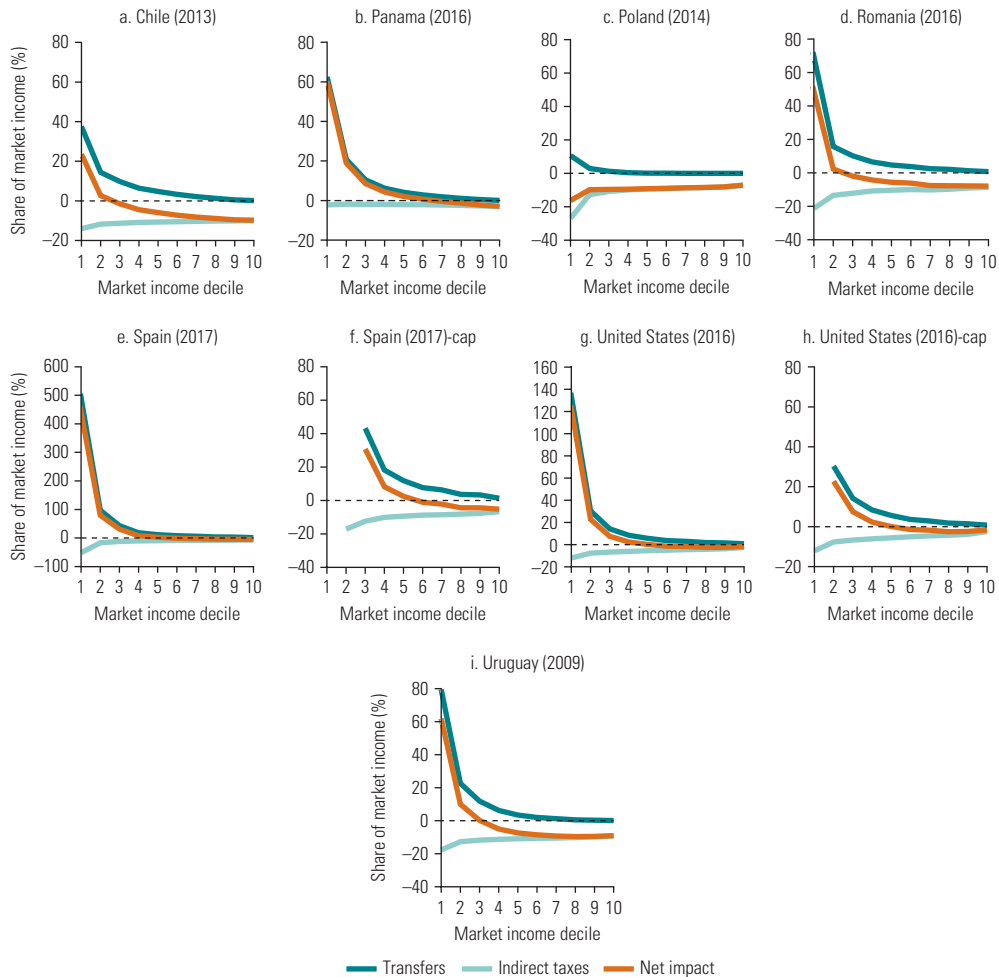
Note: CIT = corporate income tax; HIC = high-income country; LIC = low-income country; LMIC = lower-middle-income country; PIT = personal income tax; UMIC = upper-middle-income country; VAT = value added tax.

## Annex 5D

# Economy-Level Results on Indirect Taxes, Direct Transfers, and Net Impacts, by Market Income Decile

**FIGURE 5D.1**

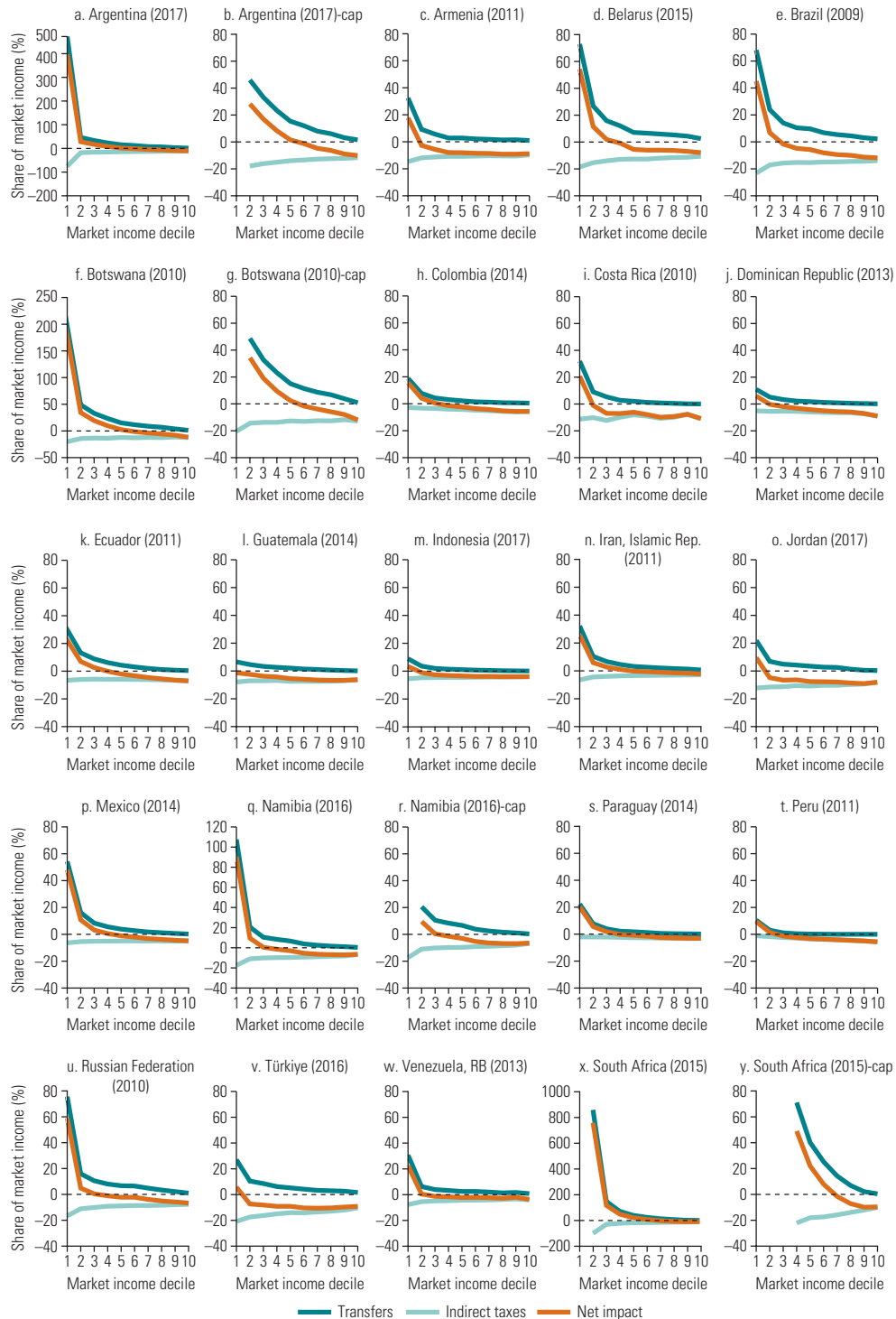
**Incidence of indirect taxes and direct transfers, high-income economies**



Sources: CEQ Institute, CEQ Data Center on Fiscal Redistribution, <https://commitmenttoequity.org/datacenter>; World Bank data.  
 Note: For economies with extreme values in the first two deciles two graphs are shown, the first panel containing all available information, and the second without extreme values, labeled "cap."

**FIGURE 5D.2**

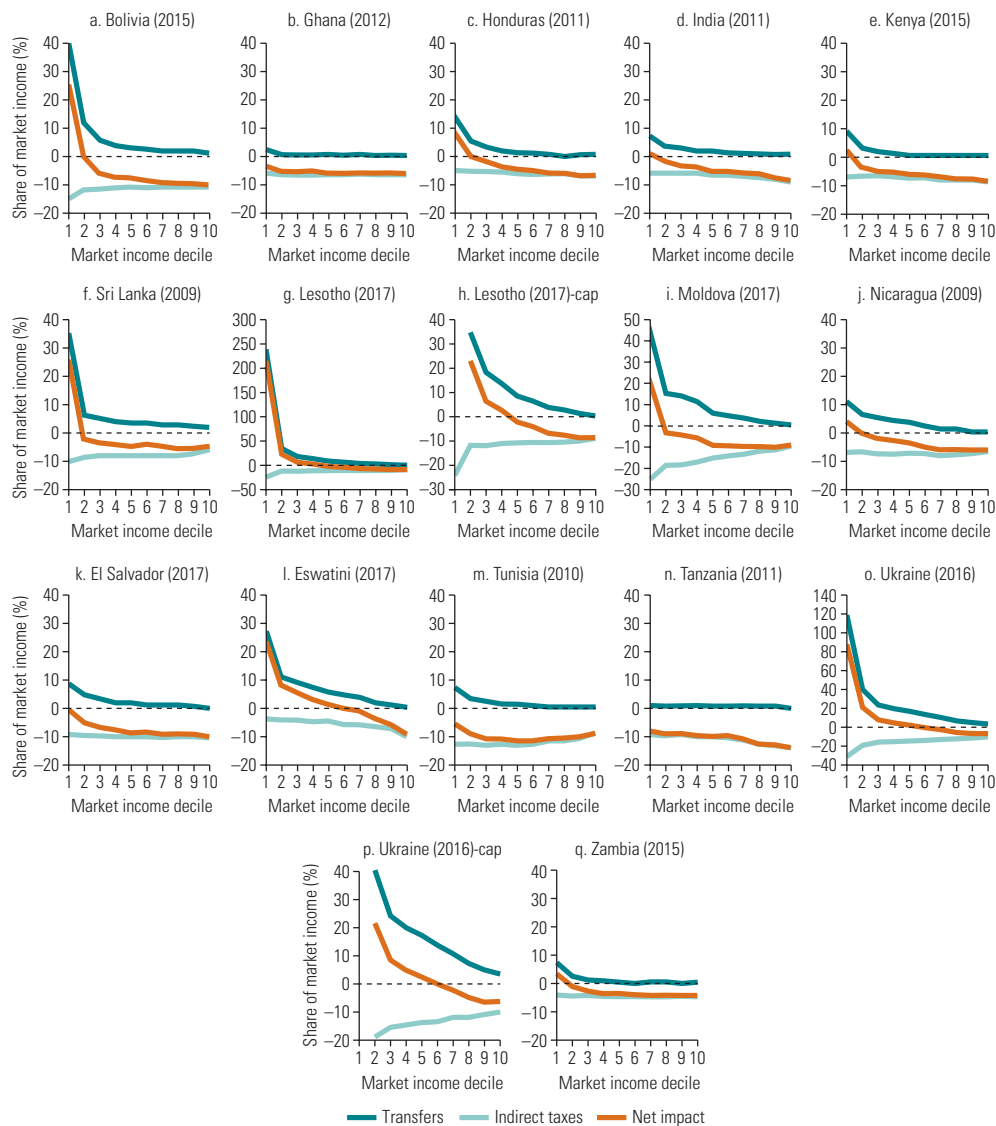
**Incidence of indirect taxes and direct transfers, upper middle-income economies**



Sources: CEQ Institute, CEQ Data Center on Fiscal Redistribution, <https://commitmenttoequity.org/datacenter>; World Bank data.  
 Note: For economies with extreme values in the first two deciles two graphs are shown, the first panel containing all available information, and the second without extreme values, labeled "cap."

**FIGURE 5D.3**

**Incidence of indirect taxes and direct transfers, lower middle-income economies**



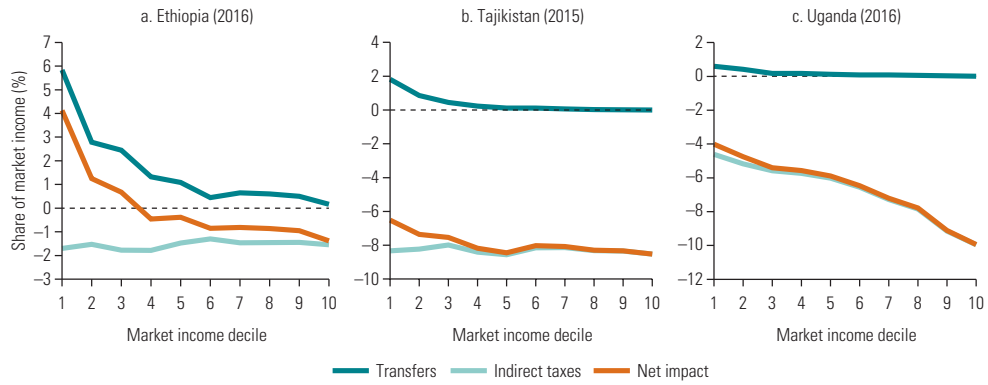
Sources: CEQ Institute, CEQ Data Center on Fiscal Redistribution, <https://commitmenttoequity.org/datacenter>; World Bank data.

Note: For economies with extreme values in the first two deciles two graphs are shown, the first panel containing all available information, and the second without extreme values, labeled "cap."



**FIGURE 5D.4**

**Incidence of indirect taxes and direct transfers, low-income economies**



Sources: CEQ Institute, CEQ Data Center on Fiscal Redistribution, <https://commitmenttoequity.org/datacenter>; World Bank data.

