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Distributional Effects of Taxation in Latin America

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Abstract[*]

This chapter analyzes the incidence on income distribution by a comprehensive array of direct and indirect taxes in ten Latin American countries circa 2018. The study finds that although there is a significant heterogeneity, the redistributive impact is equalizing for direct taxes and unequalizing for indirect taxes. Overall, redistribution through taxes, without accounting for spending effects and interactions, is slightly equalizing for some countries and unequalizing for others, but the burden on the poor is high and even higher than on the rich. This is mainly a consequence of the high share of indirect taxes in the tax structures, and of low personal income tax collection and coverage. The inclusion of the redistributive effect of the corporate income tax contributes to improve redistribution and accounts for better comparison with the redistributive impact in more developed countries, where dividends are taxed heavily with personal income taxes rather than corporate income taxes as in Latin America. High levels of evasion and informality make payroll taxes more regressive in integrated labor markets with high informality, but make indirect taxes less regressive, since the poor pay little or no indirect taxes on some of their purchases.

JEL Codes: D31, E26, H22, H26, N36.

Key Words: taxes, inequality, informality, Latin America.

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1. Introduction

Countries in Latin America have high levels of inequality. Before the coronavirus pandemic, the region had the highest levels of income inequality in the world. Then the economic and social crisis caused by the pandemic further exacerbated the problem of inequality by approximately 6%, as measured by the Gini coefficient. This increase in inequality was mainly a consequence of the fact that the pandemic had greater impacts on the population with informal jobs and on vulnerable groups (Acevedo et al., 2021). Although employment has recovered since the beginning of 2021, the effects on informality, inequality, and equity are likely to last in the medium term because of slow hiring of formal labor in an uncertain and indebted world and because of human capital losses, mainly among the school-age population.

The highly unequal income distribution in Latin America has a variety of causes (Busso and Messina, 2020). A very important one is the low redistributive impact of cash transfers and direct taxes (Lustig, 2018, and Pessino and Alaimo, 2020). This low impact becomes evident when we compare market income and disposable income inequalities. In Latin American countries, market income inequality is very similar to that observed in developed countries. but when we analyze disposable income, which is household income after receiving direct government transfers and paying direct taxes, Latin American countries become much more unequal than these countries. This is because in Latin America, government interventions in cash transfers and direct taxes only reduce income inequality, as measured by the Gini coefficient, by 5%, while interventions in developed countries reduce it by nearly 38% (Pessino and Alaimo, 2018). Even when including contributory pensions as part of market income, the difference is smaller but continues to be significant. While in these countries most fiscal redistribution appears to be driven by public spending, the tax systems have also an impact on income redistribution.

Although several studies examine the redistributive impact of fiscal policy in LAC, to date there is no extensive literature that provides a comprehensive analysis of the incidence of different taxes in the region, including their exemptions, and how the burden differs between taxes and countries[1]. This paper contributes to the discussion by analyzing the redistributive impact of the main taxes, which account for 86% of tax revenue 10 Latin American countries. The study recognizes that analyzing the redistributive impact of taxes is no simple task because the economic incidence of taxes differs from the statutory incidence. More specifically, direct taxpayers sometimes do not end up bearing the economic burden of taxes, since part of this burden is usually transferred to other parties in the market via higher prices or lower factor returns. Given the difficulty of knowing the exact percentage of taxes that are transferred to other market actors, we use various alternative assumptions in the incidence analyses so we can measure the possible redistributive impact that the different taxes may have.

This study finds that although there is significant heterogeneity between countries, the region's tax systems tend to have low redistributive impacts. Indeed, under some plausible incidence assumptions, the tax systems—considered in isolation—even increase income inequality. These low or negative redistributive impacts of taxes are due to various factors. First, in most countries indirect taxes account for a high share of the tax revenues collected compared to developed countries. This reduces the redistributive impact of taxes, since indirect taxes tend to be regressive, or at best proportional. Second, the countries in the region collect relatively little personal income and property taxes, which are often highly progressive taxes.

[1] An exception is Deza Delgado et al (2020) that analyzes the personal income tax in detail, but the comparison is only for Andean countries and does not include the rest of the tax structure.

In addition to the general characteristics mentioned, different factors further reduce the progressivity of tax systems. One is the existence of significant tax expenditures, which tend to be pro-rich and, in the case of direct taxes, reduce their redistributive impact. Another important factor is informality, which can make payroll taxes less progressive, and value added tax less regressive Furthermore, pervasive tax evasion in Latin America, with rates of about 30% in VAT and around 50% in income taxes, also negatively affect inequality. This is particularly true of the evasion of direct taxes.[2]

Lastly, in all countries analyzed, payroll taxation and heavy indirect taxation increase poverty, under some plausible incidence assumptions.

Policymakers have recently proposed various ways of raising taxes on the richest in Latin America and of making the tax code more progressive, including wealth taxes, estate taxes, lower minimum nontaxable for personal income tax, and a higher marginal income tax rate. Changing the tax system, however, requires first understanding how it currently operates, the constraints to making these changes, and the kinds of redistributions that are already in place.

This study is structured into seven sections, including this introduction. The next section focuses on describing the tax systems, presenting the relative importance and general characteristics of the different taxes of Latin America. The third section presents the methodology and data used for the incidence analysis. Section 4 discusses the results obtained on the progressivity of each of the main direct taxes that are levied in the countries in the region, first assuming that the incidence of taxes falls on the factor legally responsible for paying it and second using different incidence assumptions that may be more plausible in the context of Latin America. The fifth section discusses the same issues as the fourth but for indirect taxation. The sixth section analyzes the effective average tax rate paid by each income decile and analyzes the progressivity and redistributive capacity of the tax system. Finally, the last section presents the main conclusions and some policy recommendations for making the system more progressive.

2. Tax structures in Latin America and the Caribbean

To determine the redistributive impact of a country's tax system, it is necessary to analyze the total levels of revenue collected, the composition of this revenue, and the characteristics of the different taxes, since together these factors affect the redistributive impacts of tax systems. This section analyzes the levels and composition of tax receipts observed in Latin America and the Caribbean (LAC) countries, leaving the discussion of the characteristics of the main taxes for the next section.

Tax revenue in LAC tends to be low compared to developed countries. Countries in the region collected an average of 21.3% of GDP in taxes and social security contributions (CSS) in 2018.[3] In contrast, the countries of the Organization for Economic Cooperation and Development (OECD) collected an average of 35.1% of GDP. Although the collection gap is

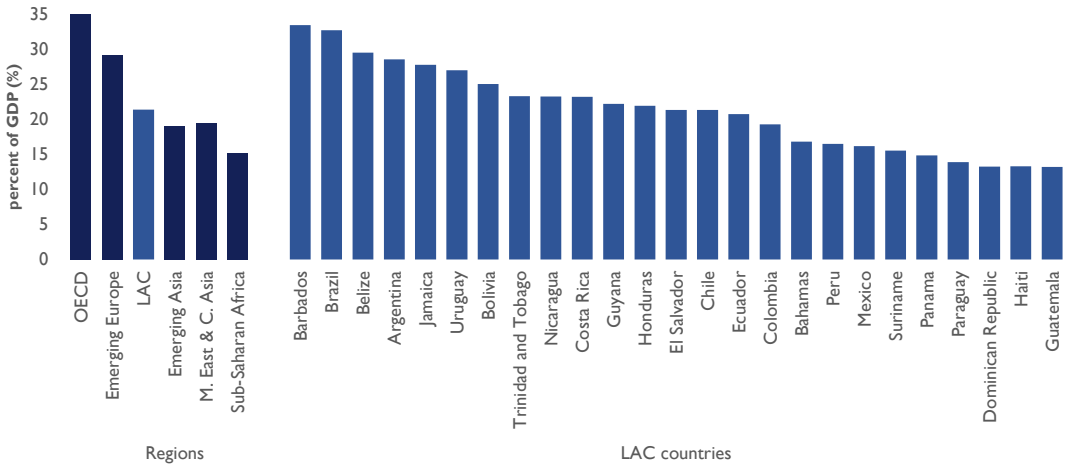
[2] See for example Alstadsæter et al (2019) on how evasion of some direct taxes exacerbates inequality, especially because the rich have more resources (i.e, tax planning) for eluding, avoiding, or evading these taxes.

[3] Throughout this study, the aggregate tax revenue figures refer to 2018. We selected this date to reflect more structural characteristics of tax systems in the region, since the COVID-19 pandemic led several countries to introduce tax policy and administrative measures that temporarily affected the levels and composition of tax receipts. Also, most household data used in the empirical analysis is from 2016 to 2019.

high, it has been decreasing over time. In 1990 the average collection gap between LAC countries and the OECD was 15.9 points of GDP, while in 2018 it was 11.5 points.[4][5]

Tax collection is heterogenous in LAC countries (Figure 1). While the taxes collected in Barbados, Brazil, and Argentina exceeded 28% of GDP, reaching levels similar to or above the revenue of some OECD countries, other countries, such as Guatemala, the Dominican Republic, and Paraguay, had very low receipts of less than 15% of GDP. These heterogeneities in revenue collected can also be seen at the level of each specific tax (see Annex A).

Figure 1. Tax revenue in 2018 (as % of GDP)



Source: Authors 'calculation based on Revenue Statistics (OECD).

It is also important to analyze the composition of the tax collected, since different taxes have different potential redistributive impacts. In general terms, direct taxes, or those levied on the income and assets of individuals and companies, tend to be very progressive. In contrast, indirect taxes, which apply to the consumption of goods and services, tend to be regressive or proportional. Given these general characteristics, the composition of tax revenue in LAC countries tends to reduce its redistributive impact, since the region's tax structures have a high share of indirect taxes. These taxes account for nearly 50% of revenue, on average, in the region's countries, compared to a share of approximately one third in OECD countries (see Figure 2a).[6] Value added tax (VAT), which is the main source of tax revenue for most LAC countries, makes up the majority of this indirect tax revenue. On average, a typical LAC country collects the equivalent of 6.2% of its GDP in VAT, which is slightly less than the OECD average (see Figure 2b). But aside from VAT, Latin American countries collect more import tariffs and sales taxes.[7]

[4] OECD countries without including Latin American countries.

[5] The data in this section comes from an OECD database called Revenue Statistics. This database does not take into account mandatory contributions to private social security (capitalization systems) and certain taxes on income from the exploitation of natural resources. The IDB produced a database that does include the sum of mandatory contributions and taxes, which it calls equivalent fiscal pressure. Including private social security contributions, LAC countries collected an average of 25.2% of GDP.

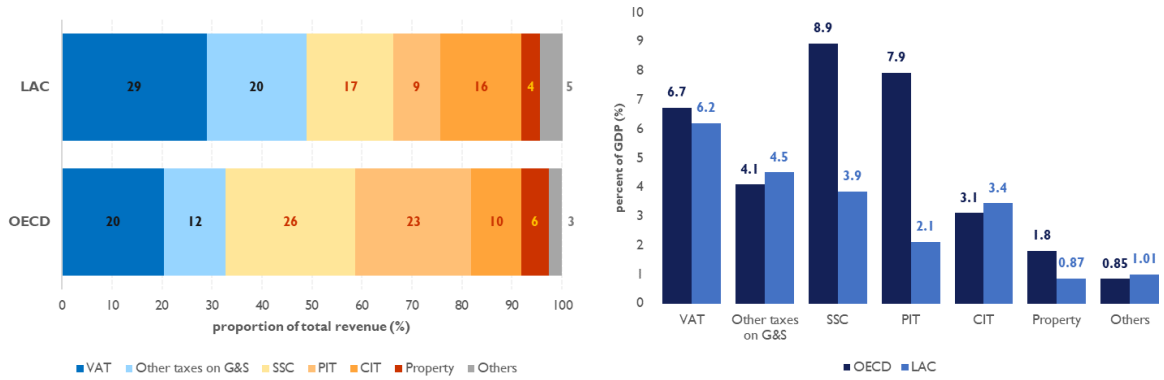
[6] Some countries also collect high levels of cascade taxes (e.g., Argentina and Brazil).

[7] LAC countries collect an average of 1.1% of GDP in import tariffs, compared to 0.2% in the OECD. Regarding sales taxes, LAC collects on average of 0.6%, while the OECD collects 0.2%. This difference in indirect taxes is partially offset by excise taxes, since LAC collects an average of 2% of this type of tax while the OECD countries collect 2.3%.

Direct taxes explain most of the region's collection gap, since on average its countries collect about 11% of GDP, or half of the share observed in the OECD. This gap mainly reflects lower personal income tax (PIT) receipts and lower social security contributions (SSCs).[8] Low PIT revenue is detrimental to redistribution, since PIT is among the taxes with the greatest redistributive impact. LAC's PIT receipts are almost four times less than the OECD's (2.1% of GDP in LAC versus 8% in the OECD.[9] The collection gap for SSCs is also high (3.9% in LAC versus 8.9% in the OECD). Perhaps the only bright spot for redistributive taxation in LAC is corporate income tax (CIT): LAC countries collect more from this tax than OECD countries (4% of GDP versus 3.3%).

Figure 2. Tax structure in 2018, LAC and the OECD.

a) (as % of total tax revenue) b) (as % of GDP)



Source: Authors 'calculation based on Revenue Statistics (OECD).

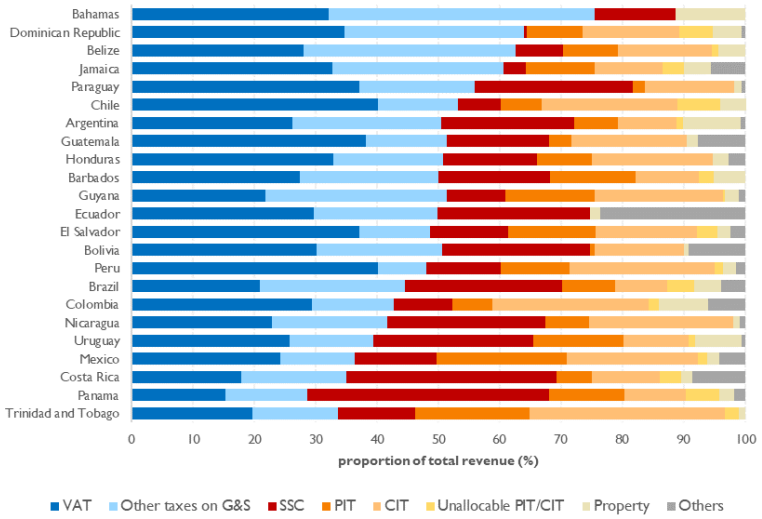
As is true of total tax revenue, there is also high dispersion in the composition of tax receipts among LAC countries (see Figure 3). In some countries, such as the Bahamas and

[8] SSCs are lower in part because of higher labor informality in LAC, but also because about a third of the LAC countries collect mandatory SSCs in the capitalization system.

[9] Other highly progressive taxes that have a lower weight in LAC compared to the OECD are property taxes. Although they represent a low percentage of tax revenue in both groups of countries, OECD collection levels for these taxes are twice as high as in LAC (1.8% of GDP versus 0.9% of GDP).

the Dominican Republic, the share of indirect taxes exceeds 60%, while in others, like Panama and Trinidad and Tobago, it is less than 35%.

Figure 3. Tax structure in LAC by country in 2018

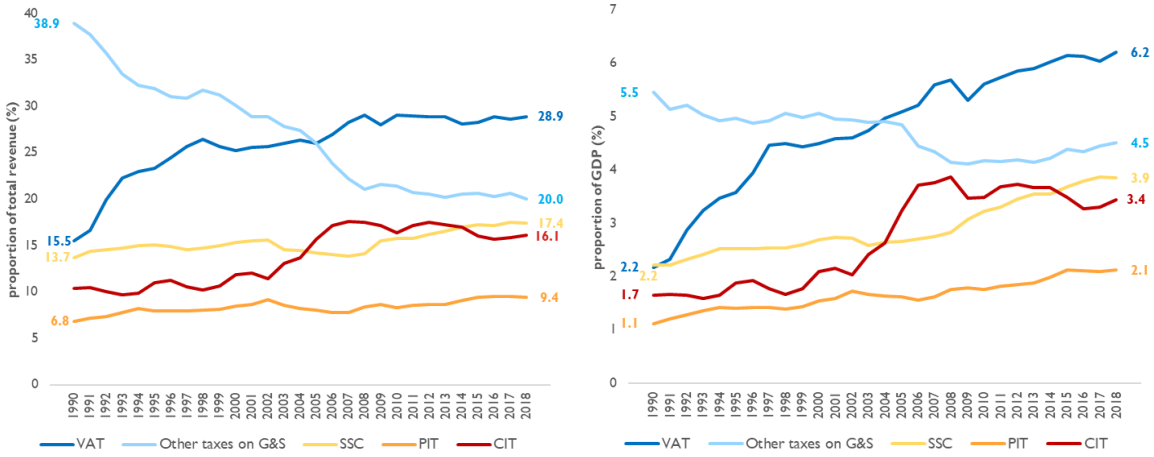


Source: Authors' calculation based on Revenue Statistics (OECD).

Additionally, the share of revenues from direct taxes has increased over time in LAC (see Figure 4a). The relative increases in corporate income tax and CSS shares are particularly significant, followed by the increase in personal income tax (see Figure 4b). These increases have probably led to an increase in the redistributive impact of tax systems. However, the strong growth in VAT collection could have mitigated this potential increase.[10]

Figure 4. Change in composition of tax revenue in LAC countries

(as % of total tax collected) (as % of GDP)



Source: Authors' calculation based on Revenue Statistics (OECD)

[10] This result should be viewed with caution given that many social expenditures that reduce inequality are financed with revenue generated by VAT. This situation can give rise to an effect known as the "Lambert paradox," where a net fiscal system (taxes plus financed transfers) with a regressive tax is more equalizing than one without it. Specifically, a VAT that is regressive, but equalizing was detected in Chile and Brazil (Lustig, 2018).

There are various factors that reduce collection levels, and these factors affect the tax systems' redistributive impact. A first factor, as mentioned, is the higher share of mostly regressive indirect taxes, to the detriment of highly progressive direct taxes. A second factor that affects tax revenue and the redistributive impact of tax systems, which is related to the first factor and is no less important, is high tax expenditures. As in the case of tax evasion, the most harmful tax expenditures concerning equity are those related to direct taxes, given that the progressivity of these taxes automatically leads to highly pro-rich and regressive tax expenditures. For CIT and PIT, region's governments report expenditures worth an average of 0.8% and 0.4% of GDP, respectively. In contrast, tax expenditures for indirect taxes could have the positive impact lowering the incidence of the tax on the poor; however, they are highly concentrated on the rich. Overall, tax expenditures end up overwhelmingly benefiting the richest the most, as the group with the highest levels of consumption. Tax expenditures on indirect taxes are thus a costly policy for reducing the regressivity of VAT. In LAC, tax expenditure on indirect taxes is high. In the case of VAT, Rasteletti and Saravia (2022) estimate an average tax expenditure of 2.4% of GDP in LAC. A third factor is the high prevalence of tax evasion. Although studies on evasion are scarce, they indicate that tax evasion is higher in LAC than in OECD countries. From a redistributive point of view, direct tax evasion is more worrying, given that this type of taxes is the most progressive. According to estimates by the governments of different countries, corporate income tax evasion reaches 2.9% of GDP on average (over 50% of potential tax revenue), while personal income tax evasion stands at about 1.5% of GDP (somewhat less than 50% of potential tax revenue). There are also high levels of evasion of SSCs, although there are not many official estimates. The high degree of income tax and SSC evasion is not surprising, given the high levels of labor informality in LAC. According to figures from the International Labor Organization (ILO), 55.8% of the region's labor was informal in 2018. Meanwhile, evasion of indirect taxes could improve the progressivity of tax systems, given that these taxes tend to be regressive, and that informality occurs mostly in poor households. Rasteletti and Saravia (2022) estimate that VAT evasion in LAC to be 2.2% of GDP on average, which matches official reports of tax evasion of about 30%.

3. Methodology and data

This paper analyzes the incidence and redistributive impact of the main direct and indirect taxes between 2016 and 2019, but mostly centered on 2018. It uses microdata from household surveys combined with budget and tax data from fiscal accounts and other administrative data for ten LAC countries: Argentina, Bolivia, Brazil, Chile, Colombia, Dominican Republic, Honduras, Mexico, Perú, and Uruguay. The taxes analyzed represent 86% of the countries' total taxation, on average, with a range of 79% in Bolivia to over 90% of total taxation in Chile, Mexico, Perú, and Uruguay.

Our analysis is one of the first to cover almost all the most important taxes. It covers an exhaustive amount of consumption taxes: the VAT; excise taxes, import taxes and cascade taxes. It also includes an often neglected tax, the CIT which is more important in terms of revenue than in the PIT. Finally, it also includes payroll taxes that are rather high in some countries at least compared to the promises of high social security benefits for most workers.

As with CEQ Assessments, the incidence analysis is point-in-time rather than lifecycle and for most taxes we do not incorporate behavioral or general equilibrium modeling. That is, we do not claim that the prefiscal income obtained from this exercise equals the true counterfactual income in the absence of taxes and transfers. It is a first-order approximation. (See Lustig (2018, 2023). For most taxes we use also for the standard scenario assumptions about inelastic demand of goods and supply of inputs. Although these are rather strong assumption, it is a common strategy given the methodological difficulties that alternative assumptions usually present. Hence, we first analyze the incidence of each tax using the standard assumptions in Lustig (2018) that individual income taxes and payroll contributions

are borne by labor in the formal sector and that consumption taxes are fully shifted forward to consumer.

The following are the main alternative assumptions made about some taxes on elasticities, behavioral and partial or general equilibrium effects that is compared in each case with the standard incidence assumption. These alternative assumptions rather than mere intellectual exercises are mostly based on compelling evidence, very useful for policy makers. In some cases, the information has to be generated using a variety of assumptions to check the sensitivity of the results under assumptions that cannot be externally validated (Lustig, 2018). Hence, we simulate (under the various scenarios) the incidence of the bulk of the actual tax system on inequality and poverty. In this context, we evaluate the individual and joint incidence on inequality of direct taxes (including corporate tax), indirect taxes (including excises and cascade taxes), and of the whole tax system.

First, we add the corporate income tax, which we initially assume to be borne entirely by capital. This is equivalent to assuming partial equilibrium and that the supply of factors of production is perfectly inelastic. We also assume—in line with the empirical literature—that 50% of the incidence of corporate taxation falls on capital and 50% on labor. In both contexts, we evaluate the individual and joint incidence of direct taxes (including the corporate tax) and of indirect taxes (including excises and cascade taxes).

Secondly, we incorporate general equilibrium and behavioral effects to better understand actual tax incidence in the context of Latin America, where labor informality is pervasive and affects the incidence of taxation through two channels. One is the effect of high informality on the incidence of some taxes. Not only does payroll taxation affect net wages in the formal sector, but it may also affect wages in the informal sector, including the self-employed. In fact, we assume that 50% of the tax falls on wages of formal sector workers and 50% on informal sector wages. To analyze the possible impact of VAT evasion through informal purchases, we assume that the tax savings generated by purchases in informal businesses are fully or partially transferred to the consumer diminishing the burden of the VAT. This analysis does not capture fully tax evasion in direct taxes, which may affect the income redistribution analysis since the extent of redistribution depends both on size and progressivity. These alternative incidence assumptions affect the progressivity of each tax and of the whole tax system and add new insights about the main equity characteristics of the tax system useful for policy making in a socioeconomic environment that also poses difficulties for turning the tax system more progressive.

The income concept in the benchmark case we use in this paper is gross income, which is market income plus direct transfers (non-contributory and contributory pensions and conditional and unconditional cash transfer programs). Market income includes wages and salary, fringe benefits, self-employment income, dividend and interest income, alimony, and private transfers and contributory and private pensions. It also includes the value of imputed housing rent. Disposable income is then calculated by subtracting direct taxes from gross income, and consumable income by subtracting indirect taxes from disposable income.

When both the information on taxpayers and taxes paid is absent from the survey, one can estimate the latter based on the tax rules. Since the information is absent in most surveys, we decided to simulate the taxes paid for all taxes and country so we avoid differences in results based on the imputation method used.

To analyze the redistributive capacity of each tax and of the system as a whole—which depends on both the size and progressivity of each tax—it is important for each tax and the total burden to reflect the actual public finance data in each country. In the analysis, we rescale the tax revenue over gross income minus transfers and rescaled to the corresponding tax as a percentage of GDP from public finance accounts to reflect the actual tax burden that each

country bears, and hence the extent to which the burden and its actual composition contributes or detracts from redistribution11.

We are not analyzing how much redistribution is accomplished through the tax system when the entire net fiscal system is taken into account, since our analysis does not include the effects that public spending financed through taxation has on redistribution. But looking at the tax system alone is useful for analyzing how progressive or regressive each tax is, its potential to be equalizing, and how it can be improved, without regards to the expenditure it finances.[12]

Next, we analyze the main direct taxes, followed by the main indirect taxes.

4. Incidence of direct taxation

Our analysis of direct taxation includes payroll, personal income, and corporate income taxes.13 By including corporate taxes, which make up a greater share of receipts than personal income tax in LAC, we are able to assess whether adding this component to our analysis changes our conclusions on the redistribution capacity of direct taxes substantially when compared to more developed countries.

4.1. Payroll taxes (SSC)

Although they have not reached levels like those observed in the OECD, fiscal revenues from SSCs account for 21.4% of tax collected on average in the 10 countries considered, and in several countries SSCs are the largest source of government revenue.[14] Given their significant relative weight among all taxes collected, it is important to analyze how SSCs affect inequality. We first analyze the standard case in which the tax is borne entirely by formal labor (i.e. labor supply is inelastic and the formal and informal sectors are segmented rather than integrated), without affecting the behavior of workers and companies. This scenario is consistent with the presence of segmented labor markets, where formal and informal workers are not substitutable. We use this case as our baseline scenario. The entire statutory incidence of payroll taxation for both employers and employees is included in the burden, which takes into account regional differences in social security contributions in places like Argentina, topping off contributions for higher wages in several countries, and different tax rates for the self-employed and the wage employed.

The alternative incidence scenario incorporates the fact that in many countries the burden of SSCs also impacts informal workers via lower wages. This other extreme case posits integrated labor markets, where formal and informal workers are substitutable. In this context,

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[11] Since GDP at market prices includes indirect and direct taxes, the closest concept in household data is market income. Since we work with gross income (market income including transfers), we correct for this factor when we scale up taxes.

[12] A few Latin American countries have a very impressive Lambert conundrum, where a regressive tax combined with transfers can make the system more equalizing than without the regressive taxes (Lustig, 2018). It should make us be cautious about advising policymakers to diminish the share of regressive taxes when other more progressive taxes are difficult to collect.

[13] We do not include property taxes, which are generally highly progressive, because existing household surveys do not provide much information on household wealth and because the rates for these taxes differ by state or province, and in some cases by municipality. Moreover, in several subnational governments, taxes are calculated based on historical rather than market property values, and the tax paid is not generally reported in the surveys.

[14] We included mandatory social security contributions to the capitalization system, which increases revenues from this type of tax in the 10 countries from 4 to 5.8% of GDP (mainly due to the mixed or full capitalization systems in Chile, Colombia, Mexico, Peru, Dominican Republic, and Uruguay). As noted in Cont and Pessino (2022) most of these systems are financed by the government, since some countries guarantee compulsory minimum pensions for a large part of the population.

the burdens of SSCs are also transferred to informal workers, via reductions in their wages, in an amount that depends on various elasticities[15]. We assume that the impact reduces net wages by 50% of the tax in both the formal and informal sector.[16] The literature on whether payroll taxes are passed through to wages is inconclusive. A payroll tax drives a wedge between the equilibrium wage rate with no taxes and the after-tax wage rate received by workers. This wedge is the share of the payroll tax that workers end up paying through a lower wage rate, which is called the pass-through effect. While Gruber (1997) finds a 100% pass-through in the formal sector in Chile (Gruber, 1997), Heckman and Pagés (2004) find a 36% pass-through in a sample of Latin American countries, and Cruces et al. (2010) find that 55% of the payroll tax is shifted to workers in Argentina. Only a few analyzed a two-sector formal-informal labor market incidence: Hernández (2012) evaluates the effect of eliminating *parafiscales* taxes (part of the payroll taxes in Colombia) on the labor market using a computable general equilibrium model and finds a pass-through to formal wages that is even larger for informal wages. Meanwhile, Antón (2014) uses a different computable general equilibrium model for Colombia and finds a higher pass-through in the formal sector than in the informal sector. Hence, 50/50 incidence seems to be a good benchmark to compare with the scenario of 100% incidence on wages in the formal sector.

Our analysis of the incidence of SSCs by income deciles shows that the redistributive effect of these contributions depends on the assumption used (see Figure 5). If we assume that markets are segmented, the incidence of SSCs tends to increase with income, which is not surprising given that most informal workers are poor and, in this case, we assume that these workers are not affected by SSCs. In the last decile, incidence decreases in 9 out of 10 countries (the exception is Bolivia) since the highest decile has a smaller share of the wage employed and, in some countries, contributions are capped at a maximum wage. Overall, the first two bars for each country in Figure 6 show the concentration coefficients (CC) and the Kakwani index (K) for the segmented labor markets case.[17] All countries show positive concentration coefficients, which confirms that the tax is proportionately more concentrated at higher income levels, but since the Gini of gross income (our pre-fiscal income measure) is smaller than the CC in most countries, the tax in those countries and under this scenario would be relatively progressive (with K>0). This is the case in Argentina, Bolivia, Colombia, Honduras, Perú, and Uruguay. In the rest of countries (Brazil, Chile, the Dominican Republic, and Mexico), the payroll tax is regressive, even under the segmented hypothesis.

When we assume integrated markets, part of the formal workers' tax incidence is shifted to informal workers and the concentration and progressiveness of SSCs are considerably reduced to the extent that this tax turns regressive in additional countries (see Figures 5 and 6). Under this assumption, we see higher incidence for the first deciles and a fall in incidence in the last deciles compared to the segmented markets scenario. With integrated markets, higher informality in the country generally means a higher incidence of SSCs on lower deciles. In countries with low informality, like Chile integrated markets tend to harm the lower deciles less, while countries with high informality, such as Bolivia and Colombia, have much higher burdens in the lower deciles. The second pair of bars for each country in Figure 6 show the CC and the Kakwani coefficients for the integrated case. While all CCs decrease with respect

[15] The formal/informal wage spillover effect of social security contributions ignores the reallocation of labor from the formal to the informal sector and hence it is a lower bound on the full incidence effect.

[16] We assumed that it also impacts the net income of informal self-employed workers. In countries where self-employment is not categorized as formal or informal, we assume that self-employed people with a tertiary degree are formal. Other possible incidence assumptions could be simulated based on a country's level of informality. For example, the case of Chile and Uruguay could be simulated with an incidence that is higher in the formal sector compared to the informal sector.

[17] The Kakwani index is frequently used to measure the progressivity of a fiscal intervention. For taxes, this index measures the difference between the concentration coefficient of tax payments and the Gini coefficient of gross income. Negative values indicate tax regressiveness, while positive values indicate progressiveness.

to the segmented case, the payroll tax switches from progressive to regressive in Argentina, Colombia, Honduras, and Uruguay; and from very progressive to neutral in Bolivia and Perú. No country remains with progressive payroll taxation under the integrated labor market scenario.

Importantly, this analysis assumes that all SSCs are considered taxation. But a major part of SSCs is used to finance workers' pensions and other social security benefits. These contributions could be considered forced savings instead of tax. If contributions to pension systems are considered savings, this reduces the tax burden of SSCs, as long as the worker values them as benefits.[18] However, this paper aims to analyze the redistributive impact of taxation without examining the expenditure that different taxes are meant to finance.[19]

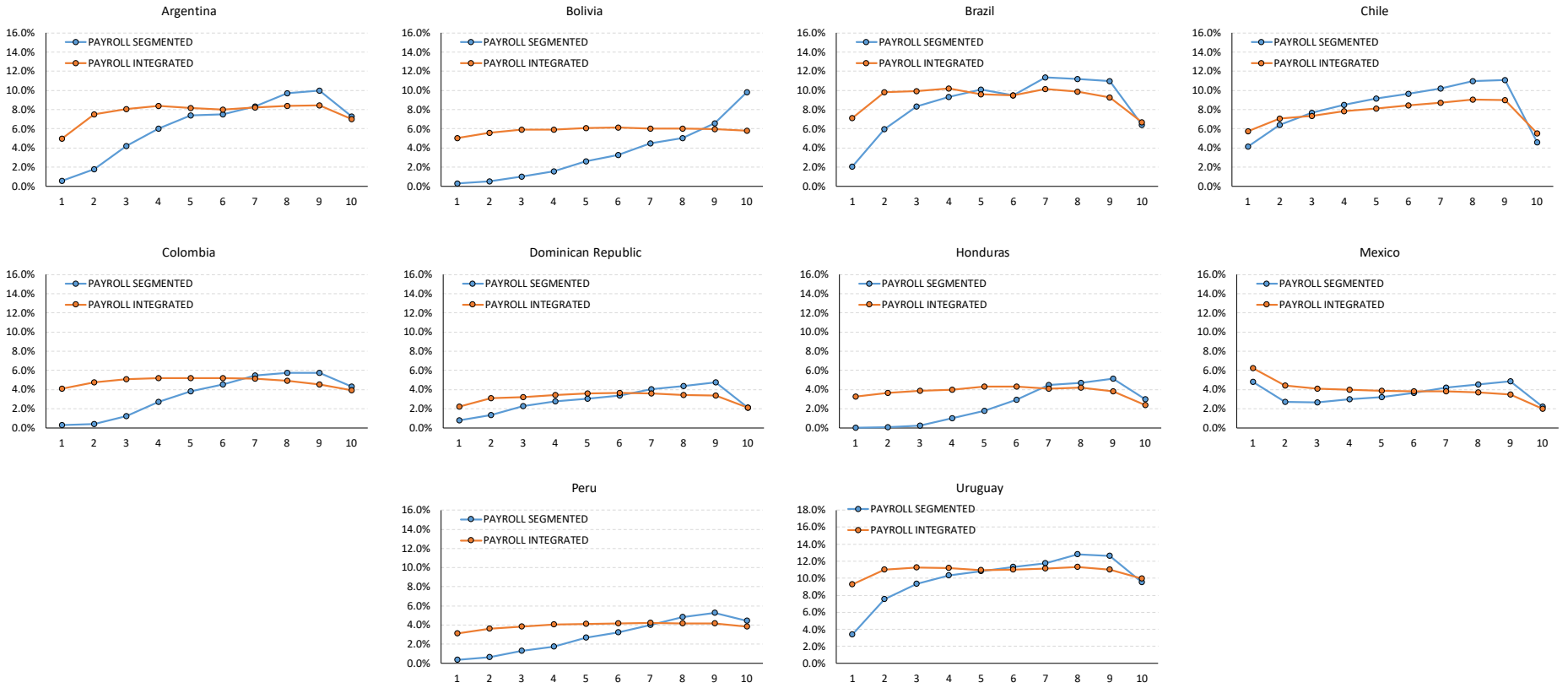
Summary

SSCs are an important source of revenues for the countries in the region. Although under traditional assumptions SSCs are progressive in some countries, their progressivity is reduced for all converting this tax in neutral or regressive for all countries if we assume that higher payroll taxes reduce wages in both the formal and the informal sectors.

[18] It is worth noting that social security benefits such as contributory pensions are pro-rich in most countries in the region (see Pessino and Alaimo, 2018).

[19] An ideal analysis would incorporate net taxation from payroll taxes that are not valued by workers and also take into account the fact that social security benefits in several LAC countries are financed with general tax revenues, since most of today's social security systems have high deficits.

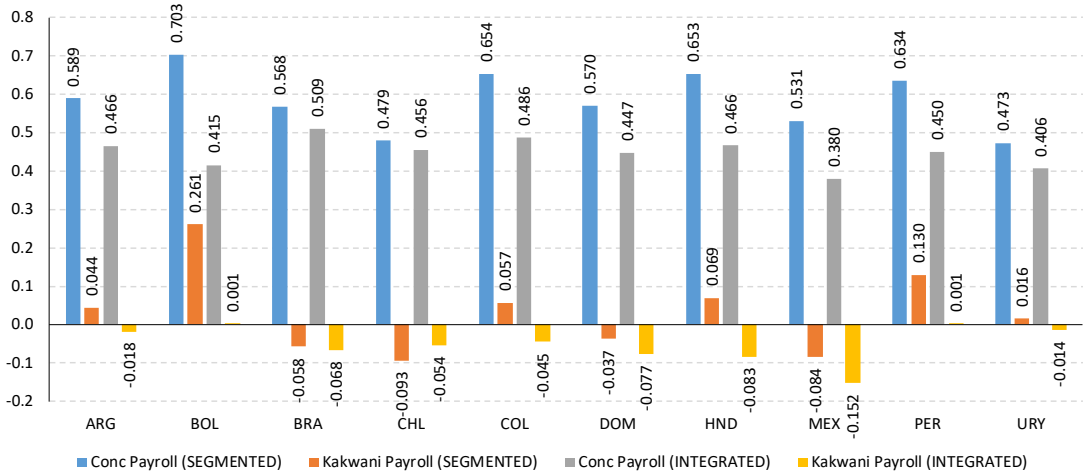
Figure 5. Payroll tax incidence, by gross income decile, 2018.



Notes: Incidence refers to the tax paid, as a percentage of gross income, by each gross income decile under two scenarios for the economic incidence of payroll taxes. Under the segmented labor market hypothesis, the entire burden is borne by formal sector wages, and under the integrated hypothesis, the burden is shared, with a reduction in wages equivalent to 50% of the tax in both the formal and informal sectors.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

Figure 6. Concentration coefficient (CC) and Kakwani index (K) of payroll taxation, by gross income decile



Notes: The concentration index, or quasi-Gini, of a given tax shows the distribution of the tax across income groups ranked by gross income. The Kakwani index is the difference between the concentration index for that tax and the gross income Gini coefficient, i.e.: K = quasi-Gini (tax) - Gini (gross income).

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries

4.2 Personal income tax

Personal income tax (PIT) revenues account for only 2% of GDP in the sample of ten countries of Latin America, which is similar to the average for all LAC countries. The small size of PIT as a share of total tax receipts limits its redistributive impact. In addition to high levels of tax evasion, a factor that limits collection of this tax and its redistributive impact is that low incomes are usually exempted by a relatively high nontaxable minimum, meaning that only the highest deciles pay this tax.

We simulate the statutory incidence of PIT based on the minimum nontaxable income threshold, the marginal rates in each bracket, and the different deductions for family members. Whenever possible, we also deduct some tax expenditure, for example for areas that have lower rates or when the simplified tax regime allows for lower taxes at lower incomes, as is the case in Argentina and Uruguay. It is assumed that individual income taxes are borne by individuals. Labor income only is only borne by the formal sector but income from capital and land is fully taxed usually at lower rates in Latin America.

As shown in Figure 7, in most cases, this tax is paid almost entirely by the two highest income deciles. Only in Mexico, and at least from the 7th decile Argentina, Brazil, the Dominican Republic, Peru and Uruguay, also pay the tax. This way of structuring the tax with high minimum nontaxable thresholds makes the tax very concentrated, with quasi-Gini or concentration indexes of between 0.81 (Mexico) and 0.98 (Colombia). Therefore, all countries have progressive personal income taxes, with Kakwani indexes ranging from 0.28 in Mexico to 0.45 in Colombia[20] (Figure 8). As we show in Section 4.3, the redistributive capacity of a tax depends on its size and progressivity (assuming no reranking). Since the revenue from this tax is rather small, the redistributive capacity will also be low.

Additionally, the low redistributive impact of PIT is also affected by tax expenditures, which for an average country are 0.4% of GDP. These tax expenses are usually derived from

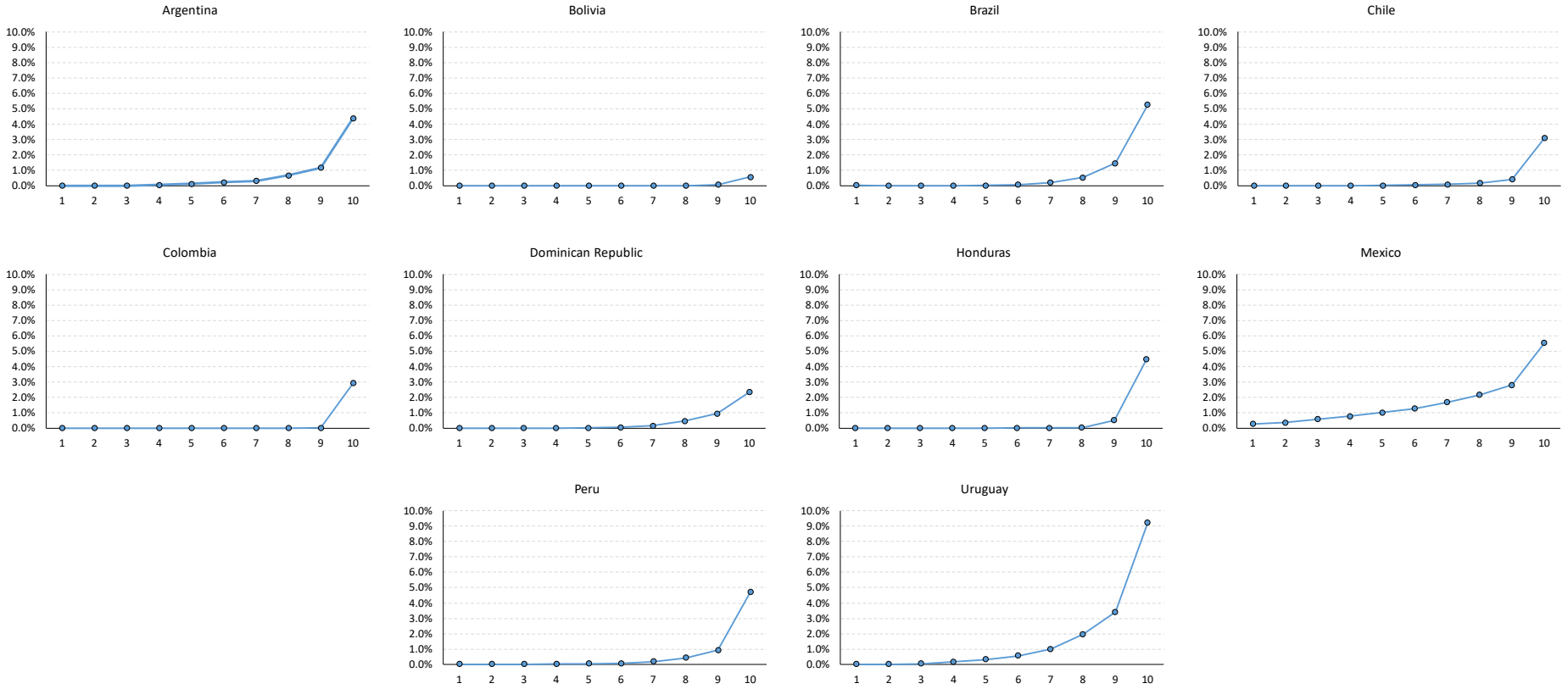
[20]The CC and K indexes in Bolivia are among the highest, but Bolivia does not really have an income tax system. Rather, it has what it calls a Complementary VAT regime that taxes income but allows for full deduction of VAT payments for high deciles. Revenues from this tax only amount to 0.2% of GDP.

untaxed income, deductions of certain expenses from the tax base, tax credits, and other sources. Since the structure of the tax means that basically only the rich pay it, these tax expenditures in personal income tax are highly pro-rich.

Summary

Although the PIT could have a high redistributive impact, its low collection levels limit the size of these impacts. The low revenues from this tax are due not only to evasion (which is only considered through informality) and tax expenditures, but also to the exemption of most of the potential taxpayers from the tax. For this reason, people have proposed lowering the minimum nontaxable threshold to cover a larger segment of taxpayers, thereby increasing the redistributive impact of this tax. But the current unequal income distribution in Latin America and the high burden of payroll and indirect taxes in the lower deciles makes this a difficult solution from an economic and political perspective.

Figure 7. Personal income tax (PIT) incidence by gross income decile



Notes: Incidence refers to the tax paid, as a percentage of gross income, by each gross income decile.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries

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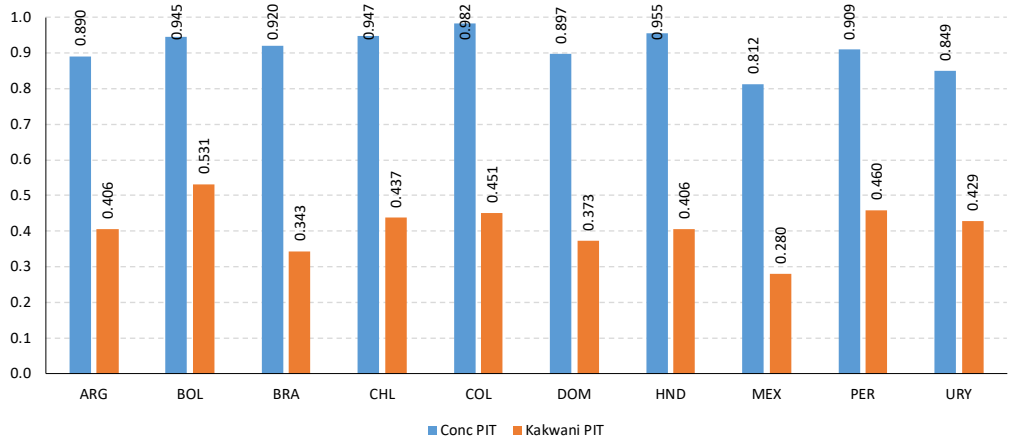
Figure 8. Concentration coefficient (CC) and Kakwani index (K) of personal income tax, by gross income decile



Notes: See Figure 6 notes.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries

4.3. Corporate income tax (CIT)

Corporate income tax revenue is, on average, quite high in the region. It is higher than PIT revenue: while average PIT receipts in LAC are 2.1% of GDP, almost four times lower than in non-LAC OECD countries (8%), CIT collection in LAC is 4% of GDP, which is almost 30% higher than the OECD average of 3.3%. This tax is generally not included in redistributive impact studies, given the various methodological difficulties of doing so. However, it is quite important to include CIT in the analysis, since many comparisons have been drawn between the direct taxes lack of redistributive power in Latin America, including only one of the incomes taxes, i.e., the personal income tax. Dividends tend to be paid at a comparatively higher rate at the corporate income tax level rather than at the level of the personal income tax in LAC, since not only is the LAC CIT rate (27.6%) higher than the average OECD rate (21.5%), but also the top personal income tax on dividends is lower than the top personal income tax rate. In fact, the top personal income tax on dividends is 9.8% in LAC but is 25.2% on average in non-LAC OECD countries. Therefore, if we only consider the incidence of personal income tax, this drastically attenuates the size effect of redistribution and makes it hard to compare the redistributive power of LAC's direct tax with the that of those found in developed and other countries.[21] On average, the rate of the integrated tax that includes CIT and tax on dividends at the personal level is about 40% in non-LAC OECD countries and is split almost evenly between PIT and CIT.[22] We estimate that the same average integrated tax rate for dividends for 17 Latin American countries is somewhat lower than in the OECD, at about 33%, but is

[21] In most European OECD and also in Latin American countries, before shareholders pay taxes, the business first pays the corporate income tax. A business pays corporate income tax on its profits; thus, when shareholders pay their layer of tax, they do so on dividends distributed from after-tax profits. The integrated tax rate on dividends reflects both the corporate income tax and the top dividend rate on personal income. So, this group of countries averages an integrated rate of 40%, split almost evenly between PIT and CIT.

[22] Integrated tax rates are calculated as follows: (Corporate Income Tax) + [(Distributed Profit – Corporate Income Tax) * Dividends].

split quite differently in favor of CIT: 83% of the integrated tax rate corresponds to CIT and only 17% to PIT (see Annex B for country-specific details).

These different treatment of profits between the PIT and CIT in those groups of countries raise the question as to whether this happens. In Latin America, as noted in section 2, revenue raised is a much smaller proportion of national income, and revenues from corporation tax tend to make up a larger share of total revenues. According to Deveraux (2020) there are fewer reliable alternative revenue sources; not only is the personal income tax underdeveloped, but the VAT is also often stretched to its limit. We add to the explanation to the fact that tax authorities in LAC for lack of information or lack of resources prefer to tax a few corporations that are easier to supervise than to rich individuals who are more and more difficult to monitor. It is a well-known fact that LAC ta administrations have all devised large taxpayers units; comprised mainly of large firms, where they concentrate much of their collection efforts.

To explore the redistributive impact of CIT, we analyze two different incidence assumptions. First, the baseline scenario assumes the standard case of inelastic supply and absence of behavioral effects, so 100% of the burden falls on capital owners. This is the assumption Piketty and Saez (2007) make in their study on the progressivity of the US tax system, for example. The alternative scenario assumes that 50% of the tax is transferred to workers and that 50% of the burden falls on the income of local capital,[23] in line with Arulampalam et al. (2012) and Hines (2020), among others.

A problem when implementing any of the incidence assumptions for this tax is that corporate profits are not usually reported in household surveys, and dividends and other capital income are heavily underreported in those same instruments. We assume that corporate income tax not only falls partly or fully on capital income but also that financial assets (and not just corporate stock) and other rents bear the tax equally as corporate income. This approach is in line with that of other studies on corporate tax.[24] Additionally, pre-fiscal income must be grossed up with a higher level of capital income to account for corporate income taxes. There are many ways to account for misreporting or underreporting of capital income (see for example Lustig (2019)). We adopt a simple but intuitive expansion method. The adjustment first calculates the individual shares of capital income and then assigns proportionally the corporate tax burden assuming the ratio between personal income tax collection and corporate tax is the same as in the actual public finance figures. The grossed-up capital income is finally obtained by dividing the tax burden of each unit with the corporate income tax rate.

Under any of the incidence assumption used, CIT is a progressive tax, although it is obviously more progressive under the assumption that the tax burden falls entirely on capital income (Figure 9). Notice also that under any incidence assumption the effective CIT tax rate on the richest decile is higher than the effective PIT rate (Figure 7) on the richest decile; the exception is Uruguay.

Unlike the PIT, whose redistributive impact was low due to low tax collection, more CIT is collected, and hence its redistributive impact is much higher. Concentration coefficients are as high as for PIT under the assumption of 100% incidence on capital. The CC range from 0.74 in Bolivia to 0.98 in Mexico, while Kakwani indexes under these circumstances are all positive, ranging from 0.27 in Brazil to about 0.42 in Argentina and Peru and 0.46 in Uruguay. On the other hand, the quasi-Gini indexes range from 0.65 in Uruguay to 0.73 in Honduras in

[23] This assumption implies that foreign investors do not bear the burden of this tax.

[24] According to the two-sector, two factor model of corporate tax incidence in a general equilibrium framework developed by Harberger (1962), it is all capital, not just corporate capital, that bears the tax (see Auerbach (2006)).

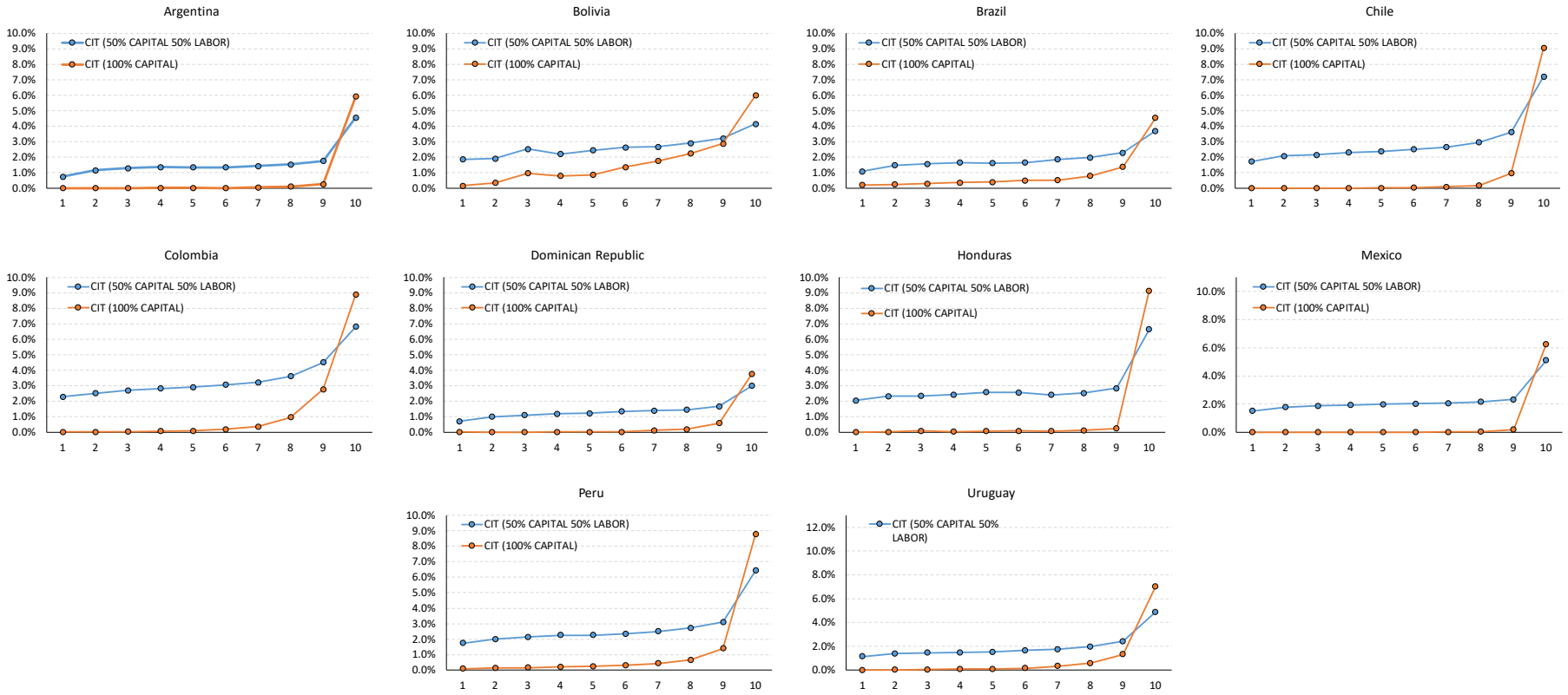
the case of 50-50 incidence, and in this scenario all Kakwani indexes remain positive but are lower than before (Figure 10).

The above analysis shows the importance of considering CIT when analyzing the redistributive impacts of direct taxes, a step rarely taken, so it is important to consider the joint incidence of both taxes. Figure 11 shows the average tax rate of the integrated income tax (including personal and corporate) by income quintile in the less favorable scenario where the burden falls on capital and labor. When personal and business income taxes are considered jointly, average integrated income tax rates are considerable and come mainly from corporate income taxation. For example, Brazil's average empirical tax rate with PIT alone is in the last quintile, at 5.5%, but this figure increases to 11.8% under the integrated approach. This allows for much better benchmarking of progressiveness against the OECD and other countries and is even more helpful for comparing the total redistributive capacity of direct taxation, as we will see in the next section.

Summary

LAC countries collect high CIT revenue relative to PIT, a tax that is highly progressive. Unlike in OECD countries, in LAC CIT statutory rate is much higher than the top PIT rate on dividends, collecting most of income tax from corporations rather than from individuals. So it is crucial to consider this tax jointly with the PIT in the analysis of the redistributive impacts of the region's tax systems.

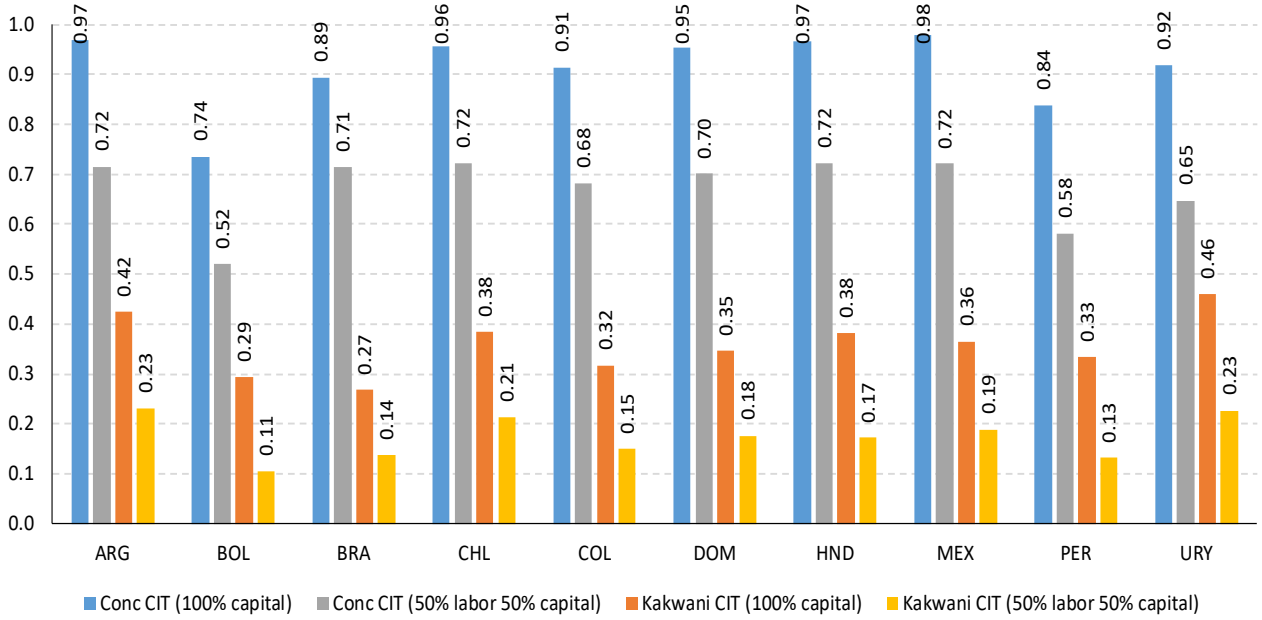
Figure 9. CIT tax incidence by gross income decile



Notes: Incidence refers to the tax paid, as a percentage of gross income, by each gross income decile under two assumption scenarios for the economic incidence of corporate income tax. In the baseline scenario, 100% of CIT falls on capital income; while under the alternative assumption 50% falls on capital and 50% on labor.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

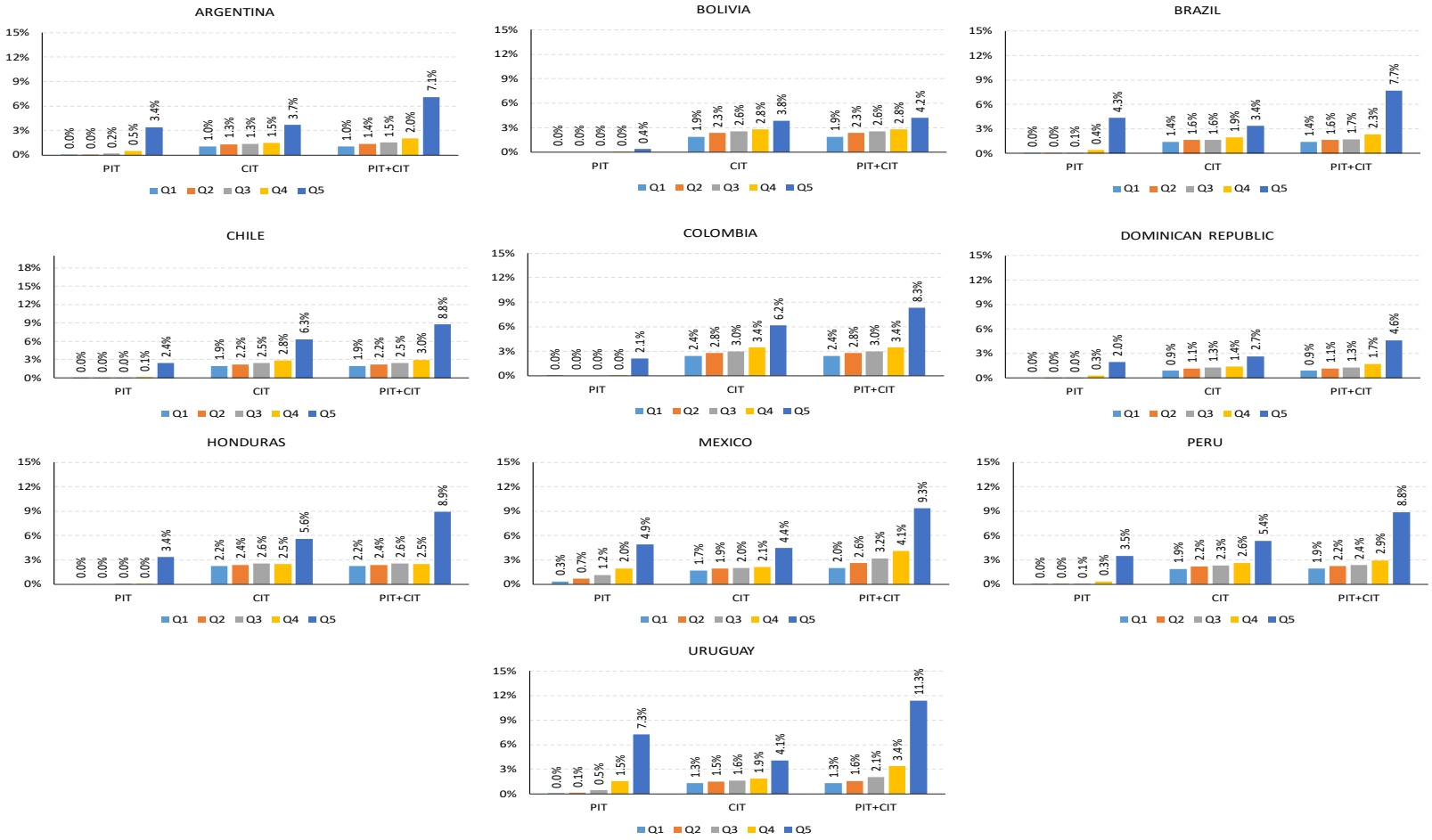
Figure 10. Concentration coefficient (CC) and Kakwani index (K) of corporate income taxation (CIT) by gross income decile.



Notes: See Figure 6 notes.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

Figure 11. Joint Incidence from CIT and PIT, by quintiles



Notes: Incidence refers to the tax paid, as a percentage of gross income, by each gross income decile. The assumption is that 50% of CIT falls on capital and 50% on labor.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

4.4 *Marginal contributions to inequality of direct taxes.*

Direct taxes' overall contribution to decreasing inequality depends on the contribution of each of the three taxes we analyze and the assumptions we make about their incidence. While correctly incorporating CIT leads to a decrease in inequality, high informality in the region makes payroll taxes less progressive or even regressive.

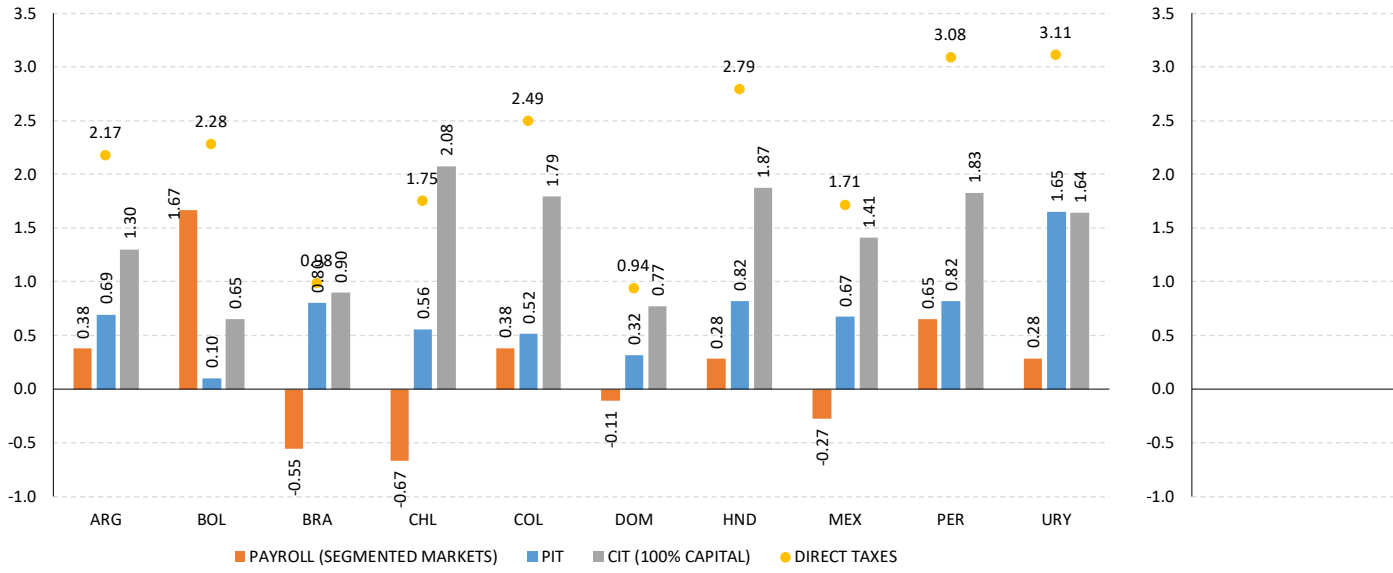
To simplify our comparisons, we first consider a scenario with the standard incidence assumptions: payroll taxes fall on formal labor wages only, PIT falls on the recipients of income, and 100% of CIT is born by owners of capital. The alternative scenario assumes that payroll taxes fall on formal and informal labor wages, PIT falls on recipients of income, and 50% of CIT is born by owners of capital and 50% by labor.

Figures 12a and 12b show the marginal contributions of each direct tax and of total direct taxation to inequality. A tax's marginal contribution (MC) to inequality is calculated as the difference between the Gini coefficient of the relevant end income concept without the tax and the Gini coefficient of the relevant end income concept with the tax. Because of path dependency, the sum of the marginal contributions of each fiscal intervention will not be equal to the total change in inequality (Enami, Lustig and Aranda, 2018). The marginal contribution has a straightforward policy interpretation because it is equivalent to asking: what would inequality be if the system did not have a particular tax or if a tax was modified? Would it be higher, the same, or lower with the tax than without it? (Lustig, 2020).

Taking disposable income as the relevant end income concept, the marginal contributions of payroll taxation in the standard segmented case is equalizing in six of the ten countries, but not in Brazil, Chile, the Dominican Republic, and Mexico. PIT and CIT are equalizing in all ten countries. However, in nine out of the ten countries, CIT has the largest impact (which is much larger than that of PIT) on reducing inequality, with a marginal contribution of about 1.4 Gini points.25 This is double the contribution of PIT, which averages 0.7 Gini points. In fact, the integrated income tax's overall marginal contribution to reducing inequality is 2.1 Gini points, which is three times larger than the contribution of the PIT alone in this analysis. This is mainly due to the higher amount of revenue collected from CIT than from PIT. In fact, Uruguay is the only country in the sample that collects more from PIT than CIT and that has a slightly higher MC for PIT than CIT. The overall redistributive effect of direct taxes is shown on the right axis of Figure 12a, which reveals CIT's significant contribution to the overall effect of direct taxation. In the alternative scenario (Figure 12.b), the marginal contribution of direct taxes is lower than the corresponding contribution in the segmented case for two reasons: the contribution of payroll taxes is mainly negative in this scenario, and 50% of the incidence of CIT falls on labor, instead of all of it falling on capital. The overall marginal contribution to decreasing inequality falls from 2.1 to 1.2, nearly one Gini point of difference.

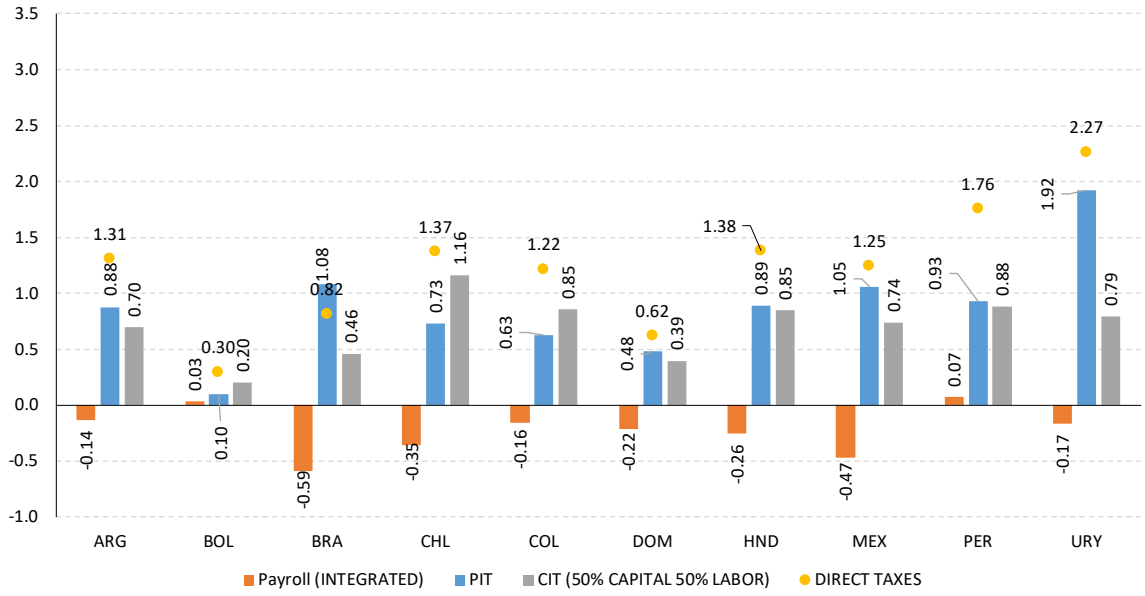
[25] For ease of interpretation, Gini points are relative to a Gini measured on a scale from 1 to 100.

Figure 12a. Marginal contribution of direct taxation and its components under standard incidence assumptions, in Gini points



Notes: The incidence assumptions are that PIT falls on recipients of income, 100% of CIT falls on capital, and payroll taxation falls on formal labor (segmented markets).

Figure 12b. Marginal contribution of direct taxation and its components under alternative incidence assumptions, in Gini points



Notes: The incidence assumptions are that PIT falls on recipients of income, 50% of CIT falls on capital and 50% on labor, and 50% of payroll taxation falls on formal wages and 50% on informal wages (integrated markets).

The marginal contribution of direct taxes is calculated as the difference between Gini of disposable income without direct taxes and Gini of the same income concept with direct taxes. Gini coefficients are measured on a scale of 0 to 100.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

5. Incidence of indirect taxation

Our analysis of indirect taxation includes the value added tax; excise taxes on alcohol, tobacco, and fuels; and import taxes for the ten countries. We also include cascade taxes for Argentina and Brazil. These cascade taxes are cumulative and highly distortive and have a low nominal rate that, through the cascading effect, results in a rather high effective tax rate. On the average of our ten countries, all these indirect taxes add up to 9.7% of GDP, or 40.7% of total taxation. We first assess the allocation of indirect taxes through household expenditure data, including the exemptions and rate reductions that we are able to capture. Afterwards, we impute the allocations to household income data. Furthermore, we assume that the incidence of VAT and cascade taxes in the baseline case falls entirely on consumers of goods through prices that are raised by the full amount of the tax. In the alternative scenario, we assume that if goods are purchased in informal shops, these taxes are either fully or partially evaded.[26]

5.1. Value-added taxes

The VAT is the main source of tax revenue, accounting for an average of 26% of total revenue or 6.5% of GDP in the ten countries analyzed. The VAT, like other taxes on consumption, tends to be a regressive tax, according to the methodologies most frequently used to measure the progressivity of taxes.

For most countries, we initially analyze VAT with an alternate survey: a household expenditure survey that captures the different non-durable goods consumed by each household in a given period. The process starts by grouping consumption expenditures by the statutory VAT rate charged for each consumption item (general, reduced, zero rate, or exempted). Goods exempt from consumption taxes should include the effects of indirect taxes on inputs. Only zero-rated goods can be assumed to involve no indirect taxes, since producers are reimbursed for any taxes paid on their inputs. While a few studies have utilized an input-output table to determine the indirect taxes paid on inputs of exempted goods, we chose to charge 20% of the VAT rate to them in all countries.[27]

When the progressivity of VAT is analyzed by ordering income deciles according to pre-fiscal income or disposable income, this tax is generally found to be regressive, given that the VAT is a consumption tax and consumption represents a greater proportion of income among lower-income households. However, various authors criticize this approach because the redistributive impacts are measured in relation to current household income, a metric that does not correctly capture their wealth or well-being. As an alternative, some authors have suggested measuring redistributive impacts by ordering households according to their level of consumption (see for example Poterba, 1989), since this variable is directly related to permanent household income. When households are sorted by level of consumption to analyze incidence, VAT becomes a tax with a relatively proportional incidence in the countries in the region.[28]

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[26] Excise taxes are likely charged at the manufacturer level and are therefore difficult to avoid or evade at retail stores. Import taxes are also applied in customs, and barring counterfeiting, are also hard to evade. In these cases, we do not correct for the possibility of informal purchases lowering the effective tax rate paid.

[27] This was based on an exhaustive study in Mexico using an input-output table that finds that 23% of the sales of exempted goods had taxed inputs. A much less precise study with Colombian data finds a value of 30% (Artana, 2012).

[28] Figure C.1 and C.2 in Annex C show that this pattern holds for most of the 10 countries.

Allocation methods for VAT and other indirect taxes

While the first step in analyzing indirect taxation is performed only with expenditure data finding the full incidence of taxation requires ordering the deciles by gross income, which is our measure of pretax income that could only be well constructed with the household income survey.

In cases where the expenditure module is not included in the household survey, we have to use information from an alternate expenditure survey, and the allocation process involves the additional step of matching observations between the main and alternative survey to assign the indirect tax payments. This matching process requires defining two key parameters: the variables used to match observations between surveys; and the value assigned in the matching process. Because both per capita disposable income and region of residence were available and consistently recorded in both surveys we used them as matching variables. We then use the region of residence and the decile of per capita disposable income. Some incidence studies used consumption in the denominator to get the ratio of taxes paid by decile and imputed to deciles of disposable income which tends to over impute indirect taxes to higher deciles with higher levels of savings. Annex D contains a detailed description of the methodology used for the countries in the sample.

Informality in purchases

The analysis described above assumes that transactions are carried out in formal establishments and therefore very likely buyers pay the entire VAT at the different statutory tax rates.

However, this assumption may not be appropriate for Latin American countries, since a significant proportion of purchases in the region are made in informal establishments, which may lead to evasion of part or all of VAT. To properly capture this phenomenon in the estimates of the redistributive impact of VAT, we have to take into account two arguments for why the price of the product sold in an informal establishment is not reduced by the value of the legal VAT tax that would be paid in a formal establishment. On the one hand, given that VAT is collected at various stages, the final sale price carries over the VAT levied at earlier stages of the production or supply chain, even though the final sale does not include VAT. On the one hand, given that VAT is collected at various stages,[29] Second, since not charging VAT on an informal sale of a good or service can generate a price gap with respect to formal transactions, the informal seller can decide to increase the final price charged for their goods or services. If this is the case, the existence of VAT in the formal sector affects the prices that consumers must pay in their informal purchases, making it so VAT generates incidence on the price paid by the buyer in informal purchases, even if the tax is evaded.

Given these two arguments and the evidence on taxed inputs of exempted goods in Mexico; we decided to include four scenarios for informal transactions: 1) no informality in purchases (all taxed); 2) 50% of the tax is paid; 3) 20% of the tax is paid; 4) no tax is paid, or 100% tax evasion.[30]

Figure 13 graphs VAT tax incidence on each gross income decile for the different countries under the different assumptions for how much of VAT is paid directly or indirectly in informal establishments, whether because purchases of goods in the informal sector carry taxes from inputs or because part of the “savings” in taxes on purchases in informal shops is retained by

[29] In fact, as shown in Pomeranz (2015), most VAT tax evasion is at the last stage, where there is no cross-checking or self-enforcement. This is based on the idea that firms have an incentive to ask their suppliers for receipts because they can deduct input costs from their VAT bill.

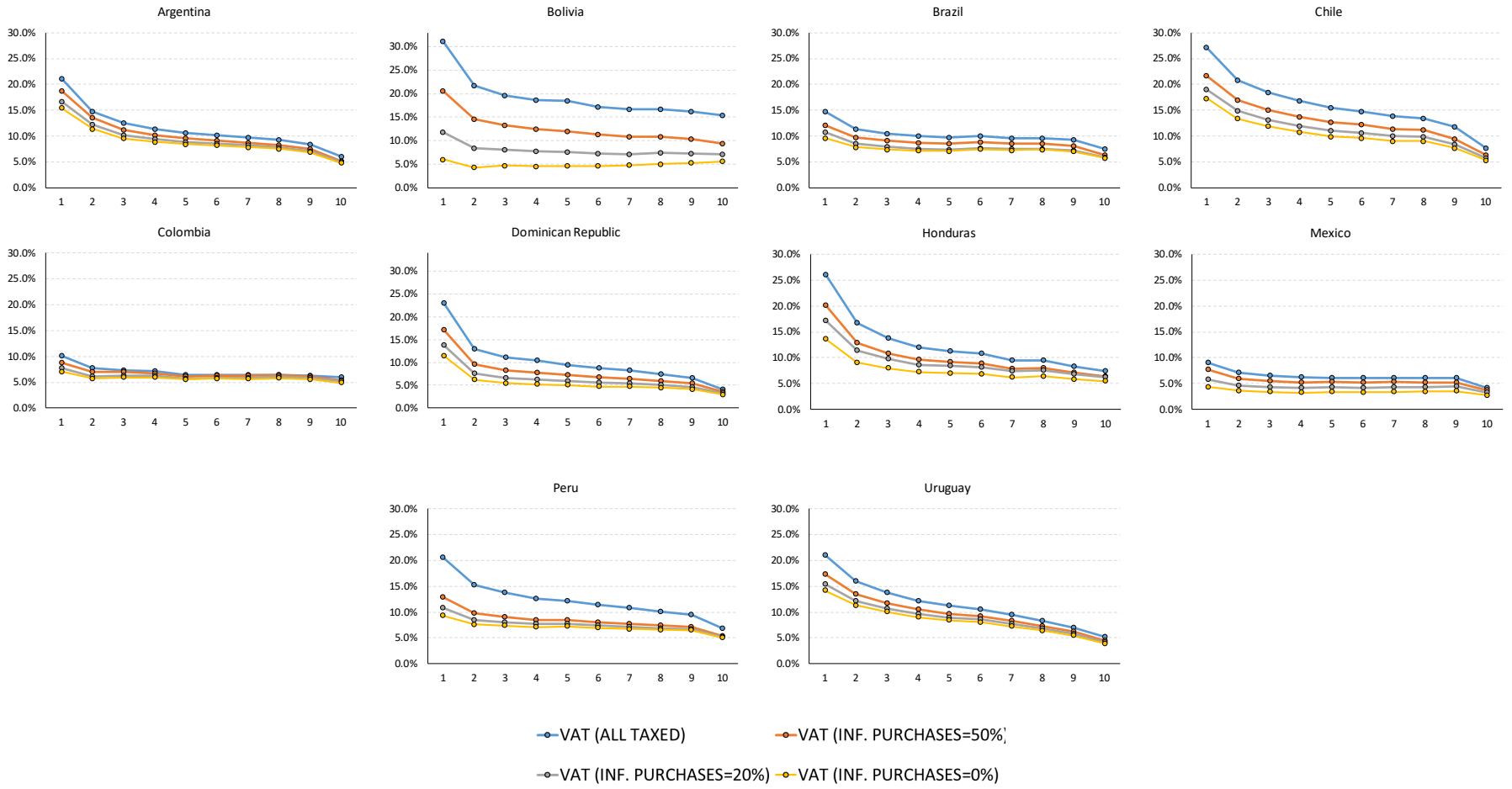
[30] In their study on VAT incidence in informal purchases, Bachas et al (2020) adopted two simulations. One posited that prices dropped by 100% of the amount of the tax, and the other a decrease in price of 10% of the VAT paid in formal establishments, as a result of inputs taxed with VAT in previous stages.

the shop. A higher VAT burden is observed for the first deciles in most countries. This burden declines relatively steadily with income. This result is mainly a consequence of the fact that poor households allocate practically all of their income to consumption, while households with higher incomes have savings capacity, so consumption represents a smaller fraction of their income.

The results show the importance of considering informality when analyzing the redistributive impacts of VAT. In all the countries, VAT never turns neutral or progressive but becomes less regressive when allowing for informal purchases at a lower tax rate. The incidence diminishes much more for the lower deciles that buy heavily in informal places and much more when we assume higher pass-through of VAT savings or lower incidence of taxed inputs. In fact, the concentration indexes increase and negative Kakwani indexes decrease (in absolute value) when the assumption of no informal purchases is compared to the assumption of payment of 20% of the tax on them (see Figure 14). But this result varies greatly among the different countries included in this study. For example, this phenomenon does not have a major impact on the incidence of the tax in countries such as Argentina, Brazil, and Chile, where informality in purchases is relatively lower. In contrast, the consideration of informality does have large impacts in countries with high levels of informality, such as the Dominican Republic and Honduras, where regressivity tends to be moderated when we assume that less or no taxes are paid on informal purchases.[31]

[31] The result that the VAT does not turn progressive when considering informal purchases is due to the fact that incidence is estimated with respect to disposable income, while in Bachas et al (2020), it is calculated by consumption deciles. Under the latter approach, VAT turns from neutral with formal purchases to progressive in some countries when allowing for informal purchases.

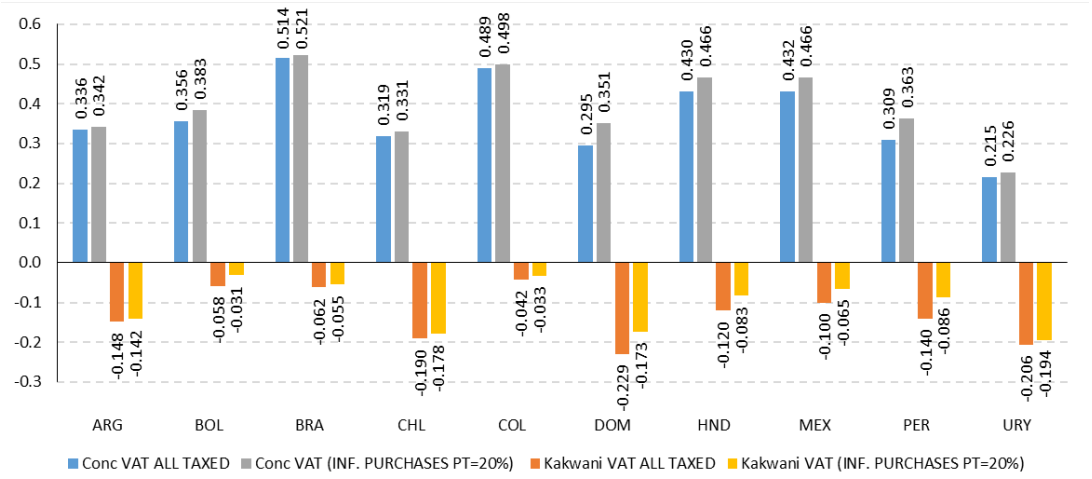
Figure 13. **VAT tax pressure by income decile, with and without informality in purchases**.



Notes: Incidence refers to the tax paid, as a percentage of gross income, by each gross income decile.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

Figure 14. Concentration (C) and Kakwani index (K) of value added tax under different informality scenarios, by gross income decile.



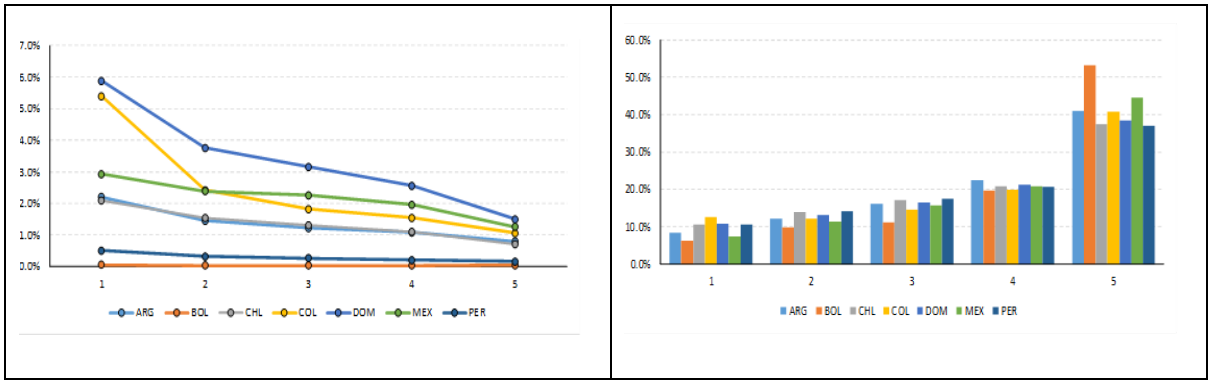
Notes: See Figure 6 notes

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

Finally, to consider policy options to lower the regressivity of VAT, it is important to analyze the current redistributive effects of existing tax expenditures. For the ten LAC countries, VAT tax expenditures amount to 2.3% of GDP, ranging from a low of 0.2% in Bolivia to a high of 5.8% in Colombia. These tax expenditures are mainly derived from taxing various goods and services at zero or reduced rates, primarily those with high consumption rates among low-income households. These preferential treatments tend to diminish poverty and the tax incidence on the poor, since the benefits received by lower-income households represent a greater proportion of their income (see Figure 15.a). However, the lack of household-level targeting of these benefits means higher-income households benefit the most in absolute terms from these tax expenditures. That is, tax expenditures have a high concentration coefficient, and the tax benefits of VAT are pro-rich. As shown in Figure 15.b the richest 20% of households receive between 37% and 53% of these tax benefits, while the poorest 20% of households receive less than 13%. These results show that the strategy of targeting goods, instead of people, is a costly way to reduce the regressivity of VAT.

Figure 15. Incidence and concentration of VAT tax expenditures, by income quintile

(a) Incidence as % of household income (b) Concentration % of total tax benefits



Notes: VAT tax expenditure is calculated under the assumption that 20% of VAT is paid on informal purchases.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

Summary

The VAT is a regressive tax for all LAC countries, although traditional measurements could be overstating the regressivity of this tax. Given the very significant relative weight of VAT in the region's tax structures this tax reduces the redistributive impact of tax systems. Additionally, existing tax expenditures on VAT are high in LAC countries, and although they favor the poor over the rich in relative terms, they are highly pro-rich, since in absolute terms, they mostly benefit higher-income households. Given the above, and since VAT is a consumption tax, achieving progressivity through this tax requires improving the targeting of the tax benefits or directly exempting poor households—also with good targeting—rather than exempting the products on which poor households spend a large part of their income.

5.2. Other indirect taxes

Indirect taxes other than VAT make up a significant proportion of the tax revenue of many LAC countries, reaching an average of 3.2% of GDP in our sample. In most countries, this revenue is derived mainly from excise taxes on the consumption of certain goods and services, at about 1.7% of GDP, and from import tax revenues, which bring in 0.61% of GDP and are much lower that they have been historically. However, other more broadly based indirect taxes, such as cascade taxes, are significant in some countries. In 2018, Argentina collected 3.9% of GDP from provincial gross receipts taxes[32] and Brazil 5.3% from three federal taxes: COFINS, a social contribution tax; PIS, a contribution to the Social Integration Program; and the IPI, a tax on industrialized products that, when applied to revenue for some sectors, ends up being cumulative and cascading.

Performing a detailed analysis of the redistributive impact of these other indirect taxes is a complex task for various reasons. In the case of excise taxes, the information from consumer surveys is not usually disaggregated enough to include all these taxes. Given these difficulties, we focus exclusively on excise taxes on fuels, cigarettes, and alcoholic beverages. Of these three, fuel taxes are the most relevant in some countries, with an average revenue of 0.8% of GDP in the countries in the sample.[33]

The patterns observed in the analysis of the incidence of excise taxes on the three goods included are more diverse than those observed for VAT in the previous subsection. The aggregate indicators of tax progressivity, such as the Kakwani index, show that these taxes are regressive when households are ordered by income levels, except for in Mexico and Peru (see Figure 16).[34.] Of the three excise taxes, the fuel tax appears to be the least regressive. This result may be due to greater automobile ownership among higher-income households, as well as the fact that the methodology only takes direct fuel consumption into account.[35]

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[32] In Argentina, the subnational tax on gross income is the most important provincial tax. This tax is levied on all stages of the production and distribution of goods and services. The legal rates are different by sector and range, from 0.1% for oil refining to 6.8% for financial intermediation.

[33] This figure reflects revenue from excise taxes. Several countries simultaneously tax and subsidize fuels, which leads to much lower net taxation. Conte Grand, Rasteletti, and Muñoz (2022) estimate that in 2018, LAC fuel subsidies reached approximately 1.1% of GDP.

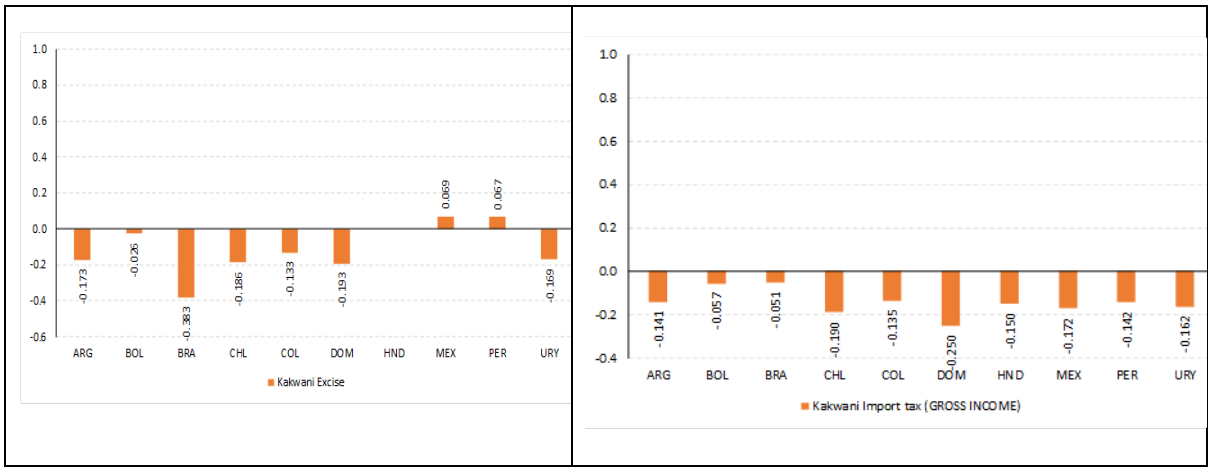
[34] Our analyses do not include estimates for Honduras because this country's expenditure survey lacks data on the consumption of alcohol, fuel, and tobacco.

[35] The analysis of the incidence of fuel taxes only considers direct impacts (e.g., on the final consumption of fuels by households). It does not consider possible second-round or indirect effects, which may originate from an increase in prices of all goods and services in the economy. Various studies have found that these indirect effects tend to make fuel taxes more regressive and account for approximately 50% of the total effect (see, for example, Coady et al (2015)).

Finally, import taxes are mostly regressive, as shown by the Kakwani indexes in Panel (b) of Figure 16.

Figure 16. Regressivity of excise and import taxes – Kakwani index.

(a) Kakwani for excise taxes (b) Kakwani for import taxes



Notes: Only taxes on fuel, cigarettes, and alcoholic beverages are included.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

In the case of taxes with cascading effects in Argentina and Brazil, we have to use the input-output matrix from the national accounts to calculate the cumulative tax from the different stages of production of a given product.[36] [37] The Kakwani indexes of cascade taxes in Argentina and Brazil are -0.139 and -0.039 respectively. These taxes add to both the regressivity and size of indirect taxes, thus making the overall system less redistributive. Additionally, they are very inefficient taxes.

Summary

Excise taxes are mostly regressive, although slightly progressive effects are observed in two countries. Import taxes are regressive everywhere. Given that the excise and import taxes included in the analysis tend to have moderate receipts, the effect of these taxes on the redistributive impact of the tax systems is probably low. An exception to this conclusion could be excise taxes on fuels, particularly if we take into account the aggregate effects on the prices of goods and services in the economy. Tobacco taxes, however, are regressive, even when measured with respect to consumption, but excluding the positive health effects for the poor.[38] Meanwhile, cascading taxes are both inefficient and regressive, and they make up a sizeable portion of tax revenue in Argentina and Brazil, which makes their low redistributive power of

[36] For Argentina, we used the tax code of the province of Buenos Aires for the year 2018 (representing 40% of GDP) as an approximation for the whole country, together with the matrix coefficients of direct and indirect production requirements for the year 1997, published by INDEC, to calculate the tax cascade. The cascade effect is calculated allowing different goods and services to have a different cascade depending on the productive sector they fall under.

[37] For the incidence estimate itself, in the case of Brazil, we follow the work of Siquiera et al. (2010). The effective tax rates reported there are used for both IPI and COFIN+PIS, in combination with the consumption categories identified in the Pesquisa de Orcamentos Familiares (POF) 2018.

[38] It is important to note that these simulations only analyze the direct impact of changes in the tax on cigarettes, However, higher taxes on tobacco discourage consumption and therefore reduce health spending on respiratory and cardiovascular diseases, various types of cancer, etc., increasing the expectation of working years throughout people's life cycle. Fuchs and Meneses (2017) capture these effects for the case of Chile, showing that tobacco taxes tend to be progressive when considering the positive effects on health of the poor.

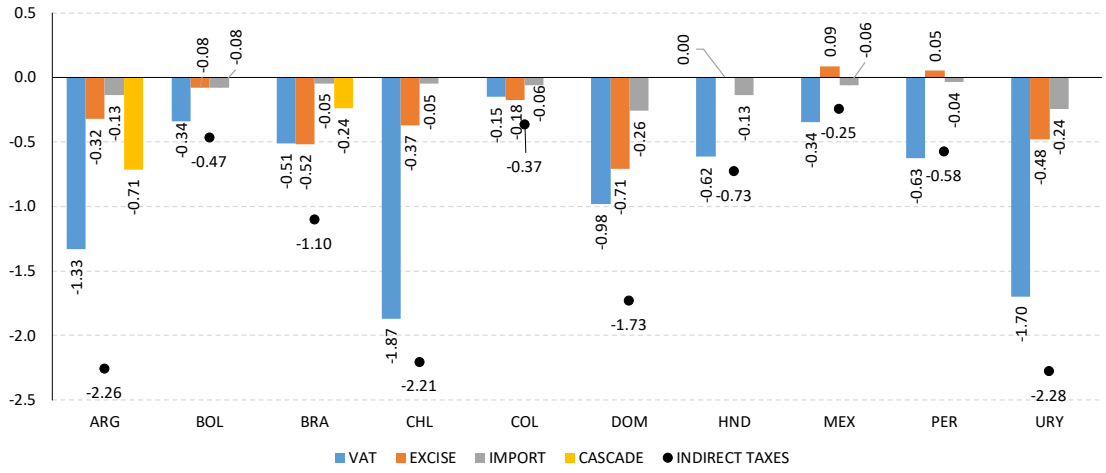
taxation even lower. Overall, indirect taxes including VAT are regressive, even when we assume that informal purchases only pay 20% of VAT and cascade taxes, since the Kakwani indexes of all indirect taxes combined are negative with respect to gross income. This regressivity persists with respect to disposable income: the Kakwani indexes increase slightly but continue to be negative.

5.4 *Marginal contributions to inequality of indirect taxes.*

The overall extent to which indirect taxes increase inequality depends on the contribution of each tax analyzed and their relative regressivity, which in turn depends on the assumptions about their incidence in informal purchases. While incorporating cascading taxes decreases redistributive capacity in the case of Argentina and Brazil, high informality makes VAT taxes less regressive.

The marginal contribution to inequality of almost all indirect taxes is negative (except for relatively insignificant excise taxes in two countries), and VAT is the largest contributor for most countries, followed by cascade taxes and lastly excise and import taxes. The countries where indirect taxes have the highest overall marginal contributions to inequality are Argentina, Chile, and Uruguay, where informality is in the relative low side. In the case of Argentina, a large portion of this contribution is also driven by the gross receipt tax.

Figure 17. Marginal contribution to inequality of indirect taxation and its components, in Gini points.



Notes: The marginal contribution of indirect taxes is calculated as the difference between Gini of consumable income without indirect taxes and the Gini or the same income concept with indirect taxes.

Gini coefficients are measured on a scale from 0 to 100 under the standard assumption that 20% of VAT is paid on informal purchases.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

6. Total simulated redistributive impact of tax systems

This section first presents the average tax paid and its tax source by income decile in each country, followed by the total redistributive impact of that countries' tax systems. To calculate both aggregate results, we use the assumptions of the alternative scenario. The incidence assumptions in this alternative scenario are that PIT falls on the recipients of income, 50% of CIT falls on capital and 50% on labor, 50% of payroll taxation falls on formal wages and 50%

on informal wages (integrated markets), to which we add that indirect taxes (VAT and cascade taxes) are evaded in informal purchases but have an incidence of 20% of the VAT in these cases as an indirect effect of taxed inputs. Annex E includes the results for the baseline scenario, assuming that PIT falls on recipients of income, 100% of CIT falls on capital, all payroll taxation falls on formal labor (segmented markets), and VAT is always fully paid.

Figure 18 shows the average tax rates by tax source and by decile for the alternative scenario. Although the average tax rates differ among the various countries analyzed, a U pattern is present in many of them. On average, the total tax rate for the 10% of taxpayers with the lowest incomes is 17% higher than the rate for the 10% of households with the highest income. The ten Latin American countries' average effective tax rate is 25.4% for the lowest-income 10%; 21.6 percent for the second-lowest 10%, 19.5% for the middle 20%; and 21.7% for the top 10%. This U pattern arises because of the high burden of VAT and other indirect taxes on the first income deciles and a higher effective direct tax rate in the highest income decile. In fact, most of the countries show a regressive overall tax system, without taking into account the usually progressive effects that this revenue has when spent (see Lustig et al, this volume). The majority of the 10 countries' tax systems hence ta[39]ke a greater share of income from low-income families than from wealthy families. Income taxes paid mostly by the wealthy, payroll taxes that also affect informal and non-wealthy workers, and an overreliance on indirect taxes all contribute to this longstanding problem.

In Argentina, Chile, and the Dominican Republic, which end up having the most regressive tax systems (Kakwani indexes of between -0.03 and -0.06), households in the lower deciles pay a much higher average tax that is not offset by the upper deciles because of high and regressive indirect taxes without enough of a counteracting burden of direct taxes in higher deciles. At the other end of the spectrum, Colombia, Honduras, and Mexico have slightly progressive tax systems (Kakwani indexes of between 0.03 and 0.06),

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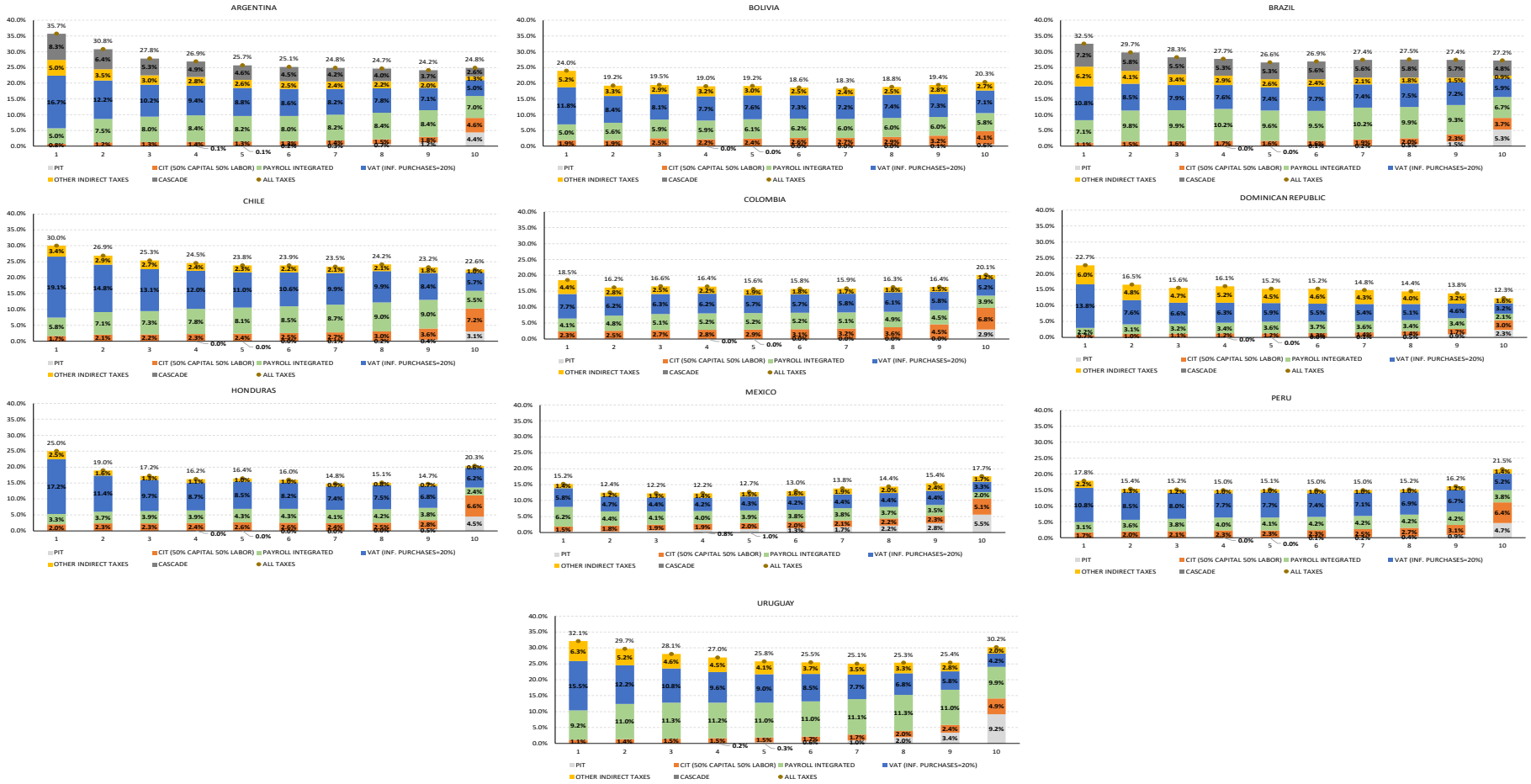
[39] These Kakwani indexes are not reported in tables, but we can share them upon request to the authors.

Figure 18. Average tax burden, by tax source and gross income deciles



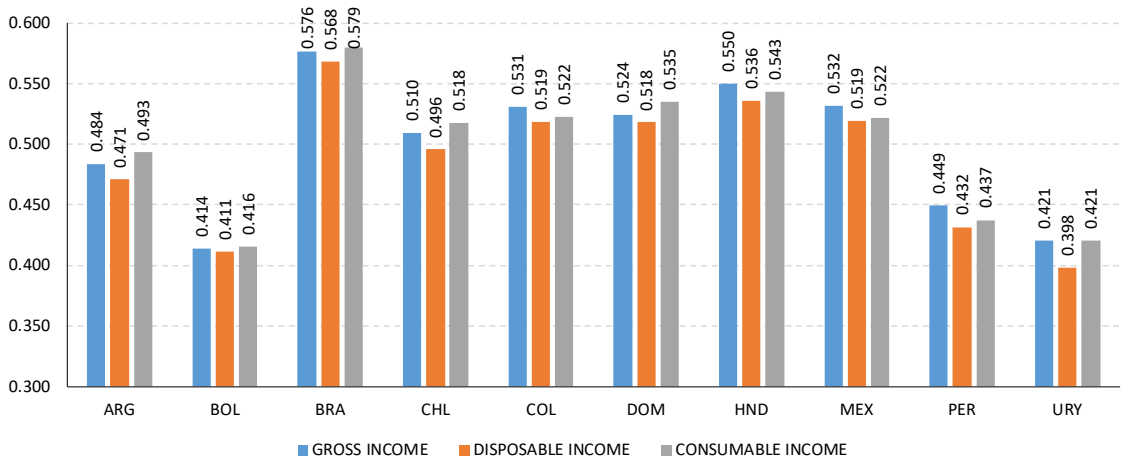
Notes: The incidence assumptions are: PIT falls on recipients of income, 50% of CIT falls on capital and 50% on labor, 50% of payroll taxation falls on formal wages and 50% on informal wages (integrated markets), and indirect taxes (VAT and cascade taxes) are evaded in informal purchases but have an indirect incidence of 20% of the VAT.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

A useful way to summarize the tax system's total incidence is to compare the Gini indicators for market income[40] (or, in our case, gross income, which is market income plus transfers), disposable income (which we define as gross income minus direct taxes), and consumable income (disposable income minus indirect taxes).

Figure 19 shows the Gini coefficients for the different definitions of income in the alternative scenario. Given our incidence assumptions for SSC, personal income taxes, and corporate income taxes, as well as the characteristics of these taxes, direct taxes reduce income inequality overall in all countries. In contrast, indirect taxes increase inequality in all countries, reversing the effect of direct taxes in some cases. The overall effect of tax systems is that inequality increases most in Argentina and the Dominican Republic (by about one Gini point), followed by Chile at 0.8 Gini points and Bolivia and Brazil at about 0.2 Gini points. The tax system in Uruguay does not change inequality, while in the rest of the countries it decreases overall inequality, with a decrease of about 1 Gini point in Peru and Mexico, and between 0.6 and 0.8 in Colombia and Honduras. All these changes are moderate, so the average tax system in the region remains neutral, neither increasing nor decreasing inequality.

Figure 19. Gini coefficients for gross income, disposable income after direct taxation, and consumable income after indirect taxation



Notes: The incidence assumptions are: PIT falls on recipient of income, 50% of CIT falls on capital and 50% on labor, 50% of payroll taxation falls on formal wages and 50% on informal wages (segmented markets), and 20% of VAT falls on informal purchases.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

These results depend on many assumptions about incidence, behavioral, and general equilibrium effects, in addition to some methodological details that vary across studies. For example, see Annex E for the results under the baseline scenario with the standard assumptions mentioned above.[41] The most important result for the baseline case is that the tax system turns more equalizing than in the alternative; even two countries, Bolivia and

[40] According to Lustig (2018), market income refers to the income of individuals or households before any state intervention.

[41] Results in Figure 19 and Figure E2 in the annex are not strictly comparable in levels. Since market income is scaled up and hence some profits are imputed to people with positive capital income, the market Gini coefficient increases with respect to the case without capital income. The market income GINI assuming that CIT is borne 50% by capital and 50% by labor is lower than the market Gini coefficient that 50% is borne by capital and 50% by labor. As mentioned in footnote 14 reallocation of labor from formal to informal labor is ignored in this last case.

Uruguay turn to have an equalizing tax system. The main driver of the change in results is the change in the assumptions that make the CIT and the payroll tax more progressive (CIT borne 100% on capital and payroll tax falls only on formal labor). In contrast, changing the assumption that the VAT rate is reduced in informal markets is not that strong as the above assumptions.

This discussion concentrated on the impact of taxation on income inequality, but the impact of tax policy on poverty is just as important for two reasons. First, the two results do not necessarily go in the same direction. In other words, an inequality-reducing tax system could be poverty-increasing. The impact of tax policy on poverty depends on the size, composition, and progressivity of tax revenues, but there is no fundamental equation analogous to the one for inequality impact that links tax policy and inequality. Secondly, there is usually a social reaction against tax reforms, which may be related to how these reforms impact the different socioeconomic groups, but mainly the poor and vulnerable. This aspect of tax reforms has been neglected by policy makers and should be contemplated at the reform planning stage to avoid worsening the income of the poor and vulnerable if possible. Many tax reforms were rejected by the public in recent years in Latin America.

We hence present the redistributive impact of tax policy on poverty, followed by a discussion of the extent to which the outcomes are related to specific taxes and assumptions on incidence.

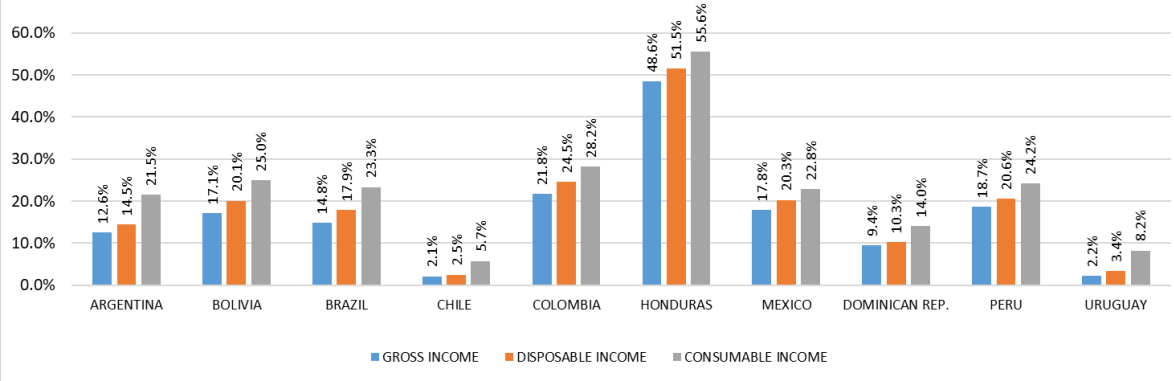
Even though the overall tax system could be equalizing in some countries, poverty increases after the action of the tax system for all of them, and to a substantial extent in most. Figure 20 shows how headcount poverty at the international PPP poverty line of US$5.5 a day increases by 6.4 percentage points on average, and most of the increase can be attributed to indirect taxes (Figure 20). It is also noteworthy, that in the alternative scenario assumptions, direct taxes also increase poverty because with integrated labor markets, informal labor shares the burden of taxation with lower informal wages. In fact, in all countries the poverty rate does not increase with the PIT; however, it increases with the CIT slightly (since 50% falls on labor) and increases on average in 1.4 percentage points with the integrated payroll tax. The countries with increases in poverty above the average (i.e. Argentina, Bolivia, Brazil, Colombia, Honduras and Mexico) are those with either high informality or high payroll taxation or both. On the other hand, the increase in poverty with the VAT under the assumption that the informal sales have a passthrough of 20% of the tax is of 3.4 percentage points, while assuming that the full amount of the VAT is saved in the informal market; poverty increases to 4.6%. So, a reasonable assumption about how much tax is passed to final sales in the informal sector of 20% reduces the increase in poverty in 1.2 percentage points. This difference is more important in countries which have less or no exemptions on food that is heavily consumed by the poor. In Bolivia with few exemptions, poverty increases in 2.9 percentage points less under full evasion of the VAT rather than with a pass-through of 20% of the VAT in informal markets. For Chile also with few exemptions, poverty increases in 1.7 percentage less under full VAT evasion. Countries such as Honduras, Dominican Republic, and Peru have food exemptions, but a high level of informality and hence poverty increases substantially more than the average increase of 1.2 percentage points. When using the squared poverty gap index to measure the impact of tax policy on poverty, the results show that fiscal policy in LAC increases poverty in all countries[42]. This result suggests that fiscal policy makes the poorest of the poor worse.

Again, these findings do not mean that informality should be fostered; rather the contrary, well targeted transfers or VAT rebates to the poor will be a much more efficient policy that

[42] Results are available upon request.

saves resources on the rich which are covered by the same exemptions and with a higher percentage of public funds.

Figure 20. Headcount poverty ratio at US$5.5 PPP a day poverty line for gross income, disposable income after direct taxes, and consumable income after indirect taxation



Notes: The incidence assumptions are: PIT falls on recipient of income, 50% of CIT falls on capital and 50% on labor, 50% of payroll taxation falls on formal wages and 50% on informal wages (segmented markets), and 20% of VAT falls on informal purchases.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

7. Conclusions

This study performed an incidence analysis on inequality for the main taxes in the region's tax systems.

The paper makes several unique contributions to literature on the inequality of taxation in Latin America. First, we significantly reduce comparability problems by analyzing 10 typical countries in the region with a common methodology, mostly with data from 2018. Second, by capturing nearly 86% of all taxes in the region, we provide a more comprehensive picture of the burden of taxation. One especially important inclusion was corporate income tax, which is rarely included in analyses of LAC but has higher receipts than PIT and a high redistributive impact. The paper showed the importance of considering the entire redistributive impact of both income taxes on inequality when benchmarking against more advanced countries. It also incorporates the full array of indirect taxes, including cascade taxes, which in several countries have a high burden and make the system much more regressive. Third, the paper develops alternative assumptions for the economic incidence of taxation. In particular, it allows for the effects of informality, which are pervasive in most countries in the region. Payroll taxes become more regressive when their incidence is assumed to fall also on wages of informal workers, but VAT becomes less regressive when individuals buy their groceries from the informal sector, which usually has a stronger presence in poorer neighborhoods or rural areas. Fourth, it calculates for the first time the burden of taxation by source and income decile for each country, comparable to the effort carried out by the Congressional Budget Office in the United States. It also estimates how each tax and total taxation affects the poor, much more than the way it affects inequality and sometimes in an opposite direction.

The most important results of this study indicate that although there is significant heterogeneity among the countries, tax systems tend to be unequalizing in some countries and slightly equalizing in others. These low redistributive impacts of taxes are due to various factors. First, several LAC countries collect relatively little in taxes, which limits the redistributive impact of progressive taxes. Second, in most countries the tax revenues collected have a higher share

of indirect taxes compared to developed countries. This reduces the redistributive impact of taxes, since indirect taxes tend to be mostly regressive, even in informal settings. Third, the countries in the region collect relatively little personal income tax, although they partly compensate for this with the corporate income tax. Both are highly progressive taxes and, taken together, are also quite redistributive in the region. Overall, the impact on inequality and poverty of direct taxes suffers from the effect of payroll taxation that is relatively high in LAC and tends to make them less progressive and poverty increasing. Fourth, tax expenditure and tax evasion are quite regressive for income taxes, while for indirect taxes, tax expenditures in the form of exemptions or reduced rates for a basket of goods that are mostly included in the poor's budget are pro-rich but do improve income redistribution by increasing the consumable income of the lowest deciles. In sum, under the most plausible assumptions about informality, which are based on available evidence on their incidence and on matching this study's average tax rates to the real tax rates, this study finds that the poor are heavily taxed and that, except for in a few countries whose tax systems are equalizing, the poor end up paying more with respect to their gross income than the rich, making the overall system neutral or regressive and unequalizing.

There is scope for improving tax policy to increase the redistributive impacts of tax systems in Latin America. Possible improvements include reducing the evasion of direct taxes and targeting tax expenditures better. Additionally, two measures that have the potential to reduce inequality have been proposed and analyzed. One measure consists of eliminating VAT exemptions and reimbursing lower-income households for VAT they actually paid. It was shown that this measure would reduce the burden of this tax on poor households, thus reducing the regressivity and the impoverishment of VAT[43]. Another measure that could have a high redistributive impact and at the same time reduce labor informality are tax credits for the labor income of low-income households[44]. These measures will also counteract the significant increase in poverty caused by excessive indirect and payroll taxes on the poor. Contrary to many proposals that call for a reduction of the income threshold for the PIT to increase its redistributive capacity; this comprehensive and integrated analysis shows first that with the current tax structure and incidence, this will increase tax pressure on middle to lower deciles that are at minimum vulnerable and who are heavily taxed in most countries. Second, in a large part, income tax from dividends is already taxed at higher rates than the OECD by the CIT.

Finally, it is important to remember that reducing income inequality and poverty is generally only one of governments' many policy objectives. Policies aimed at reducing inequality and poverty can sometimes lead to reductions in the efficiency of resource allocation in the economy, which can end up affecting productivity and growth. It is thus important to always consider how progressive tax policies might affect efficiency. Likewise, these results should be interpreted with caution, since more taxation allows more redistributive spending and has also allowed some taxes even to become progressive after transfers. It is also important to remember that for income inequality, taxes are not the only things that matter; direct and indirect transfers made by the government through public spending do as well. The correct approach is therefore to analyze the redistributive impacts of the net fiscal system, that is, the joint effect of taxes and transfers on inequality. Taxes that increase inequality but generate resources to finance redistributive spending may be desirable, especially if the effects on efficiency are small. This may be the case for many indirect taxes, which, although regressive, can help finance programs that reduce inequality and poverty. But for a given level of public

[43] See for example Hall and Rabushka (1983), Correia (2010), Barreix, Bès, and Roca (2010), Godbout and St.-Cerny, (2011), and Izquierdo and Pessino (2020).

[44] See Pessino et al (2021).

expenditure, it always improves welfare to have a more redistributive and efficient tax system that also avoids further impoverishment, which is what this paper aims to highlight.

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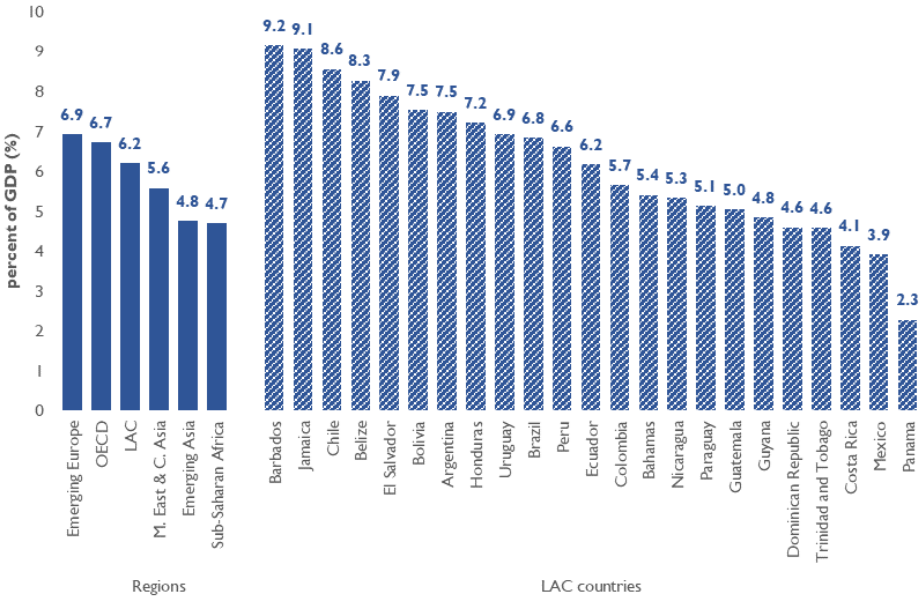
ANNEXES

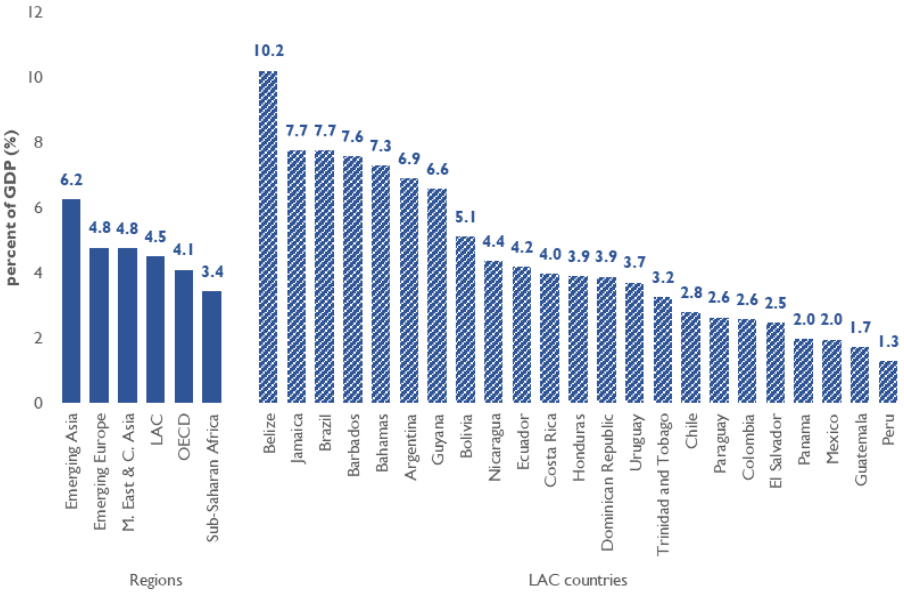
Annex A. Revenue from the main taxes, by country

Figure A.1 VAT revenue 2018



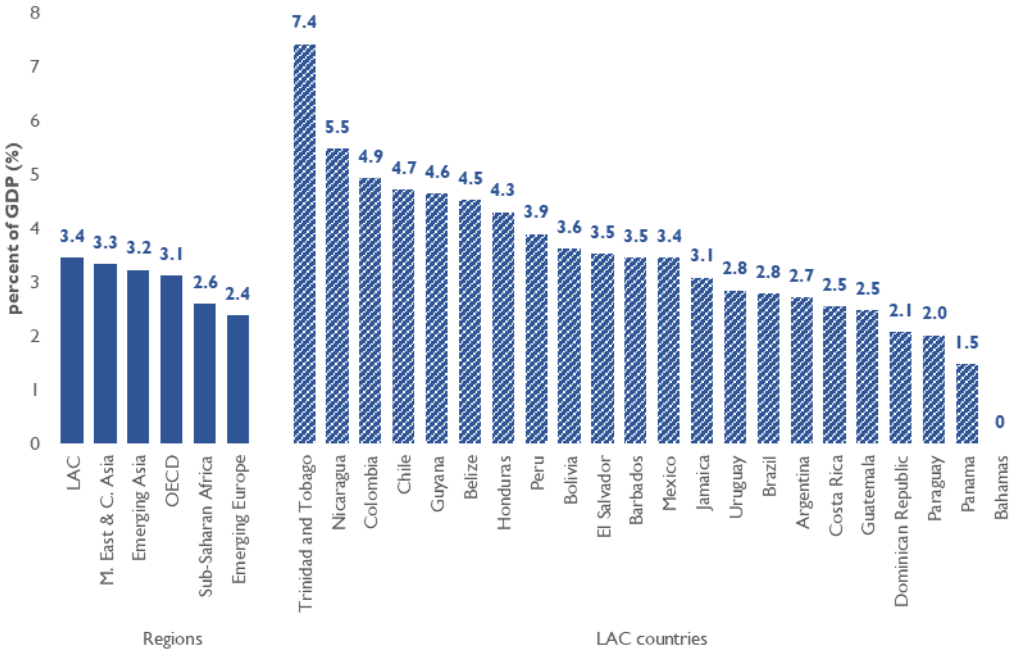
Source: Prepared by the authors based on Revenue Statistics (OECD).

Figure A.2. Revenue from other indirect taxes in 2018



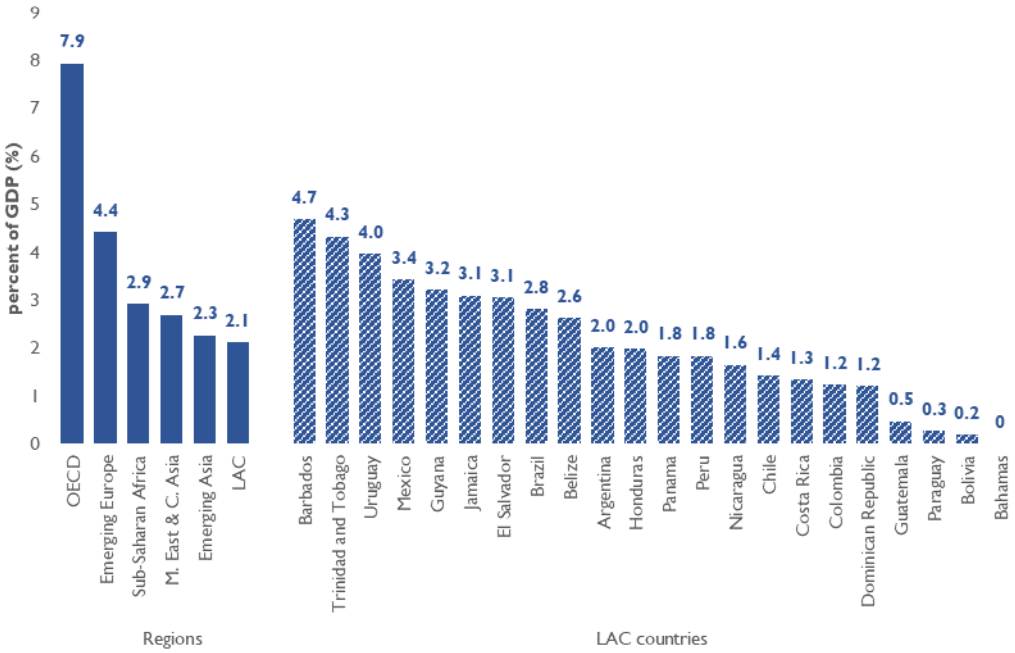
Source: Prepared by the authors based on Revenue Statistics (OECD).

Figure A.3. Revenue from corporate income tax in 2018



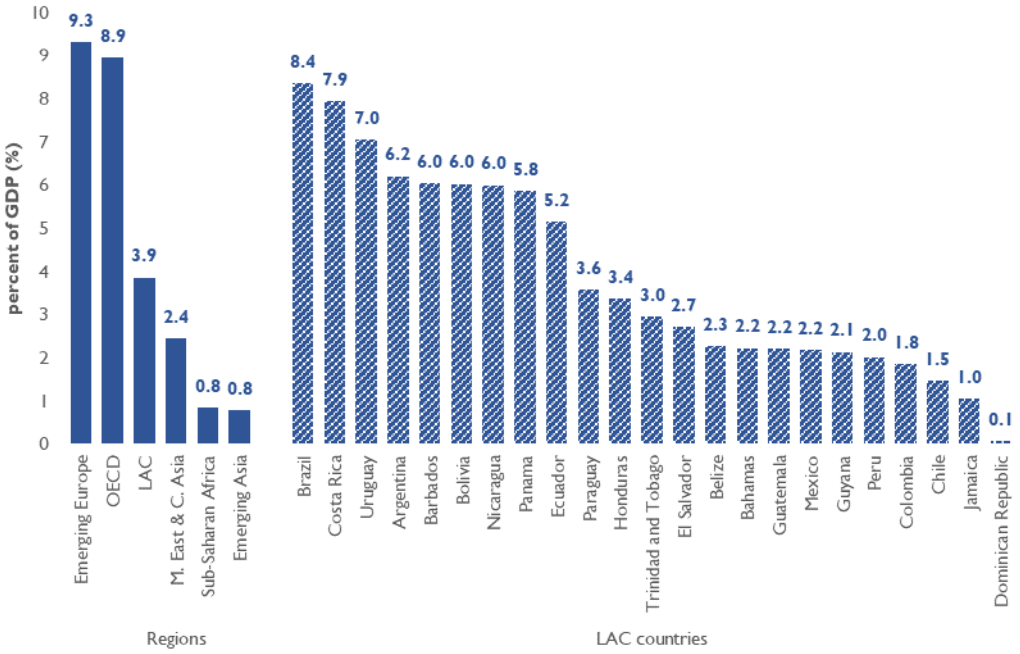
Source: Prepared by the authors based on Revenue Statistics (OECD).

Figure A.4. Revenue from personal income tax in 2018



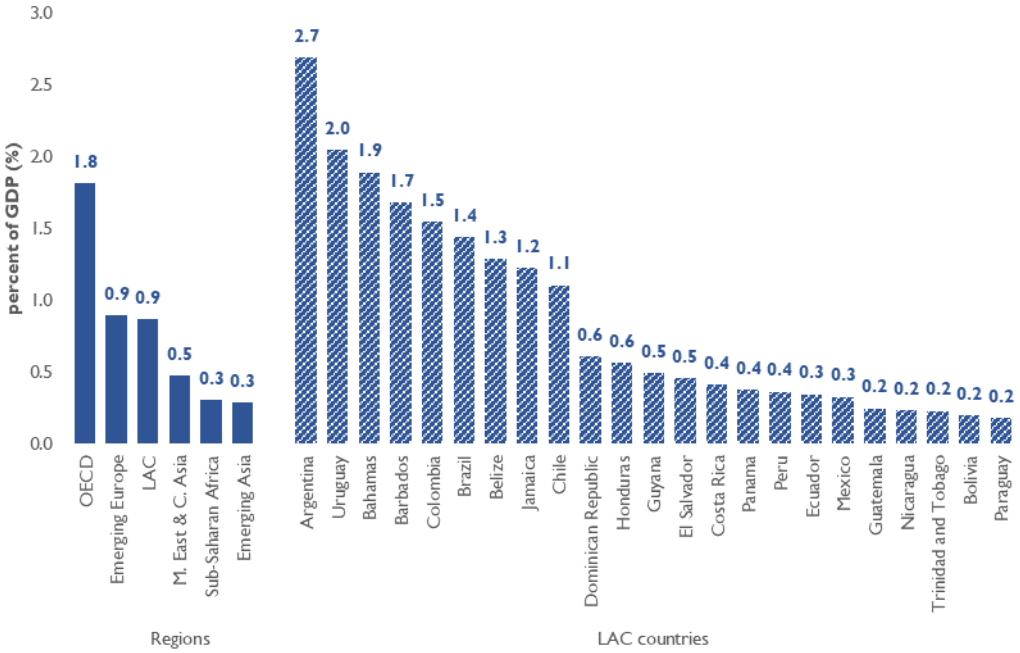
Source: Prepared by the authors based on Revenue Statistics (OECD).

Figure A.5. Revenue from social security contributions in 2018



Source: Prepared by the authors based on Revenue Statistics (OECD).

Figure A.6. Revenue from property taxes in 2018



Source: Prepared by the authors based on Revenue Statistics (OECD).

Annex B. Integrated corporate income tax rates, Latin America versus European OECD countries.

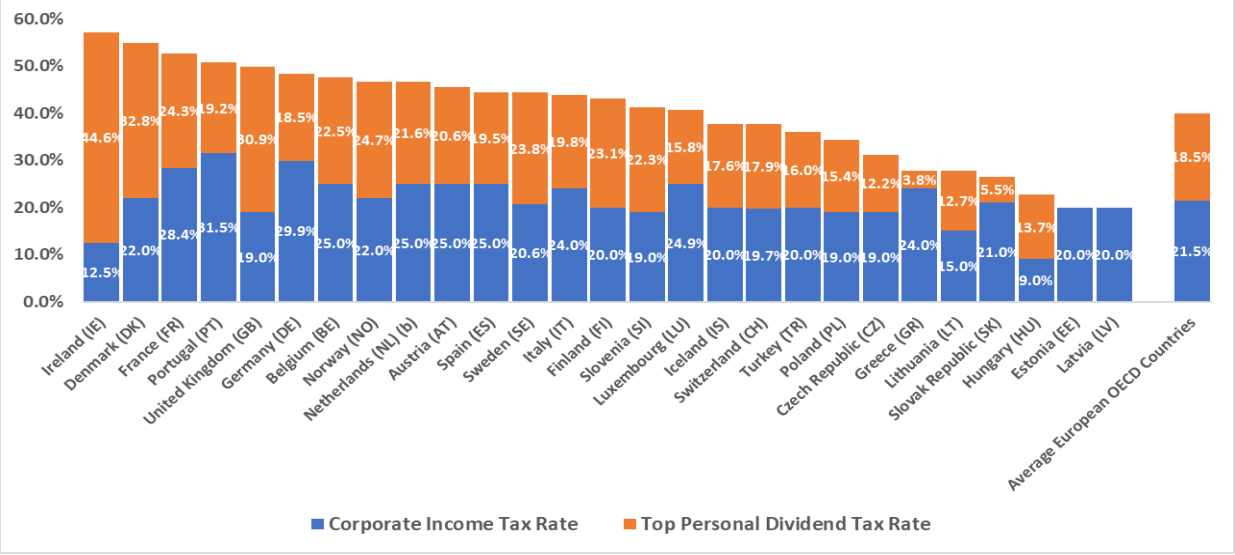
To highlight the importance of including the incidence of corporate income taxes together with personal income tax in fiscal incidence analyses, below we compare the integrated corporate income tax rates—which include taxes on dividends—for Latin American countries and European OECD countries.

A business pays corporate income tax on its profits and distributes dividends from after tax-profits. Shareholders then pay their layer of personal income tax on those dividends. The integrated tax rate on corporate income reflects both the corporate income tax and the dividends tax —the total dividends tax levied on corporate income (Bunn, 2022).

As an example, suppose that a Peruvian corporation earns a profit of $100. It must pay a corporate income tax of $29.5, which leaves the corporation with $70.5 in after-tax profits. If the corporation distributes those earnings as dividends, the income is taxed again at the individual level at a top dividend rate of 5% percent, resulting in $3.5 in dividend taxes. Thus, integrated tax on corporate profits is $33, implying that the $100 in original corporate profits is taxed at an integrated rate of 33 percent (Figure B.1). Bunn (2022) includes an example from Italy, a country largely representative of most European OECD countries. Italy's corporate tax rate is 24%, which is lower than Peruvian and most LAC countries rates, while after-tax profits distributed as dividends are taxed at 26%, which is five times higher than the Peruvian rate and almost three times higher than the LAC average (Figure B.2).

As explained in the main text, the average integrated tax, including the CIT and the tax on dividends at the personal level, is about 40% in the European OECD countries, a rate split almost evenly between the PIT and CIT. We estimated that the same average integrated tax rate in 17 Latin American countries is somewhat lower than in OECD Europe, at about 33%, but is split quite differently in favor of the CIT. The CIT accounts for 83% of the integrated tax rate and the PIT only 17%.

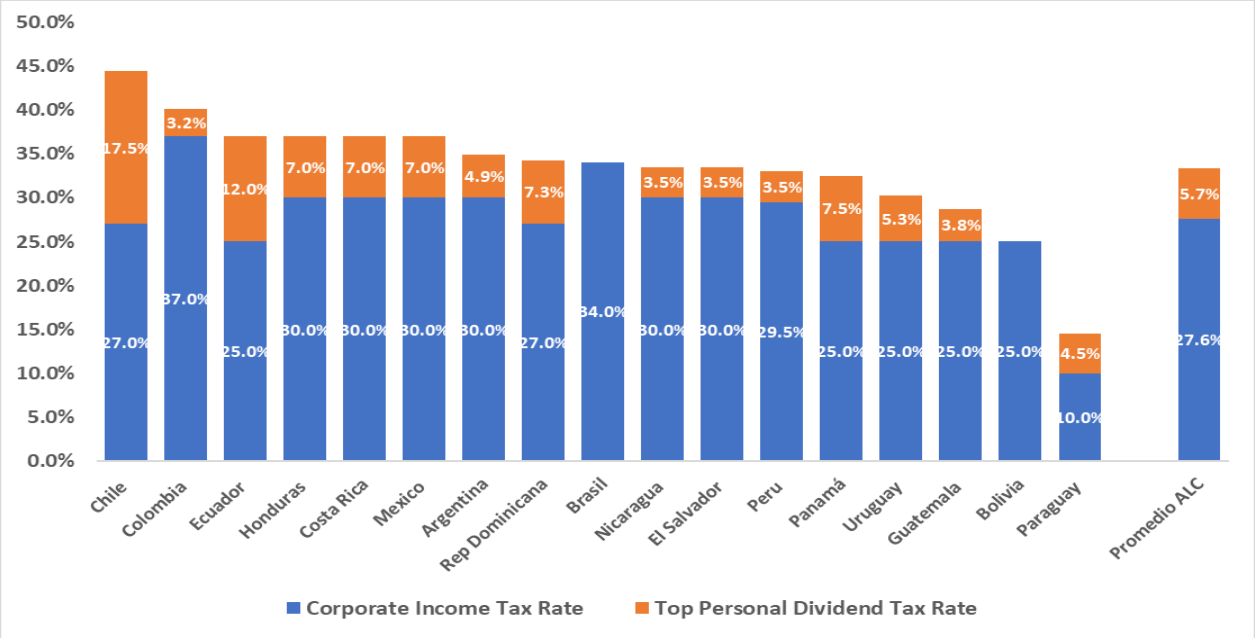
Figure B.1 Integrated tax on corporate income (dividends) 2021, European OECD countries



Notes: Integrated tax rates are calculated as follows: (Corporate Income Tax) + [(Distributed Profit – Corporate Income Tax) * Top Personal Dividend Tax Rate].

Source: Prepared by the authors based on data from the Tax Foundation and the OECD Tax Database.

Figure B.2. Integrated tax on corporate income (dividends) 2021, Latin American countries

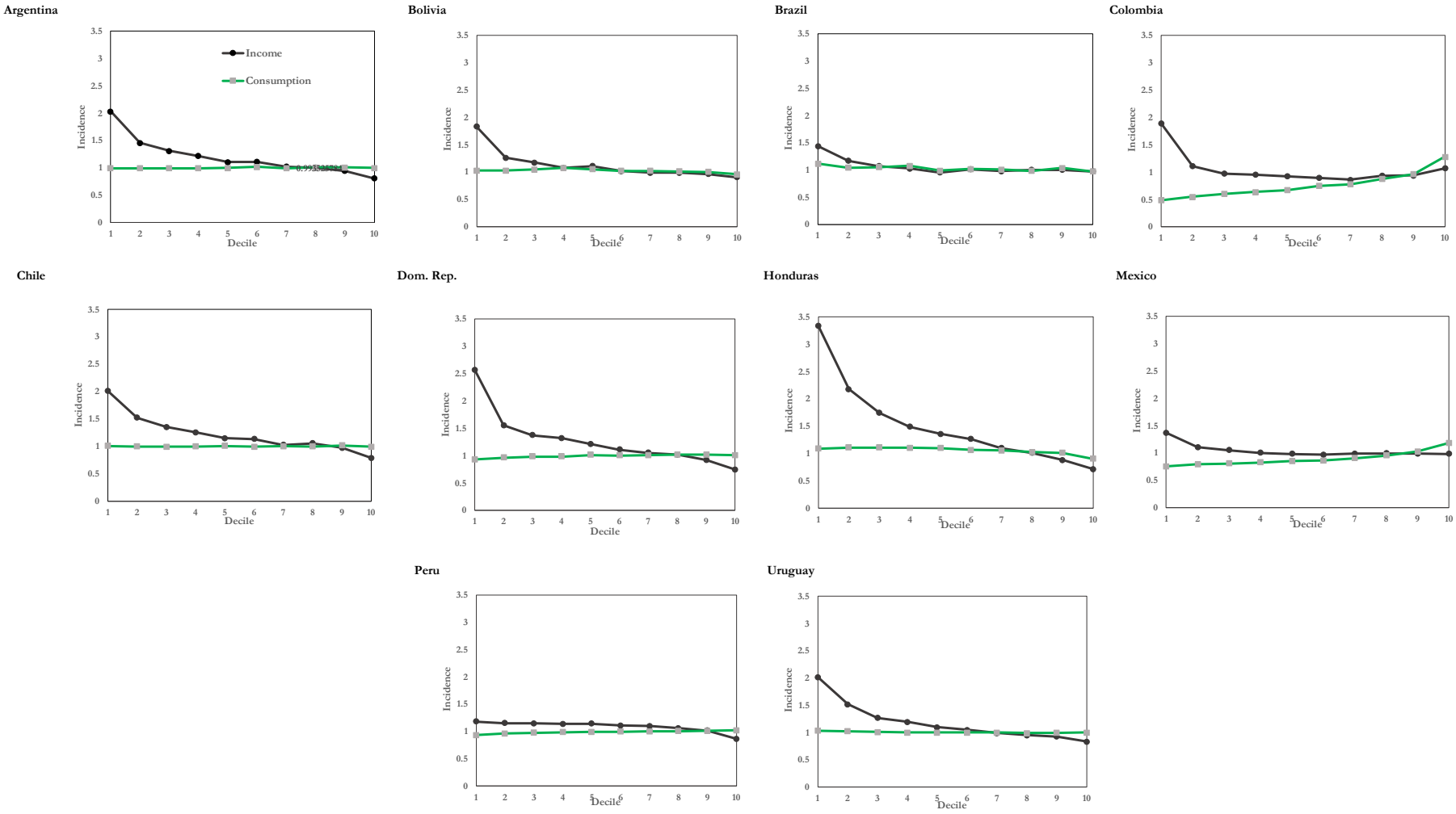


Notes: Integrated tax rates are calculated as follows: (Corporate Income Tax) + [(Distributed Profit – Corporate Income Tax) * Top Personal Dividend Tax Rate].

Source: Prepared by the authors based on data collected from ministries of finance in the respective countries and OECD Tax Database

Annex C. Comparison of Incidence of VAT, ordered by disposable income or consumption deciles.

Figure C.1. Relative tax pressure from VAT by the share on income of the decile



Notes: Tax pressure is measured by the ratio of the share of total VAT paid by decile with respect to total taxation by the share of the income or the consumption of the decile in total income or consumption.

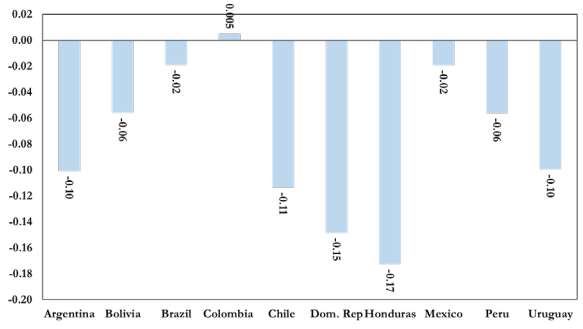
Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

Figure C.1 graphs the relative tax pressure from VAT for the different countries in the sample.[45] To better understand the redistributive impact of VAT, we analyze how the burden of this tax is distributed among the different income and consumption deciles, in this case ordered by disposable income. A very high incidence of VAT is usually seen in the first deciles, and this burden then decreases somewhat steadily with income. This result is mainly a consequence of the fact that poor households allocate practically all of their income to consumption, while households with higher incomes have savings capacity, so consumption represents a smaller fraction of their income. This high regressivity of the tax tends to disappear when households are ordered by level of consumption. In this case, the pressure from VAT tends to be relatively proportional, and in some cases, such as Colombia and to a lesser extent Mexico, the tax is clearly progressive.

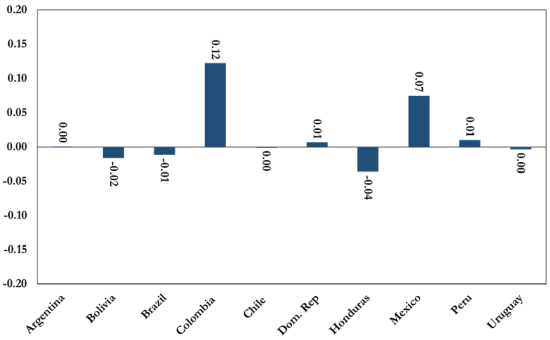
Figure C.2 shows the Kakwani indexes for the different countries. When the Kakwani index is calculated by ordering households according to their income levels, we see negative values for almost all countries, meaning that the VAT is a regressive tax. However, when we order households based on consumption, the Kakwani index acquires values close to zero for most countries, and even is positive in some cases (Colombia and Mexico), which reflects a relatively neutral tax.

Figure C.2. Distributional incidence of VAT. Kakwani index

(a) Income



(b) Consumption



Source: Prepared by the authors based on data from household consumption surveys from different countries.

[45] We calculate tax pressure as the ratio of the share of a decile of income in the total taxes paid and the share of the decile in income or consumption.

Annex D. Allocation methods for imputing incidence of Indirect taxes

The burden of indirect taxes is assumed to fall entirely on the consumer in the form of higher prices. But the step of allocating indirect taxes is complicated by the fact that an alternative to income surveys is usually needed to impute the value of the taxes paid.

In our sample of 10 countries, we used two different allocation methods based whether individual consumption of goods and services is included or not in income surveys.

For Mexico, Perú, and the Dominican Republic, the primary income survey included consumption expenditures and income sources for each observation, so we allocated indirect taxes through imputation. For imputing consumption taxes, there is data on items consumed and the taxes paid on each item. However, in the remaining countries (Argentina, Bolivia, Brazil, Chile, Colombia, Honduras, and Uruguay), the main survey lacks the consumption information needed to directly impute the value of indirect taxes paid, so we use an alternative to determine the distribution of taxes. One method is to estimate the distribution of taxes by income quantile (for example, percentile) in the alternate survey and assign the average benefit within each quantile from the alternate survey to individuals in the same quantile in the main survey (Lustig. 2018).

Consumption expenditure records in household expenditure surveys include expenditure in indirect taxes, so with external legal or effective tax rates data, we can extract the proportion of total consumption that is indirect tax expenditure. This allows us to create the consumable income concept by subtracting the loss in purchasing power due to these taxes from disposable income. In the case of VAT, for example, the process starts by grouping consumption expenditures by the statutory VAT rate charged for each consumption item (general, reduced, zero rate, or exempted). We then adjust the consumption expenditure in the survey to reflects the pre-tax price. If G_x^f is the expenditure on good "f" including the tax, and $t_{imp.\,ind}$ is the statutory rate for good "f", then the spending net of tax on good "f," which we represent as G_x, is:

$$G_x = \frac{G_x^f}{\left(1 + t_{imp.\,ind}\right)}$$

Then, we apply the statutory VAT rates to the adjusted expenditure (G_x) to estimate each household's VAT payment.

When we use information from an alternative survey, the allocation process involves one additional step: matching observations between the main and alternative survey to assign the indirect tax payments. This matching process requires defining two key parameters: 1) The variables that will be used to match observations between surveys and 2) the value to be assigned in the matching process. As matching variables, we decided to use the region of residence and the decile of per capita disposable income as recorded in the survey, which is equal to raw per capita disposable income46. We made this choice because the same variable was available and consistently estimated in both surveys[47].

In terms of values to be matched, we decided to use percentage of total tax paid with respect to disposable per capita income for each combination of region of residence and decile of disposable per capita income. Note that using consumption alone as the welfare measure in the denominator (as some of the incidence literature does) overestimates the tax rate on

[46] The raw disposable income variable recorded in both surveys is net of direct taxes for the wage employed but includes direct taxes for the self-employed. Since we end up adjusting this raw disposable income to get our correct measure of disposable income net of all direct taxes.

[47] Honduras did not have a region of residence variable, so we used just the centiles of the value in the survey of disposable per capita income.

higher deciles, since savings increase with income, distorting the incidence of the tax towards more progressivity.

CORRECTION FOR INFORMALITY OF VAT TAXES PAID

Due to tax evasion or informality, which are widespread in Latin America, consumers who purchase from informal sellers (for example, street vendors, farmers' markets, and so on) might not directly pay indirect taxes. Rajemison, Haggblade, and Younger (2003) show that using statutory rates can overestimate the impact of indirect taxes on incomes. Where estimates are available or can be calculated, effective tax rates reflecting the rates actually paid should be used, rather than the legal rates, which overestimate actual collection of indirect taxes.

But even if these consumers might not directly pay indirect (consumption) taxes, they presumably paid indirect taxes on inputs. Hence, an input-output table should be used. Goods that are exempt from consumption taxes should also include the indirect effects of indirect taxes on inputs, again computed using an input-output table. Only zero-rated goods can be assumed to involve no indirect taxes, since producers are reimbursed for any taxes paid on their inputs.

To account for tax evasion, we adapt the methodology applied by Bachas et al (2020) for all countries where information on place of purchase is available. We assume that consumers at informal stores pay a portion of the corresponding rate, not the full rate. In our baseline scenario, this proportion is 20%, but we also simulate for other percentages of tax paid, from 0% to 100%.

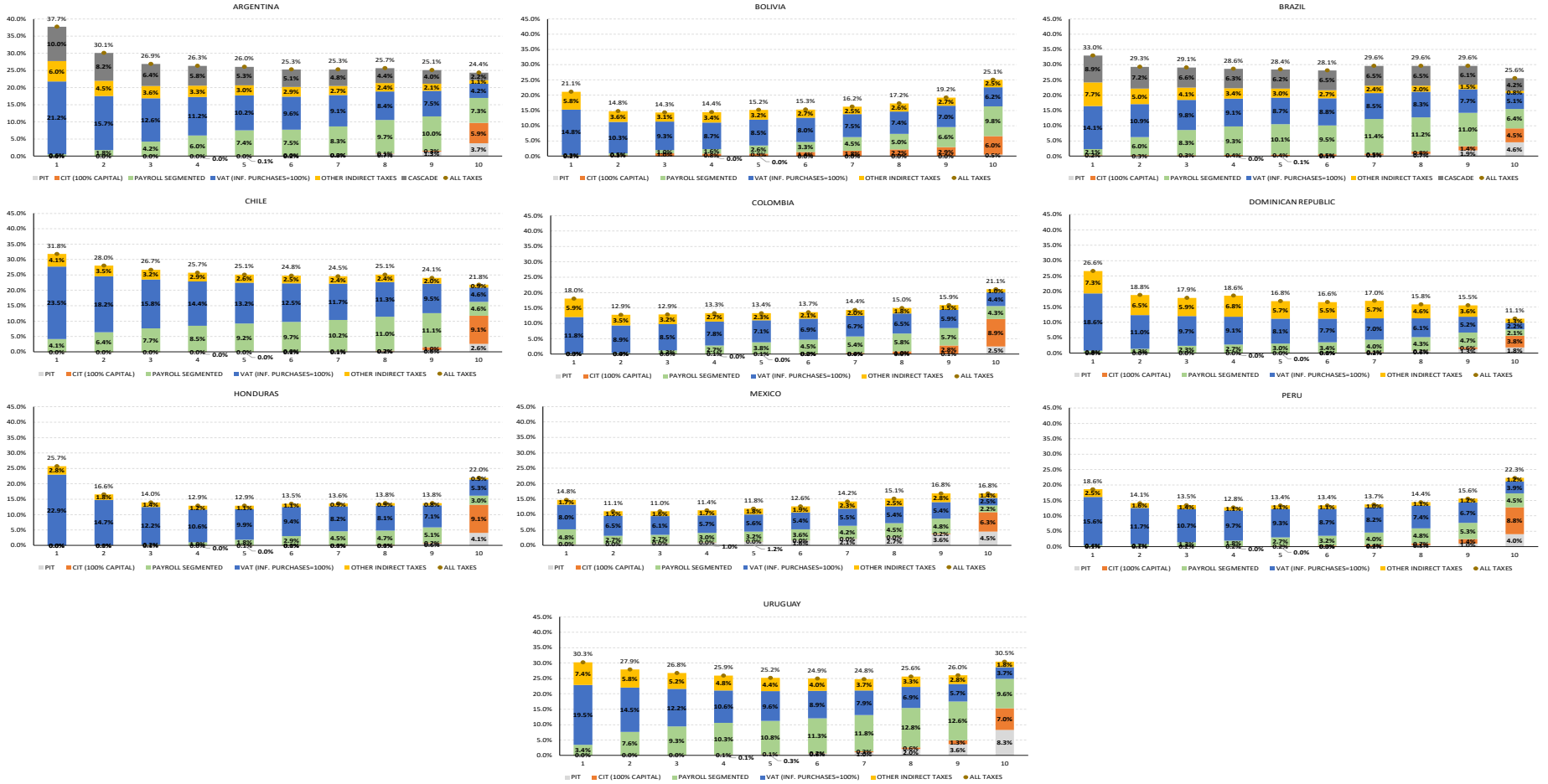
For Brazil and Honduras, where information on place of purchases was not available, we adjusted incidence for tax evasion using the estimated evasion in similar countries[48]. Once we estimated the average tax evasion ratio, we adjusted the incidence of VAT by multiplying each country's estimated incidence (without informality correction) by the previously defined tax evasion ratio. In the case of Brazil, the selected countries were Argentina, Chile, and Uruguay, while in Honduras, we used the Dominican Republic, Colombia, and Mexico as countries to calculate the average tax evasion ratio.

Finally, cascading taxes were also adjusted for informality, assuming the same percentage as was estimated for informal purchases in the VAT for Argentina and Brazil.

[48] For these two countries, we defined tax evasion as the average in similar countries of the ratios of incidence of VAT when informal purchases pay 20% of the corresponding rate to incidence of VAT when informal purchases pay 100% of the corresponding rate (no evasion).

Annex E. Comparison of Incidence of VAT, ordered by disposable income or consumption deciles.

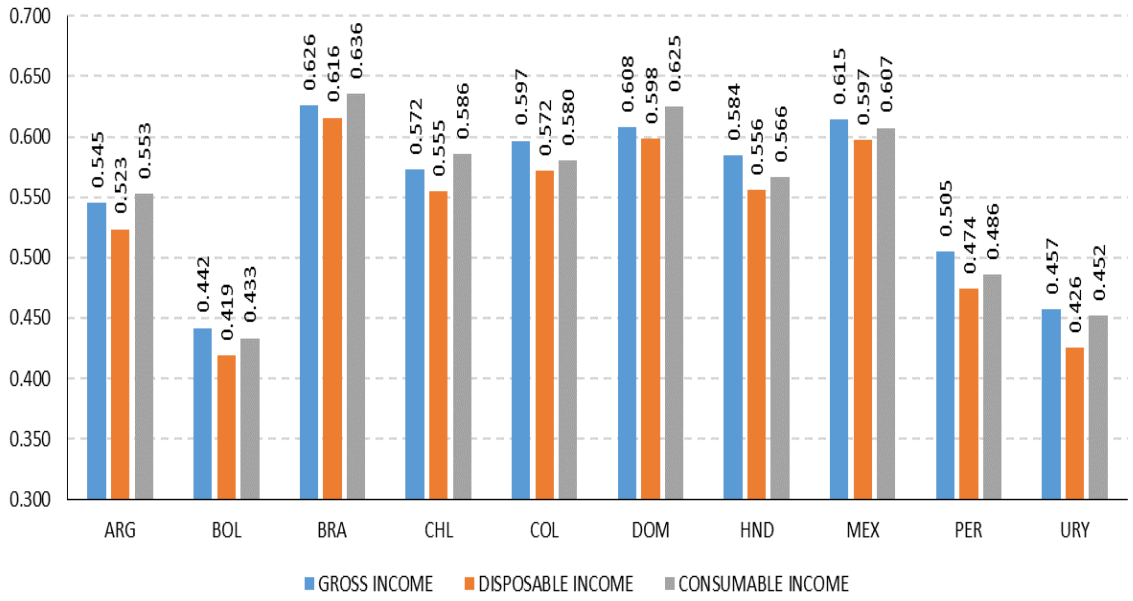
Figure E.1. Average tax burden, by tax source and gross income deciles



Notes: The incidence assumptions are that PIT falls on recipients of income, 100% of CIT falls on capital, payroll taxation falls on formal labor (segmented markets), and indirect taxes (VAT and cascade taxes) are not evaded in informal markets, so everybody pays 100% of the VAT tax rate for a particular product.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

Figure E.2. Gini coefficients for gross income, disposable income after direct taxation, and consumable income after indirect taxation



Notes: The incidence assumptions are that PIT falls on recipients of income, 100% of CIT falls on capital, payroll taxation falls on formal labor (segmented markets), and indirect taxes (VAT and cascade taxes) are not evaded in informal markets, so everybody pays 100% of the VAT tax rate for a particular product.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.

Table E1. Poverty rates (USD 5.5 2011 PPP a day) after each tax and for gross income, disposable income after direct taxation, and consumable income after indirect taxation.

INTERVENTION	ARGENTINA	BOLIVIA	BRAZIL	CHILE	COLOMBIA	HONDURAS	MEXICO	DOMINICAN REP.	PERU	URUGUAY
USD 5.5 2011 PPP										
GROSS INCOME Alternative Scenari	**12.6%**	**17.1%**	**14.8%**	**2.1%**	**21.8%**	**48.6%**	**17.8%**	**9.4%**	**18.7%**	**2.2%**
- PIT	12.6%	17.1%	14.8%	2.1%	21.8%	48.6%	18.0%	9.4%	18.7%	2.2%
- CIT (50% CAPITAL 50% LABOR)	12.9%	17.2%	15.6%	2.1%	22.4%	49.0%	18.8%	10.0%	19.1%	2.3%
- PAYROLL INTEGRATED	14.2%	19.1%	17.4%	2.4%	23.4%	50.3%	19.4%	10.0%	19.9%	3.2%
DISPOSABLE INCOME	**14.5%**	**20.1%**	**17.9%**	**2.5%**	**24.5%**	**51.5%**	**20.3%**	**10.3%**	**20.6%**	**3.4%**
- VAT (All taxed)	18.7%	29.2%	20.9%	7.1%	27.3%	56.5%	23.2%	14.1%	26.2%	8.1%
- VAT (Informal PT=50%)	18.2%	23.3%	20.4%	5.0%	27.1%	55.1%	22.3%	12.3%	23.7%	6.4%
- VAT (Informal PT=20%)	18.3%	26.1%	20.5%	5.4%	27.2%	55.3%	22.8%	13.0%	24.1%	7.0%
- VAT (Informal PT=0%)	17.6%	21.7%	20.0%	4.6%	26.7%	54.3%	21.8%	12.0%	23.4%	6.0%
- EXCISE	15.1%	20.8%	18.9%	2.7%	25.3%	51.5%	20.6%	11.2%	21.0%	3.9%
- IMPORT	14.8%	20.6%	18.1%	2.5%	24.8%	51.9%	20.4%	10.6%	20.8%	3.6%
- CASCADE	16.5%		19.6%							
CONSUMABLE INCOME	**21.5%**	**25.0%**	**23.3%**	**5.7%**	**28.2%**	**55.6%**	**22.8%**	**14.0%**	**24.2%**	**8.2%**
GROSS INCOME Baseline Scenario	**16.5%**	**20.5%**	**17.4%**	**2.6%**	**28.3%**	**51.8%**	**24.0%**	**12.9%**	**22.8%**	**3.1%**
- PIT	16.5%	20.5%	17.4%	2.6%	28.3%	51.8%	24.4%	12.9%	22.8%	3.1%
- CIT (100% CAPITAL)	16.5%	21.1%	17.5%	2.6%	28.3%	51.9%	24.0%	12.9%	22.9%	3.1%
- PAYROLL SEGMENTED	17.1%	20.8%	19.5%	2.9%	28.9%	53.0%	25.3%	13.4%	23.3%	3.3%
DISPOSABLE INCOME	**17.1%**	**21.5%**	**19.6%**	**2.9%**	**29.0%**	**53.1%**	**25.8%**	**13.4%**	**23.3%**	**3.3%**

Notes: The poverty rates are calculated in the first panel under the alternative scenario and in the lower panel for the baseline scenario.

Source: Authors' calculation based on data from household surveys and administrative tax data from different countries.