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Tax Equity in Low- and Middle-Income Countries

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Income inequality is high in developing countries and has either stagnated or increased over the past 30 years. Recent estimates from Africa show that, at the regional level, the share of pre-tax income of the top 10 percent is close to 55 percent (Chancel et al. 2023); similarly high levels of inequality are found in large developing countries for which data are available, including Brazil at 58 percent, China at 43 percent, India at 57 percent, and Indonesia at 47 percent (World Inequality Database at https://wid.world/). These levels are comparable to or higher than those observed in the United States, a developed country commonly described as highly unequal, where the share of pre-tax income of the top 10 percent was 46 percent in 2021.

This paper asks what role taxation can or might play in reducing high levels of inequality in low- and middle-income countries. Are policy instruments like the personal income tax or value-added tax used in similar ways as in high-income countries, and if so, do they have comparable distributional effects? Alternatively, do specific features of the economic structure of developing countries dilute, or

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even reverse, the redistributive effects of tax instruments that are commonly considered to be progressive or regressive? If so, how should we rethink tax design over the development path?

Hard Times: Challenges of Progressive Taxation in Low- and Middle-Income Countries

When considering the equity effects of a tax system, economists and policymakers typically want to know three key features about who pays taxes. First, the *statutory incidence* describes the taxes legally enacted by the government, and thus who might be expected to pay taxes directly. For example, many countries implement a personal income tax with statutory marginal tax rates that increase with income—such that the statutory tax burden is higher for more well-off individuals. Second, the possibility of tax evasion (or avoidance) means that the *de facto incidence* of who actually pays taxes will differ from the statutory incidence. The ability (and willingness) to evade taxes will often differ between individuals. For example, well-off individuals may have access to sophisticated evasion or avoidance techniques; this would lower their de facto tax burden (how much in taxes they actually pay) and, if such techniques are less available to those with lower income, reduce the progressivity of the tax system (because the difference in actual tax burdens between rich and poor will be smaller than the difference in statutory tax burdens). Third, the *economic incidence* of taxes refers to the fact that market prices respond to taxes, potentially shifting the burden of taxation away from the agents who remit taxes to those who trade with them. An obvious example is that while a sales tax or a value-added tax is collected from firms, the burden of such taxes is often (at least partially) passed along to consumers in the form of higher prices.[1] As we shall see below, individuals who differ in income also often differ in their market behavior; this, in turn, provides the channel through which economic incidence has equity impacts.

These three features determine the equity effects of a tax system, as they change the distribution of income "pre-tax" versus "post-tax." While this dimension of equity is the focus of our article, it is important to note that additional equity impacts will also occur when the government spends the collected taxes on public goods and services—which changes the distribution of income "post-tax, pre-transfer" versus "post-tax, post-transfer."[2]

[1] The most commonly implemented indirect tax around the world is the value-added tax, which levies a specified tax rate on the value-added created at each step of the production chain (including at the retail stage where products are sold to consumers). There is no value-added tax in the United States, where subnational governments implement general sales taxes levied at the retail stage. Most of the evidence on indirect taxes in this paper is based on studies of the value-added tax, but the main intuitions for the distributional impacts of an indirect tax would carry over to a setting with a retail sales tax (under certain assumptions).

[2] Reviewing this dimension of equity lies beyond the scope of this article. See, for example, the work by Commitment to Equity (Lustig 2022).

The distinction between statutory and economic incidence has a long history in public finance, but the concept of de facto incidence has received less attention. This may be because researchers and policymakers in high-income countries often assume (at least implicitly) that most agents who should pay taxes do so (an optimistic assumption, see Slemrod 2007). However, the assumption that tax evasion can be neglected clearly does not hold in low- and middle-income countries, making the concept of de facto incidence important in these settings. We return to it frequently throughout this article.

In the context of low- and middle-income countries, it is possible to document the statutory incidence of tax policies by using databases compiled by international organizations and researchers (these are discussed further below, but for a comprehensive overview, see Lustig 2022). However, evidence from low- and middle-income countries suggests that de facto incidence differs substantially from statutory incidence for both obvious and subtle reasons. Moreover, with few exceptions, work in low- and middle-income countries has little to say about economic incidence—with most papers dealing with the issue through implicit or explicit assumptions.[3] These assumptions are sometimes necessary to make progress, but they can still be problematic: numerous studies in high-income countries show that statutory and economic incidence often differ substantially (for example, Chetty, Looney, and Kroft 2009).

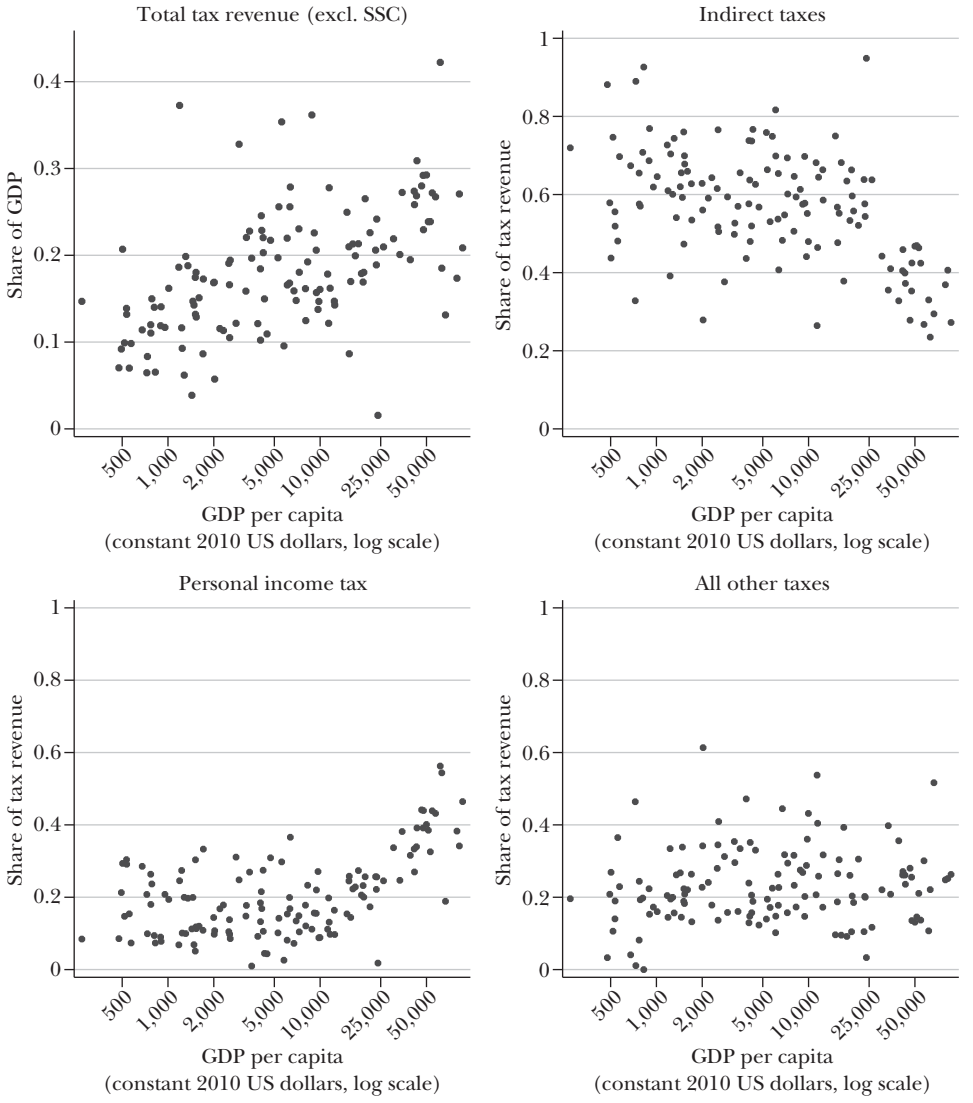
To set the stage for our discussion, Figure 1 plots countries' tax characteristics as a function of their development level, for which we use GDP per capita as a proxy. Table 1 presents averages by country income groups. The data includes the 132 countries with a population above one million inhabitants and whose revenue from oil and gas does not exceed one-third of their GDP (because public finance in countries with a high ratio of oil sales/GDP presents different conceptual issues). These countries account for 93 percent of the world's population.

Panel A considers how the total share of GDP collected in taxes evolves from lower-income to higher-income countries. The measure of total taxes to GDP shown here excludes social security contributions and payroll taxes, which have their own logic outside of redistribution concerns. Total taxes collected, expressed as a share of GDP, increase with economic development. Explaining this evolution, first noted by German economist Adolph Wagner (1835–1917), is beyond the scope of this paper. From an equity perspective, however, we expect governments in low-income countries that collect roughly 10 percent of GDP in taxes to have much less scope to redistribute through taxation than governments in the highest-income countries, where the share of GDP collected in taxes is often closer to 30 percent.

In Panels B, C, and D, these tax ratios are separated into three groups: (1) personal income tax; (2) indirect taxes which include the value-added-tax, sales taxes, excises, and tariffs revenue; (3) all other taxes, whose main components are corporate income taxes, property, and wealth taxes. Two key patterns emerge here.

[3] Shah and Whalley (1991) review earlier work on tax incidence considerations in developing countries.

Figure 1
Tax Systems across the Development Path



Source: Data for 2018 from Bachas et al. (2022), who collect these from various sources including individual countries' government archives, OECD, and UNU WIDER/ICDT.
Notes: Total tax revenues exclude social security contributions (SSC), but include personal income taxes, value-added taxes, other indirect taxes, and all other taxes are as a share of total tax revenues. Sample includes the 132 countries with a population above one million inhabitants and whose revenue from oil and gas does not exceed one-third of GDP (Data on oil and gas production from Ross and Madhavi 2015). The countries represented correspond to 93 percent of the world's population. The tax ratios then are separated into three groups: (1) personal income tax; (2) indirect taxes which include the value-added-tax, sales taxes, excises, and tariffs revenue; (3) all other taxes whose main components are corporate income taxes, property, and wealth taxes.

Table 1
Tax Systems and Informality by Country Income Group

	Tax revenue (excl. social security contributions)	*Personal income tax share*	*Indirect tax share*	*Other taxes share*	*Self-employment*	*Informal consumption*
Low income	11.0	17.0	64.9	18	81.2	85.7
Lower-middle income	16.7	15.9	59.8	24.3	58.3	64.8
Upper-middle income	19.1	15.3	58.4	26.2	33.8	30.4
High income	22.1	29.8	48.4	21.8	16.1	11.5

Source: Each number corresponds to an average across countries in a given income group, using the country income classification defined by the World Bank for 2018.
Note: Tax revenues taxes to GDP includes all sources of tax revenue but excludes social security contributions and payroll taxes. The tax ratios then are separated into three groups: (1) personal income tax; (2) indirect taxes which include VAT, sales taxes, excises, and tariffs revenue; (3) all other taxes whose main components are corporate income taxes, property, and wealth taxes. The two proxies for the size of the informal sector are the share of traditional consumption in total consumption and the share of self-employment in the active workforce population. We obtain the tax revenue variables from Bachas et al. (2022), who collect these from various sources including OECD and UNU WIDER/ICDT. These are for the year 2018, for the 132 countries with a population above one million inhabitants and whose revenue from oil and gas does not exceed a third of GDP (data on oil and gas production from Ross and Madhavi 2015). These countries account for 93 percent of the world's population. The data on informal consumption are taken from Bachas, Gadenne, and Jensen (2023a), for 32 LMICs based on expenditure surveys and places of purchase where the consumption occurred. The data on the share of self-employed workers is from the ILO for the same year and set of countries as the tax data. The four income groups are High income countries (HICs), with per capita GDP above $13,000, Upper-Middle income countries (UMICs), with GDP per capita between $4,000 and $13,000, Lower-Middle income countries (LMICs), with GDP per capita between $1,300 and $4,000, and Lower-income countries, with GDP per capita below $1,300.

First, the share of indirect taxes in total taxes decreases with economic development. Low-income countries raise a much larger share of their revenues by means of indirect taxes than high-income countries (65 versus 48 percent).[4] Second, a substitution in the tax mix occurs as per capita GDP rises: the share of indirect taxes declines and the share of personal income taxes rises. This increase in the personal income tax is particularly prevalent at higher levels of economic development. The personal income tax accounts for an average of 16–17 percent of tax revenues in low and lower-middle-income countries; its share of total taxes begins to rise only in upper middle-income countries, reaching 30 percent on average in high-income countries.

Finally, an obvious challenge for tax collection in low- and middle-income countries is that their economies have a substantial informal sector. For our purposes, we shall define informality as the absence of a (full) tax payment by a

[4]Our data does not permit a systematic separation between consumption taxes and taxes on international trade, though it is well-established that trade taxes occupy a smaller share of indirect taxes at increasing levels of development. The decreased reliance on trade taxes is likely to have important equity impacts and this is an interesting area of future research.

firm or individual. It is important to note that, when defined this way, informality arises either because a firm or individual is evading some or all of the taxes they are legally required to pay under the tax code, or because the firm or individual is legally exempt from paying any taxes under the tax code. This point is important in a developing country context because, as we shall see in the following section, vast segments of economic activity are often legally exempt from specific tax bases.

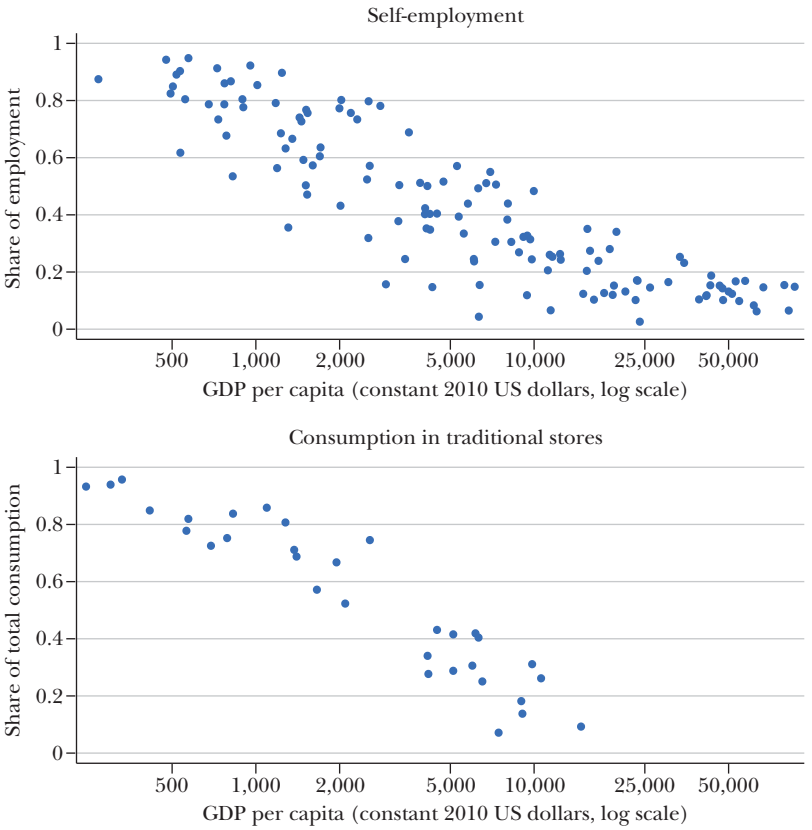
Figure 2 provides two proxy measures of informality at the country level and relates them to economic development. These proxy measures are significant *predictors* of informality. The first measure is the self-employed share in the active workforce. Around the world, including in high-income countries, enforcing income taxes has been found to be more challenging for the self-employed than for employees, due to the absence of third-party reporting and withholding (which, in the case of employees, is done by the employer). The second measure is the share of household consumption from traditional retailers: street stalls and public markets (often called "non–brick and mortar" stores), corner stores, and home production. In comparison to modern retailers (like supermarkets and department stores), traditional retailers are much smaller (in terms of sales and physical space), they hire fewer workers, and have fewer customers and interact with a smaller number of suppliers. All of these characteristics, in turn, are strongly associated with informality, making the share of households' budget spent in traditional stores a meaningful proxy for informal consumption.[5]

The broad lesson from Figure 2 is that the share of the informal sector in the economy declines steeply as GDP per capita rises. The share of informal consumption decreases from 86 percent in low-income countries to 12 percent in high-income countries; similarly, the share of informal labor decreases from 81 percent in low-income countries to 16 percent in high-income countries. In low- and middle-income countries, a significant challenge for tax design is that a large share of economic transactions and actors operate outside the tax net; in high-income countries, the tax net is much wider.

The patterns in Figure 1 reflect variation in statutory tax incidence across countries, but also differences across settings in de facto incidence (through evasion, related to Figure 2) and economic incidence (through market forces which determine the equilibrium values of the tax bases). In the next section, we explain how these patterns and challenges interact to provide perhaps surprising insights into the equity characteristics of taxes in low- and middle-income countries.

[5] Several papers have documented, and provided explanations for, the strong overlap between self-employment and informality (including Kleven et al. 2011; Kleven, Kreiner, and Saez 2016). For more details on the relationship between retailer types and informality, see Bachas, Gadenne, and Jensen (2023a).

Figure 2
Informality across the Development Path



Source: The top panel shows the share of self-employed workers using 2020 data from the International Labor Organization for 132 countries (same sample as the one displayed in Figure 1). The bottom panel displays the share of total consumption that occurs in traditional stores (markets, small convenience stores, street stalls, home production) for 32 low- and middle-income countries based on expenditure surveys which record the places of purchase where consumption occurred. The data on informal consumption are taken from Bachas, Gadenne, and Jensen (2023a) and typically correspond to years between 2010 and 2015.
Note: This figure displays two proxies for the size of the informal sector across countries at different level of GDP per capita.

A Tale of Two Taxes: Personal Income and Value-Added Taxes over the Course of Development

The tax mix in developing countries is characterized by relatively low levels of personal income tax collection, high reliance on indirect taxes for revenues, and a large share of economic activity occurring in the informal sector. What does this imply for the equity characteristics of two of the most important tax instruments, the

personal income and the value-added-tax? Here, we emphasize two main insights: (1) the existence of large informal sectors explains why low- and middle-income countries levy relatively little in direct taxes via the personal income tax; and (2) the existence of a large informal sector implies that indirect taxes like the value-added tax, which are usually thought of as regressive, instead become progressive.

The first insight is based on observing how both the personal income tax base and employment structure evolve as countries develop. The level of the personal income tax exemption threshold—the income level below which individuals are exempt from paying the tax—moves to a lower position in the country's income distribution as per capita GDP rises. The decrease in the exemption threshold tracks growth in the employee-share of employment, which occurs gradually further down the country's income distribution with development. Moreover, whilst the base of the personal income tax expands significantly with development, the share of employees in the tax base remains roughly constant. These facts hold both across countries today and within countries over the long run, as Jensen (2022a) shows with a micro-database of nationally representative household surveys that covers 100 countries at all levels of economic development and long-run time-series in the United States (1870–2010) and Mexico (1960–2010).

These patterns suggest that the expansion of the tax base and the growth in personal income taxation over the development path are driven by a transition from self-employment to employee-employment. These results are consistent with the idea that third-party reporting makes it much easier to enforce taxes on employees than on the self-employed (Kleven, Kreiner, and Saez 2016), so that the structural increase in the employee share as countries develop (Gollin 2008), and the rise of large firms with numerous employees, enables both the growth in personal income taxation and the concomitant decrease in the informal sector. More generally, enforcement constraints—which arise when the self-employed make up a large share of workforce income—shape statutory policy decisions about who to tax. When governments find it challenging to enforce taxes on people with lower incomes, who are mostly self-employed, they react by exempting these large shares of the workforce from the personal income tax altogether.[6]

A narrow tax base places practical limits on the ability of the personal income tax to be a meaningful source of revenue in low- and middle-income countries. This narrowness, likely driven by enforcement constraints, has important implications for the "optimal" way to achieve redistribution, as prescribed by economic theory. Indeed, the most-widely known result in public finance on this question prescribes that all redistribution should be achieved through the personal income tax (Atkinson and Stiglitz 1976)—which implies that redistribution through other tax instruments, such as consumption taxes, is suboptimal. This theoretical result, however, is based on the assumption that governments can implement broad

[6]See Gordon and Li (2009) for a more general discussion of how enforcement considerations constrain governments' choices of statutory tax instruments. For a discussion of political economy considerations related to broadening the personal income tax base, see Bergolo, Londoño-Vélez, and Tortarolo (2023).

and highly flexible income tax schedules along the full income distribution—an assumption clearly at odds with the reality of most low- and middle-income countries, given their narrow income tax bases. Once we account for the de facto enforcement constraints which shape statutory policy decisions, using consumption taxes for both revenue collection and equity purposes is potentially sound tax policy (Huang and Rios 2016).

The second main insight relates to the equity effects of indirect (consumption) taxes in low- and middle-income countries. Conventional wisdom, when based on the experience of high-income countries, would argue that consumption taxes have null or negative redistributive properties, as they essentially tax households in proportion to their consumption (Warren 2008). This conventional wisdom, combined with the much higher share of indirect taxes and lower share of personal income taxes in total revenues in low- and middle-income countries, may lead one to conclude that the tax system in these countries achieves little or no redistribution.

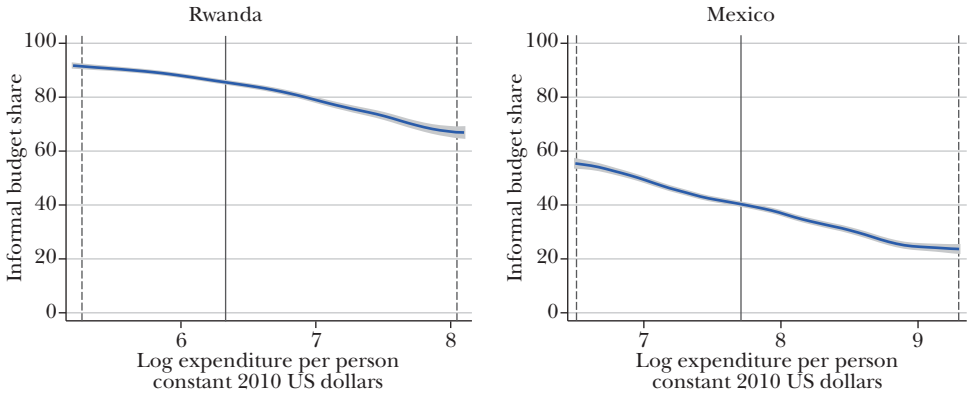
However, taking into account the de facto incidence of consumption taxes can radically change this conclusion.[7] Lower-income households may be more likely to shop in the informal sector; in this case, a consumption tax that effectively only applies to formal consumption may have positive redistributive properties. To investigate whether there is a systematic relationship between the formality status of stores where households shop and their income requires data on the place of purchase for each expenditure. Bachas, Gadenne, and Jensen (2023a) collect and harmonize household expenditure diaries for 32 low- and middle-income countries where they can observe the store-type for each purchase. Motivated by evidence from retail censuses and the literature on informality (for example, Lagakos 2016), they categorize expenditures from modern retailers as formal, and expenditures from traditional retailers, as well as consumption from home production, as informal.

To investigate how shopping patterns relate to household income, Bachas, Gadenne, and Jensen (2023a) use a variation of the Engel curve. A conventional Engel curve shows how an increase in household income is associated with a change in the share of income spent on a specific good. The authors adapt this concept to a setting with widespread informality and establish the existence of what they call the Informality Engel Curve. The Informality Engel Curve shows how a change in household income alters the extent to which a household makes purchases from the informal sector. Figure 3 plots the Informality Engel Curve in two countries: Rwanda and Mexico. In Rwanda, the share of the household budget spent in informal stores falls from 90 percent for the lowest income decile of households to 70 percent for the highest decile. In Mexico, it falls from 55 percent to 25 percent.

The existence of an Informality Engel Curve has several implications for the equity of consumption taxes. First, its downward slope implies that consumption taxes are de facto progressive (under some assumptions on economic incidence to which we will return below). For the average country in Bachas, Gadenne, and

[7] Studies which investigate the distributional impacts of indirect taxes in developing countries include Lustig (2022), Sah (1983), and Jenkins, Jenkins, and Kuo (2006).

Figure 3
Informality Engel Curves in Rwanda and Mexico



Source: This figure plots the Informality Engel Curves in Rwanda and in Mexico, copied from Figure 1 in Bachas, Gadenne, and Jensen (2023a).
Notes: The line represents the local polynomial fit of the informal budget share (proxied by consumption in traditional stores) on the vertical axis and per person total expenditure on the horizontal axis (measured in log). As households become richer their share of informal consumption tends to decrease. The shaded area around the polynomial fit corresponds to the 95 percent confidence interval. The solid gray line corresponds to the median of each country's expenditure distribution, while the dotted lines correspond to the 5th and 95th percentiles. A description of the data and method used is in the main text.

Jensen (2023a), the magnitude of the slope is sufficiently steep that setting a uniform rate on all formal products is strongly progressive: the effective tax rate paid by the top income decile will be more than twice that of the lowest decile.

Second, consumption of food items and consumption in informal stores has a very strong overlap. Many countries around the world implement reduced consumption tax rates on food products to try to improve equity (motivated by a downward-sloping conventional Engel curve for food). In practice, however, this policy produces little or no additional progressivity in developing countries, because most of the poor households' food consumption is already de facto exempt from taxation since it occurs in traditional, informal stores (and from home production).

Third, while taking into account that Informality Engel Curve increases the equity gains of a consumption tax, it also increases its (distortionary) efficiency costs, relative to a world with no informal consumption. To understand how these countervailing equity and efficiency forces play out and determine the level of the optimal consumption tax rate requires a model set-up (Bachas, Gadenne, and Jensen 2023a). Finally, the optimal extent to which there should be differentiation of consumption tax rates across goods will be limited—both because the equity gains from subsidizing necessity goods relative to other goods is limited, and because such rate-differentiation introduces additional efficiency costs.

Interestingly, in settings where informal consumption and consumption of necessities has an overlap, there may still be a redistributive role for setting reduced tax rates on some necessity goods. Some low- and middle-income countries combine the implementation of ration shops (which sell certain necessity products at a subsidized price) with potential taxation of these same products when they are sold on the market. Combined, these two features (approximately) lead to a piecewise increasing tax schedule. The existence of ration shops can provide households with insurance, because the ration shops permit the option of buying necessity goods at a fixed price in contexts where lack of market integration can lead to large variations in market prices. Implementing this system may be close to an optimal way to redistribute, at least for necessity products typically sold formally, such as energy products (Gadenne 2020). In India, the existence of ration shops has been found to increase welfare significantly, through the insurance gains provided to poorer households (Gadenne et al. 2021).

Underlying our discussion thus far has been an implicit assumption about economic incidence; namely, that there is full pass-through of consumption taxes to prices in formal stores, and there is no pass-through of consumption taxes to prices in informal stores. This assumption supports the baseline result of Bachas, Gadenne, and Jensen (2023a) on the progressivity of consumption taxes in a setting where people with higher income are less likely to purchase from informal stores, but how reasonable is it? To gauge this economic incidence assumption requires data on (tax-inclusive) prices in both formal and informal stores as well as a reform which varies the consumption tax rate. These data requirements are met in Mexico, where the same authors study a reform that increased the rate of the value-added tax in some geographical areas of the country in 2014. Consistent with the baseline assumption, the reform led to a large pass-through of the consumption tax rate increase to prices in formal stores and a much smaller (though nonzero) pass-through to prices in traditional stores.

These results raise several interesting yet unanswered questions. In theory, the coexistence of informal and formal sectors implies that some agents could benefit from a tax increase; for example, a small informal retailer may be able to increase its margins and/or its market share when the formal supermarket next door has to raise its prices in line with a tax rate increase. Brusco and Velayudhan (2023) find evidence consistent with such behavior in India. This possibility holds true not just in retail but in all markets where formal and informal agents interact, including labor markets. Complex patterns of economic incidence will likely change our understanding of equity effects of taxation in low- and middle-income countries. Uncovering these patterns is therefore a promising avenue for future research.

In summary, the existence of large informal sectors in low- and middle-income countries simultaneously limits the redistributive capacity of the personal income tax and makes the indirect consumption tax progressive. Combined, these two insights yield subtle implications regarding the equity effects of policies that seek to increase tax capacity by encouraging more firms or households to formalize. These policies may help governments use the personal income tax to its full

redistributive potential—personal income taxes are, after all, the main redistributive tax instrument used by governments in high-income countries (Jounard, Pisu, and Bloch 2013). However, greater formalization will simultaneously decrease the positive equity effects of consumption taxes, currently a main source of revenue in low- and middle-income countries. Asatryan and Gomstyan (2020) provide some evidence in line with this idea: they show that a reform which improves enforcement of the value-added tax in Armenia led to higher retail prices and had stronger negative effects on low-income consumers.

A Bleak House? The Role of Tax Administration, with Property Taxation Examples

Tax administration is an important tool of policy design in developing countries. However, administrative capacity remains constrained in low- and middle-income countries and governments make frequent reforms to try to alleviate these constraints.[8] While such reforms are usually intended to be distributionally neutral, the practical realities of implementation in the field often create a wedge between the statutory neutrality and the de facto incidence impacts. This insight often emerges in settings of local (property) taxation, where administrative reforms can inadvertently have significant distributional consequences due to their effects on tax officials, their use of local information, the extent of their discretion, and the incentive structure they face.[9]

In the local taxation context, local information—information about taxpayers' propensity to pay that is known locally, but not easily observable by outsiders—can be a significant determinant of de facto incidence. Some administrative reforms, which initially seek to alleviate capacity constraints, unintentionally stimulate the gathering and use of local information by tax officials in the field and end up having important distributional effects.

Local tax capacity can be constrained by incomplete infrastructure. One important dimension is incomplete street and property addressing infrastructure, which leads tax collectors to struggle to find the intended property in the first place and deliver tax bills. In Ghana, Dzansi et al. (2022) experimentally find that collectors equipped with a GPS tablet to improve navigation in the field delivered

[8] Investments in administrative capacity is a large area of academic work, including Bird and Casanegra de Jantscher (1992) and Besley and Persson (2009). It is also an important area of focus in international organizations; for examples, see the initiatives at TADAT, the Tax Administration Diagnostic Assessment Tool, at https://www.tadat.org/home, and ISORA, the International Survey on Revenue Administration, at https://data.rafit.org/.

[9] In the local taxation context, research teams in multiple countries have worked in the spirit of what Duflo (2017) called the "plumbing mindset," basing their work on experiments implemented in collaboration with local governments while focusing on reform details that lie within the feasible scope of tax administrations. See also the paper by Okunogbe and Tourek in this issue for further discussion of tax administrations in developing countries.

27 percent more bills and collected 103 percent more taxes. Even though the tablet was designed (only) to alleviate constraints on bill delivery, collectors used the technology to gather soft information: by leveraging the survey knowledge and time savings induced by navigational improvements, they learned about taxpayers' individual propensity to pay through repeated interactions with property owners and the discovery of hard-to-observe information in the field. In turn, based on this "soft information" gathered on households' income, liquidity constraints, and willingness to comply, the collectors focused on those households with higher propensity to pay. Because income level is one of the main household characteristics which determines propensity to pay, by stimulating the gathering of local information this administrative reform unintentionally had large positive equity effects: the GPS technology strongly increased property tax payments in the top income-asset quartile but had no effect on households in the bottom quartile.

Local information can be built over time, by people who are embedded in communities over prolonged periods. This provides a potentially valuable role for prominent community members to assist in the tax collection process—something that can be achieved through administrative reforms that outsource the responsibility of collecting taxes to local community elites. Local governments in some countries engage local chiefs to participate in the collection of taxes. In the Democratic Republic of Congo, Balán et al. (2022) experimentally find that such outsourcing increases tax collection; moreover, the increase in taxes stems from the local chiefs making use of valuable "soft information" on households' propensity to pay when they decide whom to visit for tax collection. With this type of reform, the equity impacts depend on what type of information tax collectors make use of in the absence of outsourcing. Tax collectors who are outsiders to the local community are likely to rely on more easily observable characteristics, such as exterior house quality, when they decide whom to visit for tax payments. In such a setting, when compared to tax officials who are outsiders, outsourcing tax collection to local chiefs will cause the local tax system to be more regressive in terms of property value (though not necessarily in terms of income, as shown in Balán et al. 2022).

In settings with constrained capacity, including limits on "hard information" such as third-party reports, administrative reforms can create a premium on "soft information" on taxpayers' propensity to pay.[10] The distributional impacts of such administrative reforms are nuanced and hard to predict, because they depend on (1) how the locally relevant dimensions of propensity to pay correlate with observable proxies for equity (for example, either household income or wealth); and (2) how the reform alters the targeting strategies of tax officials in the field. These factors create a wedge between statutory and de facto incidence. Household

[10] Some administrative reforms can also decrease reliance on soft information, as in Okunogbe and Pouliquen (2022). The authors experimentally study the impacts of transitioning taxpayers in Tajikistan from in-person submission of tax returns to electronic filing, finding heterogeneous treatment effects which suggest that the nature of the collection process strongly varied across taxpayers in the pre-reform, more discretionary system.

characteristics, such as propensity to pay, are not readily observable in administrative data and are often only weakly correlated with other taxpayer characteristics that are more easily observable to researchers.[11] Thus, in the design of administrative tax reforms, researchers should seek to gain deeper institutional and contextual knowledge of the local information and tax collector strategies that determine (de facto) tax outcomes in the field. Moreover, how well governments can codify the local, soft information learned in the field by officials and other community members remains an open question.

Reliance on soft information is inherently linked to discretion. Indeed, the absence of regularized processes and extensive monitoring of officials gives tax collectors in the field significant discretion, including over *who* to visit, interact, and target for enforcement and *whose* property to reassess. Due to limited administrative capacity, governments in developing countries may find themselves forced to rely on officials' discretion, at least to some extent—but what are the equity effects of varying the discretion of front-line officials? One prominent area where discretion and equity are linked is where the tax authority has to rely on officials' discretionary assessments in the field to determine the value of the property tax base. In Senegal, Knebelmann, Pouliquen, and Sarr (2023) experimentally find that reducing this form of discretion improves both vertical equity (officials with full discretion tend to undervalue high-value properties) and horizontal equity (officials with discretion display higher variance in estimated property values for properties that have similar true market value).

When discretion is prominent, individual tax officials may resort to their personal distributional preferences to guide them in their activities. In this case, officials' preferences become an important determinant of the wedge between initially designed statutory policies and the de facto incidence in the field.[12] Thus, an important area of future work is to improve the measurement of front-line officials' preferences and integrate them into the evaluation design to study the distributional impacts of administrative reforms.

Administrative reforms that fully remove discretion and soft information are unlikely in the near future in low- and middle-income countries, but some feasible policies can influence the transition towards hard information and regularized processes. This question is particularly relevant with the rapid emergence of new sources of digital data. The distributional effects of integrating digital data will depend on who was benefiting in the absence of systematized observability. In Italy,

[11] Liquidity constraints are likely to be an important determinant of tax compliance in many settings around the world. In Mexico City, Brockmeyer et al. (2021) find that liquidity constraints drive households' responses to changes in local property tax rates. In the presence of liquidity constraints, additional dimensions of tax policy—such as loans for taxpayers—may be helpful to tailor the payment process to household needs, even in the absence of precise individual information. How to design these less-studied dimensions of tax policy is an important area for future research.

[12] Improving the equity of a tax system may increase citizens' willingness to comply with taxes. Evidence on the importance of citizens' distributional preferences is limited. However, the experimental survey evidence across eight low- and middle-income countries in Hoy (2022) is consistent with this hypothesis.

a high-income country setting with traditionally high levels of tax evasion, Rubolino (2023) finds that the integration of satellite imagery into the property registry to expand the local tax base had strong positive equity effects because wealthier homeowners avoided registration in the previous, manual system. Access to more hard information can also improve enforcement capacity, which may, in turn, lead to reforms that alter the statutory tax design. For example, transitioning to an enforcement process that is more regularized and based on "hard data" can potentially allow local governments to implement more statutorily progressive taxes.

However, in settings with limited initial capacity, it is not clear that more data per se will unambiguously reduce the value of discretion (Bachas et al. 2022a). Moreover, it is also not guaranteed that governments with limited capacity can fully remove officials' discretion (Chalendard et al. 2023). Depending on the nature and quality of the new hard data, coverage of taxpayers based on new data sources may also be uneven. The advent of digital data in government is underway in many low- and middle-income countries and seems unlikely to slow down, but the result is that tax administrations may be headed towards hybrid strategies, in which the use of soft information and discretion varies significantly across segments of taxpayers.

Another important dimension of administrative reform is the incentive structure that governs how tax officials are hired, paid, and promoted.[13] A straightforward model in which payment of taxes and bribes results from bargaining between the tax collector and the taxpayer can generate a rich, if ambiguous, set of predictions where the distributional impacts depend on several factors: the extent to which reformed incentives strengthen the bargaining weights for the tax inspector (or more generally, any uneven strengthening across taxpayer types); the heterogeneity across taxpayers in their disutility from paying bribes or taxes; and the correlation between these dimensions of taxpayer heterogeneity and their income or wealth.

Performance-pay incentive schemes are used in many administrations around the world and provide a good illustration of how incentive reforms can impact the equilibrium bargaining outcome: as the bargaining weight of the tax collector increases, it may impact both the amount of taxes collected and the de facto incidence of who pays (more) taxes. In Pakistan, Khan, Khwaja, and Olken (2016) find that the overall impact of a performance-pay incentive scheme was driven by strong heterogeneity, as incentivized officials collected all the extra property tax revenue from a small group of high-value properties whose tax valuation was revised upwards. Consistent with the incentive reform affecting bargaining weights, the politically connected property-owners were in general less likely to have their valuations revised, but this advantage disappeared when tax collectors had stronger performance incentives.

The bargaining is most often modelled as a setting in which the tax collector can collude with the taxpayer to reduce the amount of taxes paid *in exchange for a bribe*. This highlights the importance of measuring both formal tax payments and

[13] For an in-depth review of the "personnel economics" of the state, see Finan, Olken, and Pande (2017).

"informal" bribe payments, as both matter to determine the ultimate de facto impact on households' available resources. The incentive reform for tax collectors in Pakistan caused bribes to increase among lower property values where there were no revisions to property valuation—highlighting how tax outcomes are only one part of the de facto payment impacts on households. More generally, almost all the studies cited in this section found significant positive impacts of administrative reforms on *both* tax payments and bribes. For example, the Ghana study found a positive impact on bribes, which was concentrated amongst households in the bottom income-asset quartile (Dzansi et al. 2022).

In summary, even though many administrative reforms are designed with the intention of being implemented uniformly across taxpayers, they end up having significant de facto distributional impacts in practice because of implementation realities in the field. Future work could seek to measure bargaining weights directly, because they contribute significantly to the ultimate impacts of any incentive reform. For example, under a different set of bargaining weights, the same performance-pay scheme used in Pakistan might have led collectors to focus their tax collection efforts on a large number of poorer households that have less influence and spare the small number of more affluent and influential property owners. Given that (partial) reliance on soft information and discretion will likely persist for some time in developing countries, another important question is how to design administrative reforms which retain positive distributional tax impacts while minimizing potentially regressive bribe impacts (Hindricks, Keen, and Muthoo 1999). More work is also required to study rigorously the impact of administrative reforms on *total payments*—the sum of taxes and bribes—at the household level.

Although the discussion in this section has largely focused on local taxation, the insights are likely to carry over to other tax bases that share similar implementation features. Moreover, it is worth noting that formal tax institutions at the local level often coexist with informal institutions that also levy payments on households and firms: informal tax systems, where households make in-kind or in-cash contributions to local public goods (Olken and Singhal 2011; Walker 2022), and social redistributive taxes, which are informal transfers within social and kinship networks (Squires 2021; Carranza et al. 2022). How quantitatively important are these informal systems, what are their distributional impacts, and which equity considerations determine who contributes and how much? These are important questions for future research.

Great Expectations: Taxing the Rich in Low- and Middle-Income Countries

Finding the best way to tax the rich in a globalized world is a major current policy focus globally (Scheuer and Slemrod 2021; Bergolo, Londoño-Vélez, and Tortarolo 2023) and such a step would be highly progressive. Two key issues plague the enforcement of taxes on high-income individuals. First, wealthy individuals earn a substantial share of their income from businesses under their direct or indirect

control (for US-based evidence in this journal, see Kopczuk and Zwick 2020). Taxing business owners is made complex by their ability to allocate income strategically between different categories (such as salaries and profits), to defer taxation, and to utilize business income for direct consumption. To enforce taxes on high income earners, tax administrations require significant audit capacity, ability to link businesses to individuals, and third-party information on all types of earnings—all of which are often limited in low- and middle-income countries.

Second, high-income individuals often locate wealth abroad, particularly in tax haven countries with low tax rates and limited transparency. Financial wealth held offshore in tax havens accounts for an estimated 12 percent of world GDP as of 2022 (Alstadsæter et al. 2023). While not all offshore financial wealth goes unreported, historically the majority does—even in high tax capacity countries. Until recently, international cooperation between tax administrations has been limited (Alstadsæter, Johannesen, and Zucman 2019). Low- and middle-income countries are at least as affected as high-income countries: up to 18 percent of GDP of Africa and the Middle East is held as financial wealth in tax havens, 13 percent in Latin America, and 5 percent in Asia. This compares to 12 percent in Europe and 7 percent in North America (Alstadsæter, Johannesen, and Zucman 2018). As another symptom of the issue of transferring wealth abroad, aid disbursement by the World Bank to the poorest countries in the world is followed by an increase in transactions to tax haven countries, with a leakage rate corresponding to 7 percent of the amount of aid (Andersen, Johannesen, and Rijkers 2021).

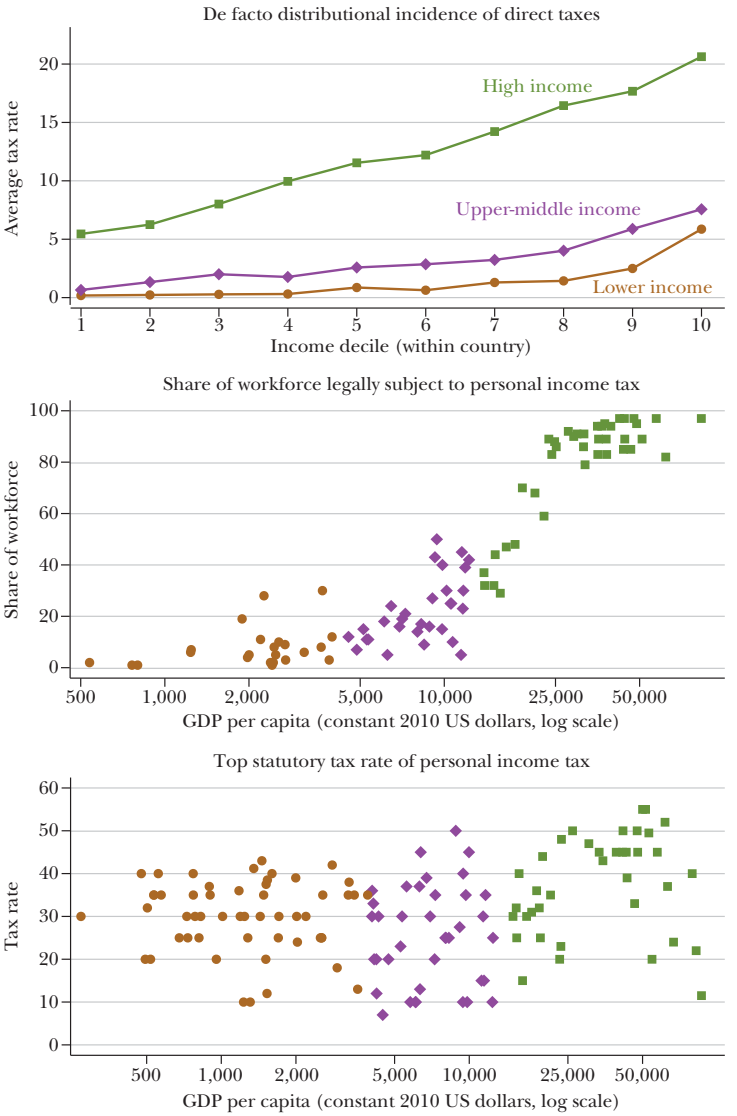
These two challenges—attributing business income to individuals and tracking offshore wealth—severely constrain the progressivity of direct taxes by lowering the de facto tax rates paid by higher-income households. This is true everywhere but is likely to be especially damaging for the progressivity of direct taxation in developing countries.

How, then, does the progressivity of personal income taxation look in practice? While studies of the taxes paid de facto by the very richest (like the top 1 or 0.1 percent) do not exist in a systematic manner, household survey data, combined with some assumptions on taxes paid by salaried workers versus self-employed workers, allows a comparison across countries of the effective income taxes paid by decile of the country's income distribution. For a description of the methodology, see Commitment to Equity (Lustig 2022), with data updated for 74 countries by World Bank (2022).

The first panel of Figure 4 plots the share of household budgets that is actually paid in personal income taxes by deciles of the country's income distribution. The categories for countries' level of income follow the World Bank's definition: high-income countries have per capita GDP above $13,000; upper-middle-income countries have per capita GDP from $4,000 to $13,000; and the categories of lower-middle-income and lower-income countries are combined into a single group, with per capita GDP below $4,000.

The first panel of Figure 4 shows two key patterns that differentiate high-income versus low- and middle-income countries. First, in all deciles, average

Figure 4
Personal Income Taxation: Statutory and De Facto Incidence



Source: The top panel's data are based on the World Bank (2022) and includes 74 countries for which a fiscal incidence report has been conducted: 30 are high-income countries, 21 are upper-middle-income countries, and 23 are low- and middle-income countries or just low-income. The middle panel shows the share of the active workforce that is covered by the personal income tax, based on the location of the exemption threshold in the income distribution, drawing on data from Jensen (2022a) for 92 countries. The bottom panel shows the top marginal tax rate of the personal income tax using data from 129 countries using 2023 data collected by the authors (and using same sample selection as in Figure 1, more than one million inhabitants and under one-third of GDP from oil and gas).
Note: The top panel shows the average income tax rate (de facto) distributional incidence of direct taxation (principally personal income tax) by income deciles separately for High income, Upper-Middle Income and Lower-Middle plus Lower Income countries, as these categories are defined by the World Bank. The fiscal incidence analysis follows the methodology developed by the Commitment to Equity institute (CEQ; see Lustig 2022), which aims to reproduce the de facto incidence of direct taxes using household survey data.

effective tax rates for income taxes are higher in high-income countries. Second, income tax rates in the top deciles increase steeply with development: while the richest 10 percent of households pay around 20 percent of their income in direct taxes in high-income countries, the richest 10 percent of households only pay 5 and 8 percent in low- and in middle-income countries, respectively. The first fact implies that the income tax raises much more revenue in high-income countries, which can later be redistributed via targeted transfers and social insurance programs. The second fact implies that the income tax is much more progressive in high-income countries: the difference in de facto tax rates between the top and bottom decile is around 15 percentage points in these countries, while it is only 5–7 percentage points in low- and middle-income countries.

These patterns occur in part because of the shift from informal to formal employment during the development process, as discussed earlier. To what extent are lower de facto income tax rates also due to statutory policies? On the one hand, the middle panel of Figure 4 shows that the share of the workforce population legally liable to pay personal income taxes significantly increases over development, and only individuals in the top income deciles are liable in low and middle-income countries. This can explain the low levels of de facto tax rates observed in most income deciles apart from at the top. On the other hand, the bottom panel of Figure 4 shows that the top statutory tax rate (the maximum marginal income tax rate that applies to the highest incomes) is only slightly lower in poorer countries: 29 percent on average in low- and middle-income countries versus 35 percent in high-income countries. This difference in top statutory tax rates is clearly insufficient to account for the large difference in de facto income tax rates in the top income decile between high-income countries versus low- and middle-income countries (first panel of Figure 4).

Overall, the large differences between statutory tax rates and de facto tax rates in low- and middle-income countries imply that finding effective ways of taxing individuals with high incomes could have large effects on both revenue and equity. Conversely, taxing the rich may also be particularly difficult in developing countries because of the ample evasion and avoidance opportunities available to high earners, which could lead to large behavioral responses in the form of reductions in reported income when tax rates increase. The size of behavioral responses is typically measured with the elasticity of taxable income, which estimates the percent change in reported income for a 1 percent change in the "net-of-tax rate" (one minus the tax rate).

Only in the last few years has the elasticity of taxable income of rich individuals been estimated in some developing countries, thanks to increased collaborations between tax administrations and researchers. In both Uganda and South Africa, increases in the marginal income tax rate for the 1 percent richest led to large reductions in reported income, with elasticities estimated at just below one (Jouste et al. 2021; Axelson et al. 2023). In Uruguay, an increase of the top income tax rate also led to a substantial drop in reported income (elasticity of 0.6), and to taxpayers switching from filing under the personal income tax to filling under the more

advantageous corporate income tax (Bergolo et al. 2022). Studies of capital taxation in low- and middle-income countries similarly find large behavioral responses: in Colombia, the elasticity of reported wealth to the wealth tax rate is estimated at around two, driven by the underreporting of hard-to-verify assets (Londoño-Vélez and Ávila-Mahecha 2022).

In some cases, changes to reported taxable income can be sufficiently large that raising top tax rates leads to lower total revenue collection (for evidence from Pakistan, see Waseem 2018; for evidence from Brazil, see Locks 2023). More generally, reforms to make the statutory income tax more progressive by increasing tax rates on high earners often lead to large behavioral responses—thereby limiting the effectiveness of these reforms. This likely explains why the personal income tax does not raise as much revenue as in high-income countries, and why the de facto income tax rate of top decile earners is limited.

However, elasticities of reported income for top earners are not immutable. Rather, they depend on the availability of tax evasion opportunities and on the enforcement capacity of tax administrations, as recent successful experiences in taxing high-income individuals have shown.[14] In Colombia, a program to disclose hidden wealth voluntarily, in exchange for tax breaks on the wealth disclosed, had a significant effect on tax revenues and progressivity (Londoño-Vélez and Ávila-Mahecha 2021). The disclosure of hidden wealth increased steeply along the wealth distribution, from a probability below 1 percent for the wealthiest 5 percent of households, to a disclosure probability of 40 percent for the wealthiest 0.01 percent. Similarly, the experience of Argentina's 2016 tax amnesty is striking: it led to the revelation of assets worth 21 percent of the country's GDP, with over 80 pecent of the assets hidden abroad mainly in the United States and tax havens (Londoño-Vélez and Tortarolo 2022). The effective rate of the wealth tax rose persistently from 0.5 percent to 0.75 percent of wealth, with the largest increase for the top 0.1 percent richest households. Similarly, in Ecuador, a tax on dividend distribution to shareholders located in tax havens encouraged the repatriation of income domestically and raised tax progressivity (Brounstein 2023).

Part of the success of recent tax amnesties can be attributed to the implementation, since 2016, of automatic exchange of information across borders between tax administrations (Alstadsæter et al. 2023). This practice was first started by the United States, under the Foreign Account Tax Compliance Act, and has since been implemented by a majority of countries under the Common Reporting Standard. Under these exchange-of-information agreements, banks report to tax administrations the balances of all accounts held by foreign nationals, and in the case of business accounts, their foreign beneficial owners, too. Third-party information on foreign financial wealth holdings generated by international cooperation has the

[14] Increasing the resources available to tax administrations has been shown to be very effective at reducing tax evasion of the largest taxpayers, and more effective at raising revenue than tax rate hikes: for discussions, see Basri et al. (2021) on enforcement of the corporate tax in Indonesia and Keen and Slemrod (2017) on a theoretical framework for optimal tax administration.

potential to increase revenue and progressivity in low- and middle-income countries and close a prominent channel of tax avoidance used by wealthy individuals. These reforms will likely limit the elasticity of reported income at the top, providing further scope for progressivity.

At the same time, several challenges remain. One important challenge is that real estate wealth is not covered by this exchange of information. This could represent an important constraint on the progressivity of tax systems; in the case of Dubai, real estate wealth held by foreign nationals accounts for several percentage points of the GDP of multiple countries in the region (Alstadsæter et al. 2022). It is unlikely that this real estate wealth is reported domestically; even in Norway, where data could be cross-checked at the taxpayer level, less than one-third of Dubai's Norwegian-owned real estate was reported in the domestic wealth tax. Indeed, wealthy taxpayers are taking advantage of the absence of information exchange for real estate: up to one-quarter of financial wealth in tax havens might have been relocated to real estate following the implementation of information exchanges, where it escapes scrutiny (Bomare and Le Guern Herry 2022). Further, successfully implementing exchange-of-information collaborations presents a set of challenges for countries with low capacity: to receive information they must reciprocate, and the information they receive from foreign banks is not always of sufficient quality to allow their tax administrations to match their citizens to foreign bank accounts.

Finally, an important share of the income of the very wealthy in all countries is tied to business income and undistributed profits, which are typically captured only poorly by personal income tax systems. In this context, the corporate income tax plays an important role as a backstop for the personal income tax (and the progressivity of the tax system as a whole) by ensuring that *some* taxes are collected on business incomes (Fuest and Neumeier 2023). The capacity of the corporate tax to act as a backstop might have eroded over time globally; statutory corporate tax rates have declined and special low tax regimes have flourished, resulting in very large firms paying low effective tax rates. Low- and middle-income countries may be particularly exposed to such trends (Tørsløv, Wier, and Zucman 2022; Johannesen, Tørsløv, and Wier 2020). Registries of beneficial owners of corporations link individuals to the firms they own: in France, these data reveal that the only tax effectively paid by the 75 richest individuals in the country is the corporate income tax (Bach et al. 2023). To our knowledge, similar studies of firm-ownership linkages do not exist in low- and middle-income countries. However, beneficial ownership registries, which identify individuals with significant ownership of a firm, are under development in many countries and will likely provide fruitful research opportunities in the future.[15]

[15] See the Open Ownership website at https://www.openownership.org/en/map/ for a list of countries that have already enacted or are planning to build a beneficial ownership registry.

Conclusion

The equity characteristics of tax systems in low- and middle-income countries offer a topic in which the "known unknowns" and "unknown unknowns" outweigh the available "knowns": many questions remain unanswered, and many questions have not yet been asked. For example, the economic incidence of taxes in the presence of large informal sectors is one important unknown. Insights generated by recent research have challenged some of the received wisdom on the redistributive effects of certain tax instruments, which has been based primarily on the context and research insights from high-income countries.

We emphasize two areas in which policy is rapidly changing in developing countries and that are bound to impact the equity characteristics of tax systems: environmental pricing and the advent of new technologies. While few low- and middle-income countries have implemented a carbon tax and/or environmental pricing schemes, many plans are under consideration. These policy plans are a response to the urgent need to curb future carbon emissions, the bulk of which will come from developing countries (Copeland, Shapiro, and Taylor 2021). Understanding the distributional impacts of environmental fiscal policies across households is key to ensure that such policies are equitable and politically sustainable (Känzig 2023).

In addition, tax administrations in low- and middle-income countries have been making ongoing technology investments to enhance their capacity to raise revenue (Okunogbe and Santoro 2023). Work in this area has mostly focused on the effects of technological changes—such as digitization of payments—on tax collection (for example, Brockmeyer and Sáenz Somarriba 2023; Das et al. 2023). However, the equity effects of new technologies are also likely to be important. A greater reliance on digital technologies to collect taxes may create new forms of horizontal inequities between individuals and firms, depending on their compatibility with technology and their "digital literacy" (Jacobs 2017). The increasing availability of data on taxpayers and their interactions with markets and the government raises the possibility of using new tax instruments that adjust to individual characteristics and circumstances in ways hitherto deemed impossible; an example is a personalized value-added tax, which would compensate poor households on a continuous and individual basis for the amount of taxes paid on their consumption (Kotlikoff, Lagarda, and Marin 2023). The possible gains from improved efficiency and targeting would need to be balanced against data privacy risks and the potential lack of transparency that would arise from more complex tax and transfer systems.

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