Public Disclosure Authorized

Public Disclosure Authorized

Policy Research Working Paper 11104

Bridging the Gap

Revenue Mobilization in South Asia

Hagen Kruse
Franziska Ohnsorge
Gabriel Tourek
Zoe Leiyu Xie

WORLD BANK GROUP
South Asia Region
Office of the Chief Economist
April 2025

Policy Research Working Paper 11104

Abstract

This paper examines tax revenue shortfalls in South Asian countries. On average during 2019–23, South Asian revenues totaled 18 percent of GDP—well below the average 24 percent among emerging market and developing economies (EMDEs). Econometric estimates from stochastic frontier analysis, which control for tax rates and the size of potential tax bases, suggest that tax revenues in the region are 1 to 7 percentage points of GDP below potential, with shortfalls in five of the region's eight countries larger than in the average EMDE. Even after controlling for country characteristics, such as widespread informal economic activity outside the tax net and large agriculture sectors, sizable tax gaps remain, suggesting the need for improved tax policy and administration. The paper discusses and provides evidence from international experience with reforms to raise government revenues.

This paper is a product of the Office of the Chief Economist, South Asia Region. It is part of a larger effort by the World Bank to provide open access to its research and make a contribution to development policy discussions around the world. Policy Research Working Papers are also posted on the Web at http://www.worldbank.org/prwp. The authors may be contacted at lxie@worldbank.org.

The Policy Research Working Paper Series disseminates the findings of work in progress to encourage the exchange of ideas about development issues. An objective of the series is to get the findings out quickly, even if the presentations are less than fully polished. The papers carry the names of the authors and should be cited accordingly. The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the International Bank for Reconstruction and Development/World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

Produced by the Research Support Team

Bridging the Gap: Revenue Mobilization in South Asia

Hagen Kruse, Franziska Ohnsorge, Gabriel Tourek, and Zoe Leiyu Xie *

Keywords: *Tax revenues, stochastic frontier analysis, tax administration, South Asia*

JEL classification: H23, H24, H25, H26, O23

---

*Hagen Kruse (hkruse@worldbank.org), Franziska Ohnsorge (fohnsorge@worldbank.org), and Zoe Leiyu Xie (lxie@worldbank.org): World Bank Chief Economist Office for the South Asia Region. Gabriel Tourek (gabriel.tourek@pitt.edu): University of Pittsburgh and NBER. We thank Alan Auerbach, Pierre Bachas, Charles Collyns, Martin Raiser, Jim Rowe, Emilia Skrok, Chris Towe, and Gabriel Zucman for helpful comments and suggestions. Rabiul Hossain provided input for the literature review on tax buoyancy. The findings, interpretations, and conclusions expressed in this paper are those of the authors and should not be attributed to the World Bank, its Executive Directors, or the countries they represent.

1. Introduction

South Asian countries face significant fiscal challenges, in particular large debt and debt-service burdens.[1] At end-2023, gross government debt averaged 77 percent of GDP in South Asia, compared with an emerging market and developing economy (EMDE) average of 64 percent of GDP. Partly as a result, South Asian governments spent 26 percent of their revenues on interest payments—well above the EMDE average of 9 percent. Heavy debt and debt-service burdens constrain funding capability for basic government services. All South Asian countries except Maldives spend less on healthcare than would be expected based on their per capita incomes, and three of the four South Asian countries with the highest interest burdens spend less than half of the EMDE average on education (relative to GDP)—and far less than would be expected based on their per capita incomes (World Bank 2025a).

At the root of South Asia's fiscal challenges are low revenues. During 2019–23, South Asian governments' revenues excluding grants averaged 18 percent of GDP, the lowest among all EMDE regions and well below the EMDE average of 24 percent of GDP. All countries in the region other than Maldives have tax revenues that are 2–18 percentage points of GDP less than the EMDE average.

This paper first presents key stylized facts of South Asia's revenue collection, then quantifies the size of tax revenue shortfalls in South Asian countries using stochastic frontier analysis. In contrast to the literature (for example, Benitez et al. 2023; Garg, Goyal, and Pal 2017; McNabb, Danquah, and Tagem 2021), we conduct the estimation in two steps and for each main tax category. The first-step estimation considers only tax rate and potential tax base as input for revenue collection, and country characteristics that correlate with revenue collection are only introduced in the second step. The two-step approach is applied to each tax category to identify specific shortfalls and gaps and guide policy recommendations.

In the first step, we find that South Asian countries' tax revenues are 1–7 percentage points of GDP below the estimated potential implied by their tax rates and potential tax bases. Five of the region's eight countries have tax revenue shortfalls above 5 percentage points of GDP, much higher than the EMDE average of 3 percentage points. Revenue shortfalls are particularly pronounced for consumption taxes but are also sizable for personal income taxes and, in the larger economies, corporate income taxes.

Taking into account country characteristics in the second step only accounts for a small portion of the revenue shortfalls identified in the first step. In all South Asian countries except Nepal, no more than one-third of the aggregate shortfall can be explained by features of their economies, such as pervasive informality, large agriculture sector, and lack of financial development. In four

[1] South Asian countries comprise Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, and Sri Lanka.

South Asian countries, the remaining tax gaps are larger than the EMDE average and suggest the need for broader reforms to tax policy and tax administration.

Drawing on evidence from international experience, we outline three groups of policy options for raising government revenues in the South Asian context. First, government revenues in the region could be raised by tax policy measures to eliminate exemptions, and unify, simplify, and harmonize tax rates. Second, in EMDEs of other regions, efforts to facilitate tax collection and incentives for tax officials have been successful in raising revenues. Third, pollution pricing could help address high levels of pollution, as well as low government revenues—two of South Asia's main challenges.

This paper contributes to the literature first, by updating and extending earlier studies on the drivers of tax revenues, using the latest data to derive estimates of revenue shortfalls and their sources. Second, it conducts a comprehensive review of the literature on how tax revenues respond to changes in national income—often referred to as tax buoyancy—and to tax policies, and compares estimates for South Asia with those for other countries.

The paper does not try to assess the optimal level of tax revenue. A welfare analysis of revenue measures—such as in the welfare-weighted marginal value of public funds framework of Bergstrom, Dodds, and Rios (2024)—is beyond the scope of this paper. So is a comparison with any optimal revenue ratio, such as the one derived in Choudhary, Ruch, and Skrok (2024).

The rest of the paper is organized as follows. Section 2 documents recent features of South Asian revenue collection. Section 3 estimates tax revenue "shortfalls" using stochastic frontier analysis. Section 4 investigates correlates of these shortfalls and derives remaining tax revenue "gaps". Section 5 concludes with a discussion of policy options to close these revenue gaps.

2. Features of South Asian revenue collection

Revenue collection in South Asia can be characterized by four stylized facts on the level, buoyancy, and composition of revenue, as well as tax rates.

Stylized fact 1: Low tax revenues. During 2019–23, general government revenue in South Asia was the lowest among EMDE regions, and in all countries except Maldives it was lower than the average of EMDEs (figure 1, table 1). This reflects lower-than-average tax revenue: in all South Asian countries, tax revenue as a percent of GDP is lower than the EMDE average, and in all countries expect India and Nepal tax revenues are lower than other EMDEs with similar GDP per capita.

Stylized fact 2: Sufficient tax buoyancy. South Asian countries' weak revenue collection appears to be more broad-based than merely a failure to tax the fastest-growing economic activities. In Bangladesh and India, revenue buoyancies—the responsiveness of tax revenues to changes in the tax base—are broadly in line with the EMDE average and, in Nepal, they are even in the highest

quartile for EMDEs (figure 2, based on a literature review detailed in appendix 1). Only Pakistan's tax buoyancy falls in the bottom quartile of EMDEs, suggesting a reliance on taxation of slow-growing economic activities.

Stylized fact 3: Dependence on indirect tax revenues. Compared to the average EMDE, South Asian countries derive smaller shares of tax revenues from direct income taxes. During 2019-23, only India had higher personal income tax revenue, and Bhutan and Maldives had higher corporate income tax revenue, than the average of EMDEs. South Asian countries collect higher indirect taxes including consumption tax and trade tax. Three of the eight countries have higher consumption tax revenue, and six have higher trade tax revenue, than the average of EMDE (table 1). This relatively high dependence on trade and consumption tax revenues limits the region's revenue potential, undermines the equity of the tax system because of the regressive nature of consumption taxes, and can create disincentives to trade.

Stylized fact 4: High tax rates. In part, above-average reliance on revenues from consumption and trade taxes reflects relatively high tax rates on consumption and imports (figure 3). Tariffs, including para-tariffs (defined as additional taxes or fees imposed on goods over and above customs tariff), are above average in all South Asian countries except Bhutan, which raises effective trade tax rates well above the EMDE average. In India and Sri Lanka, para-tariffs triple or quadruple effective tariff rates (World Bank 2024a, 2024b). In Pakistan and Sri Lanka, consumption tax rates were well above the EMDE average in 2024. In addition, in most South Asian countries with available data, corporate income tax rates are above the EMDE average, and, in India, the average personal income tax rate is above average.

For all categories of taxes, most South Asian countries' tax revenues are lower than would be expected given these tax rates. Pakistan, Sri Lanka, and Bangladesh—the three South Asian countries with the lowest overall revenue-to-GDP ratios—also have much lower tax revenue-to-GDP ratios compared with other EMDEs with similar tax rates in all categories of taxes. India collects less trade tax revenue than would be expected based on its tariff and para-tariff rates.

3. Tax revenue shortfalls

We estimate tax revenue shortfalls using stochastic frontier analysis. This section, first, motivates and introduces the methodology and then presents the shortfall results.

3.1 Methodology: Stochastic Frontier Analysis

As a first step, a stochastic frontier analysis is conducted, which estimates the efficiency frontier and a country's tax potential for each type of tax. The "tax revenue shortfall" is estimated as the deviation of actual tax revenue from the potential—obtained from the estimation using only tax rates and potential tax bases as the independent variables. Compared with the traditional regression approach, the stochastic frontier model has the advantage that it models inefficiency

in revenue collection separately from random error in a combined error term (Jondrow et al. 1982). Traditional regression models assume that the error term follows a two-sided normal distribution, whereas stochastic frontier models assume a one-sided distribution such as half or truncated normal distribution.

In other words, with stochastic frontier models, a firm or country can only underperform but never overperform. As such, the stochastic frontier models generate estimates, or efficiency scores, for each observation, which measures how efficient a country or firm is relative to the highest possible output or revenue (i.e., the efficiency frontier). One often-cited criticism of the stochastic frontier framework is that the estimated efficiency score can vary substantively depending on the assumptions about the error term (Benitez et al. 2023; McNabb, Danquah, and Tagem 2021). For the analysis of revenue generation, the most commonly used stochastic frontier model is the true random effects model, which assumes that inefficiency is time-varying and captured by the individual specific effects (Greene 2005). The true random effects model is found to generate estimates that are less influenced by outliers in input data (McNabb, Danquah, and Tagem 2021).

The exercise cannot be considered in any way causal. It also does not take into account behavioral responses to tax changes (Gemmell and Hasseldine 2012).

3.1.1 Estimation model

Following the stochastic frontier model, a production function of revenue is modeled that transforms inputs, tax rates and potential tax base, into tax revenues:

$$Y_{it} = f(X_{it}, \beta)E_{it}V_{it}$$

where Y_{it} is tax revenue of country i in year t as a percent of GDP, X_{it} is a set of inputs, is a vector of coefficients, E_{it} is the unobserved level of individual efficiency for country i in year t and takes values between 0 and 1, and V_{it} is random shock that is assumed independent of the efficiency term and is normally distributed. In the baseline estimation, tax rates (in percent) and potential tax bases (as a percent of GDP) are used as inputs.

To estimate the production function above, take the natural logarithm:

$$\ln(Y_{it}) = \ln[f(X_{it}, \beta)] + \ln(E_{it}) + \ln(V_{it}).$$

Assuming the tax revenue production function f is log linear, for example a Cobb-Douglas production function, then the logged production function becomes

$$\ln(Y_{it}) = \alpha + \Sigma\beta \ln(X_{it}) + \ln(E_{it}) + \ln(V_{it}).$$

Rewriting as an econometric model

$$y_{it} = \alpha + x_{it}\beta + v_{it} - u_{it}$$

where the lower-case letter denotes the logarithmic of the corresponding upper-case letter, and $u_{it} = - \ln(E_{it})$ denotes the individual-level inefficiency to be estimated and is assumed to follow a half (positive) normal distribution. A country's tax potential is then obtained as the ratio between actual tax revenue and the estimated efficiency score E_{it} (between 0 and 1). Tax revenue shortfall is then defined as the difference between tax potential and actual tax revenue.

3.1.2 Sample and data

The sample includes 139 EMDEs during 2000–23. For Pakistan, separate data on personal and corporate income tax revenues are available only to 2015.

Tax revenues. Four categories of general government tax revenues are considered: personal income tax revenue, corporate income tax revenue, consumption tax revenue, and trade tax revenue. Consumption tax revenue comprises of taxes on goods and services, and includes VAT and sales tax. In addition, direct tax revenue is considered because separate personal and corporate income tax revenues are not reported for some countries in some years. Data on tax revenues are from UNU-WIDER, supplemented using the World Bank *Fiscal Survey*. Corporate income tax revenue for Bangladesh since 2017 and Pakistan since 2005 were extrapolated using the IMF *Government Finance Statistics* and Haver Analytics. Personal income tax revenue for Bangladesh since 2017 is computed as the difference between direct tax revenue and corporate income tax revenue.

Tax rates. For personal income tax rates, for which data are available for the highest and lowest rates, the average of highest and lowest tax rates is used as baseline. Data on tax rates are from Vegh and Vuletin (2015), supplemented using the USAID *Collecting Taxes* Database, and World Bank data.

Potential tax bases. Labor income proxies for the potential tax base of the personal income tax, market capitalization of listed domestic companies for the base of the corporate income tax, consumption for the consumption tax, and goods imports for the trade tax (all as a percent of GDP) The choice of a broad definition for a potential tax base helps reduce the reverse causality from changes in tax rates to tax bases. Data on labor income are from the International Labour Organization, and data on the other potential tax bases are from the *World Development Indicators*.

The potential tax revenue estimated from the stochastic frontier analysis represents the largest tax revenue that could be collected without any inefficiency, given the country's potential tax base and tax rate. The "tax revenue shortfall"—the difference between potential and actual tax revenues—captures the inefficiency in a country's tax system.

3.2 Tax revenue shortfall results

Given their tax rates and potential tax bases, most South Asian countries have larger tax revenue shortfalls in personal and corporate income tax revenue than the average of EMDEs, many also have larger shortfalls in consumption tax revenue (table 2, appendix tables A2.1–A2.4).

3.2.1 Direct tax revenue shortfall

Since 2020, Afghanistan, Bangladesh, Pakistan, and Sri Lanka have had sizable shortfalls in direct tax revenue, ranging from 1.4 percentage points of GDP to 2.6 percentage points of GDP, compared to an average shortfall of 0.8 percentage point among all EMDEs. In these four South Asian countries, revenue shortfalls have been nearly evenly split between personal income tax revenues and corporate income tax revenues.

Personal income taxes. Given their tax rates and potential tax bases, all South Asian countries except India have had larger shortfalls in personal income tax revenue than the average of EMDEs. The shortfalls in those countries range from 0.53 to 1.48 percentage points of GDP, compared to an average shortfall of 0.5 percentage point among EMDEs (table 2 column 1). For Maldives, the personal income tax revenue shortfall is the only revenue shortfall that is larger than EMDE average, consistent with the country's high income tax exemptions (World Bank 2022).[2]

Corporate income taxes. Given tax rates and potential tax bases, shortfalls in corporate income tax revenues have been larger in three of South Asia's four largest countries—Bangladesh, India, and Sri Lanka—than the average of EMDEs. The shortfalls have ranged from 1.16 to 1.56 percentage points of GDP in these three countries, compared with an average shortfall of 0.7 percentage point among EMDEs (table 2 column 2).

3.2.2 Indirect tax revenue shortfall: Consumption taxes

Given their tax rates and potential tax bases, most South Asian countries have had shortfalls in consumption tax revenues in recent years (table 2 column 3). The shortfalls in Afghanistan, Bangladesh, Bhutan, Pakistan, and Sri Lanka have been larger than the EMDE average. For these four countries (except Sri Lanka), the estimated shortfall has been larger than the 75th percentile of all EMDEs, and is at least as large as actual consumption tax collection, which is broadly in line with earlier estimates: for example, World Bank (2024c) estimates that in FY2019 the VAT gap for Bangladesh was twice the size of its VAT revenue collection. For India, Maldives, and Nepal, in contrast, consumption tax revenue shortfalls have been below the EMDE average.

3.2.3 Indirect tax revenue shortfall: Trade taxes

[2] Stochastic Frontier Analysis estimation results are reported in appendix tables A2.1-A2.4.

Given their tariff rates and potential tax base, Bhutan, Bangladesh, India, and Sri Lanka have had larger shortfalls in trade tax revenues than the average of EMDEs (table 2 column 4). In addition, the data for actual trade revenues include revenues from para-tariffs, which are significant in several South Asian countries (Kathuria and Arenas 2018). Accounting for the para-tariff rates of 10 to 15 percent, estimated trade revenue shortfalls in India and Pakistan would double. Even so, for all South Asian countries, trade revenue shortfalls are less than 1 percentage point of GDP.

3.2.4 Robustness tests

Robustness checks are conducted using alternative tax rates or samples. For personal income tax rates, where highest and lowest rates are available, the robustness test includes only the highest tax rate (table 2 column 5). For consumption tax revenue, a longer time series is available than for the baseline sample, starting in 1989, and is used as a robustness check (table 2 column 6). All results are qualitatively robust to these changes.

4. Correlates of revenue shortfalls and tax gaps

The sizable tax revenue shortfalls could be attributed to country characteristics such as pervasive informality, large agriculture sector, and lack of financial development. To investigate correlates of the large shortfalls in personal income tax, corporate income tax, and consumption tax, the stochastic frontier estimation is expanded to include country characteristics that are associated with the revenue shortfalls. Consistent with the literature, the "tax gap" is defined as the difference between actual tax revenue and the potential tax revenue, estimated on the basis of tax rates, potential tax bases, and country characteristics (Hutton 2017; World Bank 2025b). The dependent variable remains the specific type of tax revenue-to-GDP ratio.

4.1 Sample and data

The following country characteristics are considered: the size of the informal sector and the size of the agriculture sector as a proxy for the size of the economy that is hard to tax; financial development as a proxy for enforcement capacity; the size of the agriculture sector also to proxy for exemptions from consumption taxes.[3] Data availability for these variables further restricts the sample to 104 EMDEs for 2000–23, and now excludes Afghanistan among South Asian countries. The specific estimation sample period varies slightly for each specification, as indicated in appendix tables A2.1–A2.4. Appendix table A2.6 lists data sources and definitions for the variables used.[4]

[3] The ILO variable for informal employment share of total employment is not available for many countries and years, and as a result, the stochastic frontier analysis fails to converge when this variable is used instead of the self-employment share of total employment.

[4] Estimates obtained using the stochastic frontier approach are sensitive to sample size. For this reason, robustness exercises are conducted that use the same smaller sample from the second step in the first step. These estimation

A smaller informal sector and a more developed financial system are associated with a higher personal income tax revenue-to-GDP ratio. A smaller agriculture sector and a more developed financial system are associated with higher ratios to GDP of corporate income and consumption tax revenue.

Informality. Because income generated in the informal economy goes unreported, large informal sectors are typically associated with lower direct tax revenue (Dokas et al. 2024). This is one of the reasons why countries with large informal sectors tend to rely more heavily on trade-related taxes (Emran and Stiglitz 2005; Keen and Lockwood 2010; Piggott and Whalley 2001). The share of self-employment in total employment is used to proxy informal sector activity in the estimation of the PIT revenue gap.

Large agriculture sectors. An economy in which lower-productivity sectors, such as agriculture in most EMDEs, form a large part might collect less tax revenue, because of the progressive nature of most tax systems and the subsistence nature of agriculture, especially in lower-income countries (Agbeyegbe, Stotsky, and WoldeMariam 2006; Baunsgaard and Keen 2010). In addition, agricultural output is often undertaxed (OECD 2020; Stewart-Wilson and Waiswa 2021). The share of agriculture in total output is used to capture this in the estimation of corporate income and consumption tax revenue gap.

Financial development. Financial development—and the documentation associated with it—can help the tax authorities track income and spending and, thus, raise tax revenues (Gnangnon 2022; Lompo 2024). More advanced financial development and the benefits of access can also provide an incentive for firms to enter the formal economy (Capasso, Ohnsorge, and Yu 2024). The IMF's financial development index is used as the measure.

4.2 Estimated tax gaps

When jointly included in the estimation, the country characteristics just considered account for up to one-third of the overall tax revenue shortfalls in all South Asian countries except Nepal, where they account for four-fifths. Table 3 columns (1)–(3) report the remaining tax gaps for countries and tax types with above-average revenue shortfalls. It shows that after accounting for the country characteristics, the remaining tax gaps are still much larger than the average of EMDEs.

Among the four countries with above-average tax revenue shortfalls—Bangladesh, Bhutan, Pakistan, and Sri Lanka—the country characteristics account for one-quarter to one-third of the overall shortfalls. Even so, the four countries still have tax gaps that are larger than the EMDE average: for personal and corporate income taxes and consumption tax in Bangladesh and Sri Lanka, personal income tax and consumption tax in Bhutan and Pakistan. After accounting for

results are listed in appendix table A2.1 column (1.2), appendix table A2.2 column (1.1), and appendix table A2.3 column (1.2), and are quantitatively similar to the baseline results.

country characteristics, India's tax gap in corporate income tax remains larger than the EMDE average, as well as personal income tax gap in Maldives. Taking these characteristics into account reduces Nepal's already-low overall tax revenue shortfall to close to zero.

These baseline results are tested for robustness to the inclusion of additional controls (such as governance) and nonlinearities (such as those implied by the Laffer curve).

4.3 Robustness test: Accounting for the quality of governance

Poor governance or weak institutions, such as reflected in the presence of tax evasion and corruption of tax officials, can undermine tax collection efforts (Ajaz and Ahmad 2010; Besley and Persson 2014; Nichelatti and Hiilamo 2024). Because poor governance tends to correlate strongly with other control variables, we do not include it together with the rest of the country characteristics. Using the average (scaled to 0 to 1) of the bureaucracy quality and corruption scores from the International Country Risk Guide (ICRG) to proxy for the quality of governance, estimations reported in appendix table A2.5 show that better governance is correlated with higher personal income, corporate income, and consumption tax revenues.

The ICRG score is available for four South Asian countries—Bangladesh, India, Pakistan, and Sri Lanka. For these four countries, governance quality accounts for up to 10 percent (Pakistan and Sri Lanka) of the personal income tax revenue shortfall, up to one-half (Bangladesh and Sri Lanka) of the corporate income tax revenue shortfall, and up to one-quarter (Sri Lanka) of the consumption tax revenue shortfall. Nonetheless, as columns (4)–(6) in table 3 show, most tax gaps remain above the EMDE average, except for consumption tax in Sri Lanka.

4.4 Robustness test: Accounting for nonlinearities

A robustness specification is conducted for each tax revenue category that includes the squared (logged) tax rate to capture possible non-monotonic relationship between tax rate and tax revenue collection. By including the squared (logged) tax rate, the model could capture the curvature of a Laffer curve (Alba and McKnight 2022). Implicitly, a translog tax revenue production function is assumed for this step, which allows for interaction term of variables included in the X_{it} term (Coelli et al. 2005). Appendix table A2.2 column (4.1), appendix table A2.3 column (4.1), and appendix table A2.4 column (3) report the second step results including the squared tax rate term for corporate income tax revenue, consumption tax revenue, and trade tax revenue, respectively. This specification is not reported for personal income tax revenue because the estimation does not converge.

The squared term is negative and statistically significant for consumption and trade tax revenues, suggesting that tax revenues do eventually decline when tax rates become too high. None of the South Asian countries falls on the declining portion of the implied Laffer curve for consumption or trade tax revenue. That implies that tax or tariff cuts would indeed lower revenue collection in

South Asian countries. Any such cuts would therefore need to be embedded in broader reform to safeguard revenues.

5. Policy options

The large portion of South Asian countries' tax revenue shortfalls that is unaccounted for by the country characteristics points to weaknesses in tax administration, the presence of exemptions and loopholes in tax codes, and broader governance challenges.

5.1 Tax policy

Compared with other EMDEs, South Asian governments' revenue shortfalls are particularly large for consumption taxes. The World Bank and IMF have recommended several priority tax policy measures for South Asian countries: measures to rationalize or eliminate exemptions; to unify, simplify, and harmonize tax rates; and to broaden the tax base.

5.1.1 Streamlining

An unusually large share of South Asian income earners is exempt from personal income taxation. But exemptions are also pervasive for other taxes (figure 4). Exemptions make tax evasion easier and encourage informal activity. In all South Asian countries, the rationalization of tax exemptions—while preserving structural relief for lower-income households—is therefore a priority (FBR 2024; IMF 2023, 2024a, 2024b, 2024c; NBR 2024; World Bank 2021, 2023a, 2023b, 2025c). The elimination of exemptions can be part of a broader strategy to simplify, harmonize, and unify the tax regime. Such streamlining could reduce incentives to operate in the informal sector and help both compliance and enforcement in South Asia (IMF 2023, 2024a; World Bank 2023a, 2023b, 2024c).

Presumptive taxation, which is based on expected income, could increase revenues in economies with widespread informality and large agriculture sectors dominated by small farm holdings, because it would lower compliance cost. Withholding taxes could simplify tax collection, especially in countries where compliance and enforcement are weak (Brockmeyer and Hernandez 2016; World Bank 2021, 2023a). However, withholding taxes also require substantial enforcement and monitoring capacity to be effective (World Bank 2023b).

5.1.2 Tax progressivity

Progressive taxation, which entails levying higher tax rates on higher-income groups, can serve redistributive purposes. It also increases the acceptance of revenue mobilization and tax morality among lower-income groups. Most EMDEs, including those in South Asia, rely more than advanced economies on indirect tax revenues, so that their tax systems are less progressive (Bachas, Jensen, and Gadenne 2024; Bergolo et al. 2023). Lower-income groups could be

protected by shifting the base of revenue collection from indirect to direct taxes, or by increasing the progressivity of direct or indirect taxes (Lustig 2022).

Countries can increase the progressivity of indirect taxes by imposing higher consumption tax rates on goods and services that are mostly consumed by high-income households. In *India*, for example, a recent 10-percentage-point cut in VAT rates for non-luxury products has increased equity at relatively low efficiency costs, with price reductions passing through to consumers and limited product relabeling (Bachas, Bhering, and Ghosh 2025).

Policies that broaden the tax base can help shift tax revenue from indirect to direct taxes. Increasing tax rates on higher incomes and adjusting thresholds for income tax brackets can increase the progressivity of direct taxes. Pakistan, for example, ranks among the EMDEs with the widest range of tax rates and the widest range of income thresholds across personal income tax brackets, which makes its income tax regime relatively progressive. Income taxes can also be made more progressive by removing exemptions for high-income groups and raising the income bracket of the highest tax rate so that the highest-income groups are taxed at higher effective rates.

South Asia is home to 7 percent of the world's billionaires (Forbes 2024). In 2020, for example, almost 10 percent of Dubai's real estate was owned by investors from South Asia (Alstadsæter et al. 2022). On average, the effective rate on the wealth of global billionaires is below 0.5 percent (Alstadsæter et al. 2024). More taxation of wealth or real estate taxation could, in principle, be an attractive option for raising revenues and increasing progressivity (World Bank 2024d; 2025d). In India, for example, it has been estimated that a tax of 2 percent on the net wealth of the 167 wealthiest families in 2022 would have increased total revenues by 0.5 percentage points of GDP (Bharti et al. 2024).

Enforcing compliance with such taxes can be challenging. More effective taxation of wealth or high incomes would require a strong cross-country information exchange on assets (including real estate) and sound asset valuations. It would also require a mechanism that takes into account the ability of high-net-worth individuals to relocate abroad for tax purposes—for example a global asset registry and a capacity to continue the taxation of wealthy, long-term residents for some years after departure, as proposed by Alstadsæter et al. (2024). An automatic, cross-country exchange of bank information could significantly improve compliance; real estate assets, which can be large, typically fall outside its perimeter but the fact that they are immobile provides opportunities for tax enforcement.

Global reforms to coordinate the taxation of multinational corporations—as spearheaded by the OECD—could have benefited South Asia. For South Asia, average net revenues from taxation of multinational corporations in line with the proposed "Multilateral Convention to Implement Amount A of Pillar One" have been estimated to amount to 1.8–2.6 percent of 2025 corporate income tax revenues (Barake and Le Pouhaër 2024). That said, the presence of multinational

corporations in South Asia is limited: in 2023, net FDI inflows accounted for only 0.8 percent of GDP in South Asia, compared with about 1.5 percent of GDP in other EMDEs (UNCTAD 2024). Yet, *India* is estimated to have lost 5 percent of corporate income tax revenues in 2021 from the shifting of profits of multinational corporations into tax havens (Tørsløv, Wier, and Zucman 2023).

5.2 Tax administration

In addition to tax policy changes, tax administration could be strengthened in all South Asian countries. A growing literature has quantified the impact of specific policy interventions in EMDEs. Beyond these interventions, best practices include transparency, sound risk management, and timeliness.

Okunogbe and Tourek (2024) assemble 26 studies on the revenue impact of specific policy interventions, which cover 17 EMDEs (including India and Pakistan), 87 interventions, and three types of taxes (corporate and personal income tax, and VAT). The estimated revenue impacts and the standard errors of these estimates can be used for a meta-regression analysis. These studies do not report net effects that weigh revenue gains against the implementation cost of interventions. However, these costs are typically either low (for example, sending letters to tax offenders) or fixed and amortized over a few years (for example, implementing digital registries). While the design of these interventions varied widely, a few patterns emerge.

The highest average revenue gains were from interventions aimed at raising VAT or personal income tax revenues: on average in these cases, revenues rose by about 80 percent (table 4). The studies examined four types of interventions: strengthening the incentives or deployment of tax officials, improving taxpayer identification and fraud detection by using third-party data and facilitating more rigorous collection. The effectiveness of interventions differed by type of intervention and by country characteristics.

The largest revenue increases were achieved with two types of inventions: strengthening enforcement, and strengthening the incentives or deployment of tax officials.

Enforcement. Interventions to facilitate enforcement and enable sanctions significantly increased compliance and revenues. When information about tax audits was mailed to small- and medium-sized firms in Uruguay, their VAT compliance rose by 7 percent in the first year and the effect persisted for several years (Bergolo et al. 2023). When tax authorities in Colombia called tax debtors by phone to invite them to a meeting at the local tax authority, collection of unpaid taxes rose by 25 percent (Mogollon, Ortega, and Scartascini 2021).

Incentives and deployment of tax officials. In Pakistan's Punjab, a scheme of merit-based re-assignment of tax officials significantly raised revenues (Khan, Khwaja, and Olken 2019). In Indonesia, a large reform of corporate tax administration, which increased the number of tax officials per taxpayer, almost tripled the related tax revenues (Basri et al. 2021). In Peru, revenues were increased by enforcement actions that targeted administrative effort toward the greatest

expected revenue collection (Del Carpio, Kapon, and Chassang 2022). In the Democratic Republic of Congo, replacing tax collectors in the bottom quartile of enforcement performance raised revenues by almost half; involving village chiefs raised revenues further (Balán et al. 2022; Bergeron, Tourek, and Weigel 2023).

Facilitating collections. In Peru and Ethiopia, increases in e-invoicing for VAT significantly increased tax compliance but had a less pronounced effect on revenue collection (Bellon et al. 2022; Mascagni, Mengistu, and Woldeyes 2021). Effects were also disappointing when an intervention in Uruguay increased the use of electronic payments by offering VAT rebates: the use of electronic payments did increase but there was no increase in tax compliance by firms (Brockmeyer and Sáenz Somarriba 2025). In Papua New Guinea, nudges to encourage tax filing did increase compliance but the taxpayers most likely to respond were those who were exempt (Hoy, McKenzie, and Sinning 2021).

Taxpayer identification. VAT systems can invite the creation of ghost firms and invoices to fraudulently claim refunds. In Delhi, third-party verification significantly increased VAT revenue collection (Mittal and Mahajan 2017). In Ecuador, letters were sent to firms to inform them of investigations into ghost VAT claims and request the submission of amended tax returns. Among the firms that responded, reported transactions rose significantly but so did VAT claims, resulting in only minor increases in tax collections (Carrillo, Pomeranz, and Singhal 2017; Carrillo et al. 2023). Beyond VAT, in Costa Rica, a doubling of the withholding rate improved tax compliance and raised aggregate sales tax revenues by 8 percent, and third-party reporting also raised income-tax reporting (Brockmeyer and Hernandez 2016).

In addition to specific interventions, a growing literature has assessed how improved organization of tax administration can help strengthen revenue collection. Empirical evidence for EMDEs reviewed in Jensen and Weigel (2024) suggests that revenues are higher when tax administration is organized in a hierarchical structure with high specialization and rules-based decision-making. This could include, for example, a separation of audit and collection functions. However, government legitimacy is a prerequisite for effective tax collection.

The Tax Administration Diagnostic Assessment Tool (TADAT)—developed by a coalition of governments and international organizations, including the World Bank and IMF—provides granular assessments of tax administration capacity but, for South Asia, only publishes assessments for Pakistan (Khwaja et al. 2021). TADAT identifies 32 features of robust tax administration, which fall into several broad categories. They include, but go well beyond, the interventions examined in the literature described above, to include the integrity of the registered taxpayer database, effective risk management, supporting voluntary compliance, timely tax filing and payment, accurate reporting, effective tax dispute resolution, efficient revenue management, and accountability and transparency. The assessment for Pakistan identifies compliance risk

management, the timeliness of tax declaration filings, tax dispute resolutions, and tax payments, as well as the monitoring of inaccurate reporting as the main areas needing improvement.

The potential of digital technologies. Digital technologies can help identify taxpayers, strengthen reporting, and facilitate collection (Okunogbe and Santoro 2023). First, biometric national identification cards such as India's "Aardhar Card", Kenya's "Huduma Namba" national ID, and Ghana's "Ghana Card" allow tax authorities to identify potential taxpayers and integrate different systems, for example customs and VAT data. However, identification alone may not raise revenues unless it is accompanied by strengthened enforcement and sanctions, as recent experience in Liberia has shown (Okunogbe 2021). Second, digital technologies can also improve reporting. For example, in Ethiopia, the rollout of cash registers that automatically recorded and transmitted transactions increased VAT revenues by almost one-half. In China, a shift to electronic receipts raised VAT revenues (Fan et al. 2023). Third, digital reporting and risk assessment can help detect fraud by cross-checking with third-party data. In Pakistan, for example, the introduction of electronic VAT filing and computerized risk analysis reduced refund claims by one-half and led to the detection of a significantly larger number of fraudulent claims than had manual assessments (Shah 2023). Fourth, digital means can facilitate collections. For example, electronic transactions can readily be taxed through digital means. In Costa Rica, credit card companies withhold sales tax (Brockmeyer and Hernandez 2016). Ghana, Tanzania, and Uganda levy taxes on mobile money transactions.

5.3 The potential of pollution pricing

Because of its exceptionally high pollution levels, and the concentration of its population in the most polluted area—the Indo-Gangetic Plain and Himalayan Foothills— South Asia could benefit substantially from pollution pricing. This could take the form of pollution taxation or pollution trading, which are both increasingly being introduced around the globe, typically in the context of carbon emissions but also aimed at tackling air or water pollution. In 2022, 46 countries were pricing emissions, either in the form of pollution taxes or through emissions trading schemes (Black, Parry, and Zhunussova 2022). In 2023, carbon pricing instruments, for example, generated US$104 billion—0.7 percent of global tax revenue and more than five times what was generated from them in 2010 (World Bank 2024d).

In 2022, 49 percent of South Asia's population was exposed to fine particulate matter in the air at levels ten times higher than considered safe by the World Health Organization (WHO; over 50 µg/m3 of PM2,5; Rentschler and Leonova 2022). This is higher than in any other EMDE region. Air pollution is highest in the airshed of the Indo-Gangetic Plain and Himalayan Foothills, where more than half of South Asia's population lives. In Uttar Pradesh—India's most populous state—more than 95 percent of the population is exposed to hazardous air pollution and the share is above 70 percent in six other predominantly Northern Indian states. The poor are

disproportionately affected, because they are less able to afford mitigation measures, such as migrating to less polluted areas, or healthcare treatments (Damania et al. 2023).

South Asia is also the EMDE region with the most polluted water. In 2021, 2.9 percent of deaths in the region were attributed to unsafe water sources. In six of South Asia's eight countries, water is less safe than the average of other EMDEs. Water pollution is highest in India, Bangladesh, and Pakistan, all three of which rank in the quartile of EMDEs with the most polluted water.

5.3.1 Pollution taxes

In 1991, Sweden was among the first countries to introduce a carbon tax, and it imposes one of the highest carbon tax rates worldwide. The tax generated about 1 percent of total tax revenues in 2022 and is estimated to have lowered emissions by 30 percent between 1991 and 2015 (Martinsson et al. 2024; World Bank 2023c). Among EMDEs, 11 countries have introduced carbon taxes to disincentivize polluting activities.[5] In 2014, for example, *Mexico* implemented a national carbon upstream excise tax, which is collected from producers and importers on a monthly basis and capped at 3 percent of a product's sales price. In 2023, this pollution tax generated 0.2 percent of total tax revenue (US$437 million). Carbon taxes have also been put in place in *South Africa* (0.1 percent of total tax revenue, or US$127 million, in 2023), Argentina (0.1 percent, or US$198 million), *Colombia* (0.2 percent, or US$124 million), and *Uruguay* (1.3 percent, or US$275 million) (World Bank 2024d). In South Asia, a gradually implemented, moderate carbon tax might raise government revenues by about 1.3 percentage points of GDP, on average, by 2030 (Mercer-Blackman, Milivojevic, and Mylonas 2024).

Taxes have also been put in place for water pollution. Among EMDEs, examples include rapidly rising levies in *China* for the three pollutants that most exceed standards; an environmental tax for chemical oxygen demand (dubbed "COD") emissions in China's Jiangsu Province; and fees for residual pollution after wastewater treatment in *Colombia* and *Malaysia* (Olmstead and Zheng 2021). These schemes have been shown to significantly lower water pollution—by about 40 percent in Jiangsu, *China* between 2009 and 2011 (He and Zhang 2018); by 27–45 percent in *Colombia* between 1993 and 2005 (Blackman 2006); and by more than 70 percent in Malaysia between 1978 and 1991 (Kathuria 2006). However, their revenue impacts have not been rigorously assessed.

5.3.2 Pollution markets

Pollution markets price pollution through the trading of a limited number of pollution allowances issued by the government for each compliance period (Coase 1960). Markets for emission certificates have been introduced in the European Union and the United States, and are generally considered effective and efficient in reducing air pollution (Dechezleprêtre, Nachtigall, and

[5] These are Argentina, Albania, Chile, Colombia, Hungary, Mexico, Nepal, Poland, Ukraine, Uruguay, and South Africa.

Venmans 2023; Martin, Muûls, and Wagner 2016). In EMDEs, they are still rare and there are no water pollution trading schemes. Surat in *India's* state of Gujarat introduced the world's first emissions market for particulate matter in 2019. *China's* Guangdong province launched a carbon market for 200 industrial companies in 2013.

Both schemes have been shown to lower pollution, but the revenue raised from them has thus far been modest. The Gujarat scheme lowered pollution by 20–30 percent between 2019 and 2021, while the Guangdong scheme lowered pollution by 17 percent between 2011 (in anticipation of the scheme) and 2016 (Greenstone et al. 2025; World Bank 2024d; Zhu et al. 2022). The license auctions for these pollution trading schemes have also raised revenues, amounting to 0.7 percent of state revenues in Guangdong in 2022 (World Bank 2024d). In Gujarat, revenues from auctioning 20 percent of pollution permits have so far been used to cover direct administrative costs and are therefore not separately reported as state revenues. Globally, there has been a shift since about 2016 toward allocating licenses using auctions. As a result, the vast majority of global government revenues from carbon pricing now comes from pollution markets.

Market-based mechanisms tend to have the advantage of lower costs of coordination and monitoring, which is particularly relevant for EMDEs with limited institutional capacity (Duflo et al. 2018; World Bank 2023d). Thus, in Gujarat, the decline in emissions was associated with higher rates of compliance and lower abatement costs than in firms operating under command-and-control regulations (Greenstone et al. 2025).

The pilot cases in Gujarat and Guangdong have helped demonstrate the potential effectiveness of emission trading systems in reducing air pollution and raising revenues in EMDEs. New emission trading systems are being planned by governments in at least seven other EMDEs—Brazil, Colombia, India, the Russian Federation (Sakhalin), Türkiye, Ukraine, and Viet Nam (World Bank 2024d). In India, parliament has passed the necessary legislation for its planned national carbon trading scheme, which is expected to be formally adopted, with compliance obligations in force, by 2025–26 (ICAP 2023; Singh 2023).

To be effective, pollution pricing requires monitoring and enforcement. The significant decline in Colombian water pollution between 1993 and 2005 was partly the result of improved monitoring and enforcement by regulatory authorities (Blackman 2006). Similarly, water pollution levies have historically been most effective in Chinese provinces with more rigorous monitoring and enforcement systems (Wang and Wheeler 2003). Monitoring can be easier if conducted on fewer, larger firms and this can also make pollution pricing a progressive form of taxation. For example, the pollution market in Gujarat was implemented in a cluster of 317 industrial plants that were considerably larger than the average firm in South Asia (Greenstone et al. 2025; World Bank 2024e). Emissions trading schemes require additional, more sophisticated administrative and monitoring systems than emission taxes, which can typically be integrated into existing fuel taxation, revenue collection, and budgeting processes (Parry, Black, and Zhunussova 2022).

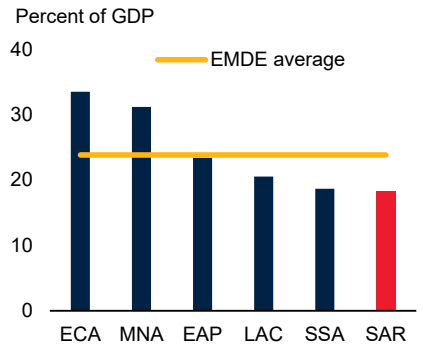
Revenue generation from pollution taxes and markets has been documented most rigorously for carbon taxes and trading systems. Many important air pollutants are non-carbon gases, such as particulate matter, ground-level ozone, sulfur dioxide, and nitrogen oxides. Two prominent examples of emission taxes in EMDEs that also target non-carbon gases were introduced in Viet Nam in 2012 and China in 2018. In both cases, data on revenues—around US$3 billion for China in 2023 and US$2 billion for Viet Nam in 2018—do not distinguish carbon and non-carbon components (CEIC 2021; Chinese Tax Administration 2024).

Over time, pollution pricing will tend to become a victim of its own success. When pollution declines to acceptable levels—admittedly a distant prospect in South Asia—revenues from these measures will dry up. That means that pollution pricing could be a transitional source of revenues, most powerful when implemented as part of a policy package that also enhances administrative capacity and revenue collection from other sources.

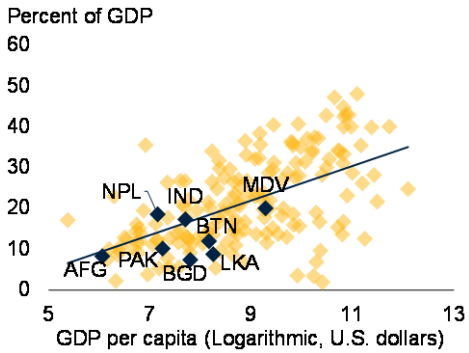
Figures and tables

Figure 1. Revenues

A. General government revenues, 2019–23



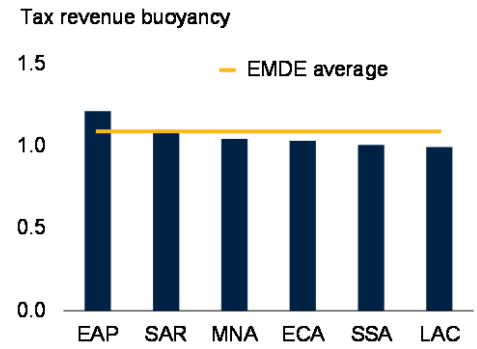
B. Per capita income and tax revenues, 2019–23



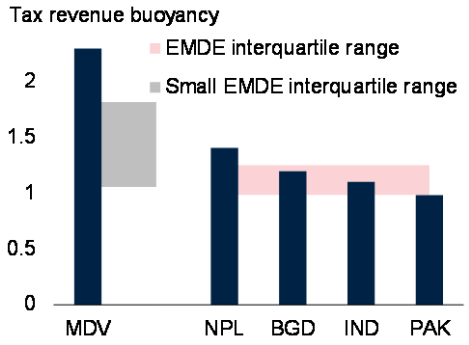
Sources: Haver Analytics; IMF Government Finance Statistics (database); UNU-WIDER; World Bank Fiscal Survey (database); World Development Indicators (database); World Bank.
Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; EAP = East Asia and the Pacific; ECA = Europe and Central Asia; EMDE = emerging market and developing economy; IND = India; LAC = Latin America and the Caribbean; LKA = Sri Lanka; MDV = Maldives; MNA = Middle East and North Africa; NPL = Nepal; PAK = Pakistan; SAR = South Asia; SSA = Sub-Saharan Africa. All revenues refer to general government revenues.
A. Total revenue excludes grants. EMDE average is nominal GDP-weighted average of 140 EMDEs.
B. Per capita income in nominal US dollar. Straight line represents linear relationship between GDP per capita and tax revenue as a percent of GDP.

Figure 2. Literature review: Tax revenue buoyancies

A. Buoyancies across regions

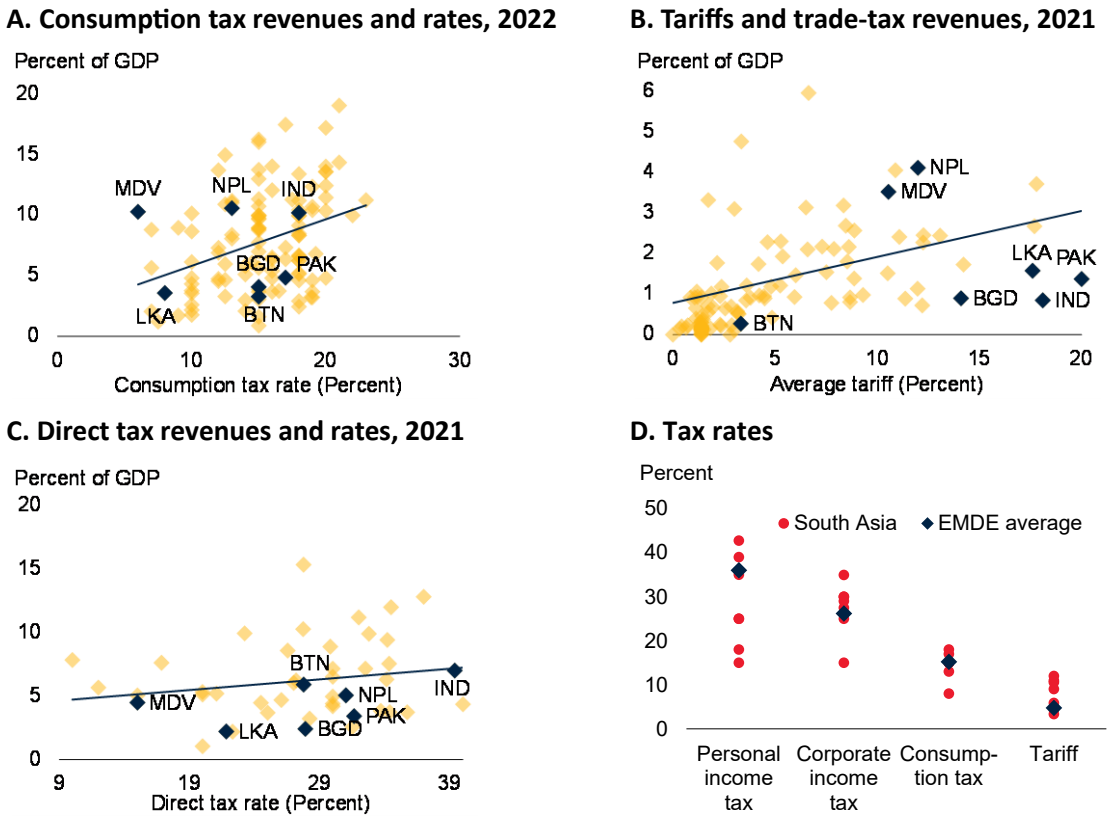


B. Buoyancies within South Asia



Sources: Dudine and Jalles (2018); Gupta, Jalles, and Liu (2022); Khadan (2020); Lagravinese, Liberati, and Sacchi (2020); supplemented with buoyancy estimates from various country-specific studies (see appendix table A1.1).
Note: BGD = Bangladesh; EAP = East Asia and the Pacific; ECA = Europe and Central Asia; EMDE = emerging market and developing economy; IND = India; LAC = Latin America and the Caribbean; MDV = Maldives; MNA = Middle East and North Africa; NPL = Nepal. PAK = Pakistan; SAR = South Asia; SSA = Sub-Saharan Africa.
A. Sample comprises 148 countries, including 112 EMDEs. Aggregation uses nominal GDP as weights.
B. Red (gray) shades denote interquartile ranges across 107 other EMDEs (across 24 small state EMDEs).

Figure 3. Tax rates



Sources: Haver Analytics; IMF Government Finance Statistics (database); Trading Economics; UNU-WIDER; USAID Collecting Taxes Database; Vegh and Vuletin (2015); World Bank Fiscal Survey (database); World Development Indicators (database); World Bank.

Note: BGD = Bangladesh; BTN = Bhutan; EMDE = emerging market and developing economy; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan. Tax revenues refer to general government tax revenues.

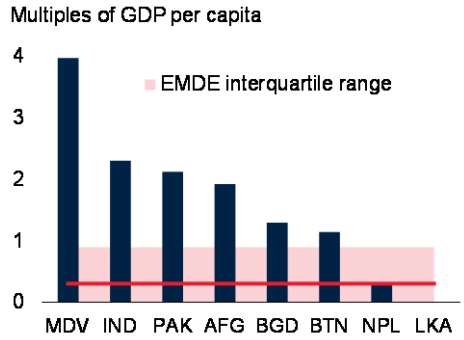
B. Average tariff rates. For Bangladesh, India, and Sri Lanka rates include para-tariffs (fees that resemble tariffs).

C. Direct tax rate is the weighted average of personal and corporate income tax rates, weighted by labor share of GDP.

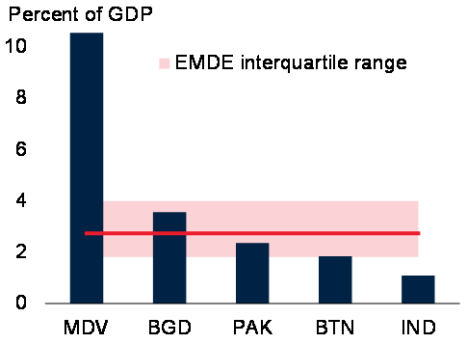
D. Personal and corporate income tax rates are from 2023, consumption tax rates are from 2024, and average tariff rates are from 2021. South Asia sample excludes Afghanistan.

Figure 4. Tax reform priorities for South Asia

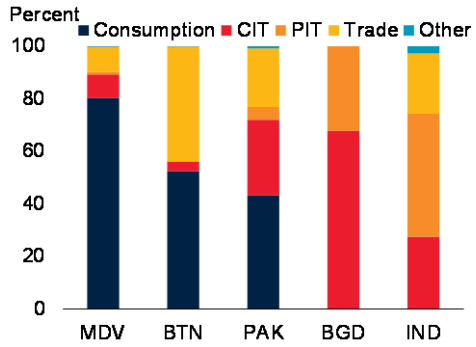
A. Income threshold for lowest personal income tax bracket, latest



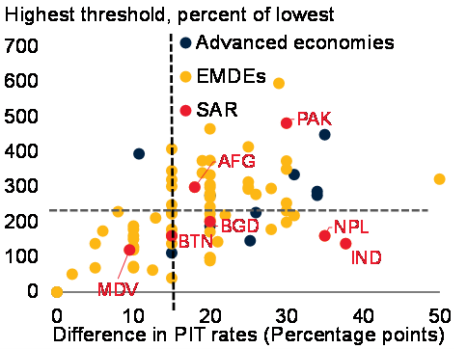
B. Revenues forgone due to exemptions and preferential tax treatments, 2021–23



C. Revenues forgone due to exemptions and preferential tax treatments, by tax, 2021



D. Range of personal income tax rates and thresholds, latest



Sources: IDOS and CEP Global Tax Expenditures Database; IMF 2023, 2024b, 2024d; USAID Collecting Taxes Database; World Bank 2021, 2023b, 2024c; World Bank.

Note: BGD = Bangladesh; BTN = Bhutan; EMDE = emerging market and developing economy; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan; SAR = South Asia.

A.B. Recommendations in latest World Bank and IMF reports to improve tax systems in South Asian countries. "Streamlining" includes the harmonization, simplification, and unification of different tax types or brackets.

A.D. Data are from 2022 or from 2021 if 2022 data are unavailable.

A.B. Red-shaded area shows interquartile range for 106 (C) and 53 (D) other EMDEs.

C. "Consumption" includes exemptions and preferential rates for VAT, goods and services, sales, and excise taxes.

D. Vertical axis indicates logarithm of ratio of income threshold for the highest and lowest tax brackets (in percent). Horizontal axis indicates the difference between the highest and lowest personal income tax rate (in percentage points). Vertical and horizontal lines indicate EMDE medians.

Table 1. Revenue and tax revenue components

	(1) General government revenue (excl. grants)	(2) Tax revenue	(3) Personal income tax revenue	(4) Corporate income tax revenue	(5) Consumption tax revenue	(6) Trade tax revenue
Afghanistan	13.4	8.3	0.9	0.3	2.3	**3.1**
Bangladesh	8.6	7.4	0.9	1.6	4.0	**0.8**
Bhutan	19.3	12.0	0.9	**4.8**	3.6	0.3
India	20.5	17.4	**2.9**	2.9	**10.0**	0.7
Maldives	**27.4**	20.1	0.2	**3.4**	**9.9**	**3.7**
Nepal	21.4	18.6	1.6	2.6	**9.9**	**3.6**
Pakistan	12.1	10.2		3.4	4.4	**1.4**
Sri Lanka	9.6	8.8	0.3	1.8	4.2	**1.5**
EMDE:						
average	23.9	20.4	2.1	3.4	8.8	0.7
25th percentile	20.9	16.1	1.2	2.9	7.9	0.3
75th percentile	27.3	22.9	2.9	3.6	9.6	0.7

Sources: Haver Analytics; IMF Government Finance Statistics (database); UNU-WIDER; World Bank Fiscal Survey (database); World Development Indicators (database); World Bank.
Note: For each country, numbers are average between 2019 to 2023. Numbers are as a percent of nominal GDP. Bold indicates value is greater than the average of EMDEs. Column (1): General government revenue excludes grants. EMDE average and percentiles are nominal GDP-weighted average and percentiles of 139 EMDEs. Column (2): Tax revenue includes social security contributions. EMDE average and percentiles are nominal GDP-weighted average and percentiles for 139 EMDEs. Columns (3)-(6): EMDE average and percentiles are nominal GDP-weighted average or percentiles of 115 EMDEs for personal income tax, 117 EMDEs for corporate income tax, 137 EMDEs for consumption tax revenue, and 135 EMDEs for trade tax revenue. Consumption tax includes VAT, goods and services taxes, sales taxes, and excise taxes. Decomposition of direct tax revenues into personal and corporate income tax revenues is missing for Pakistan, and so total direct taxes excluding social security is shown.

Table 2. Tax revenue shortfalls

	(1)	(2)	(3)	(4)	(5)	(6)
	Personal income tax revenue	Corporate income tax revenue	Consumption tax revenue	Trade tax revenue	Robustness: Personal income tax revenue	Robustness: Consumption tax revenue
Afghanistan	**0.85**	**-**	**4.28**	**-**	**0.87**	**-**
Bangladesh	**1.07**	**1.56**	**4.09**	**0.50**	**1.02**	**3.73**
Bhutan	**1.48**	**-**	**4.14**	**0.92**	**1.33**	**2.91**
India	0.25	**1.16**	0.39	**0.29**	0.21	0.66
Maldives	**1.37**	**-**	0.08	0.11	**1.47**	0.15
Nepal	**0.53**	**-**	0.30	0.10	**0.42**	0.58
Pakistan	***1.43***	*0.63*	**4.64**	0.10	***1.62***	**4.12**
Sri Lanka	**1.42**	**1.50**	**2.09**	0.07	**1.35**	**1.39**
EMDE:						
average	0.50	0.71	1.62	0.22	0.45	1.50
25th percentile	0.18	0.44	0.24	0.10	0.14	0.46
75th percentile	0.62	0.83	2.72	0.25	0.61	2.26

Sources: Haver Analytics; IMF Government Finance Statistics (database); ILO; UNU-WIDER; USAID Collecting Taxes Database; Vegh and Vuletin (2015); World Development Indicators (database); World Bank Fiscal Survey; World Integrated Trade Solution Database; World Bank. Appendix table A2.6 lists data sources for each variable used.
Note: Tax revenue shortfall is the difference between potential and actual tax revenues, expressed as a percent of GDP. Bold indicates value is greater than the average of EMDEs. Potential tax revenues are obtained as the ratio of actual tax revenue and the efficiency score derived from stochastic frontier analysis with tax rate and potential tax base. Sample comprises 158 EMDEs. Values shown are the average of 2020 to the most recent year. For Pakistan, shortfalls of personal and corporate income tax revenues are the averages since 2015 (in *italics*). Column (1): Personal income tax rate is the average of the highest and lowest tax rates. Potential tax base is labor income (percent of GDP). Estimation results are in column (1) appendix table A2.1. Column (2): Potential tax base for corporate income tax revenue is market capitalization for listed domestic companies (percent of GDP), which is available for four South Asian countries. Estimation results are in column (1) of appendix table A2.2. Column (3): Tax base for consumption revenue is private consumption (percent of GDP). Estimation results are in column (1) of appendix table A2.3. Column (4): Tax base for trade revenue is goods imports (percent of GDP). Estimation results are in column (1) of appendix table A2.4. Estimated shortfall for trade tax revenue does not include the shortfall accounting for para-tariffs. Column (5): Robustness check on personal income tax revenue with the highest tax rates as personal income tax rate. Estimation results are in column (1.1) of appendix table A2.1. Column (6): Robustness check on consumption tax revenue with longer sample including observations during 1989–2023. Estimation results are in column (1.1) of appendix table A2.3.

Table 3. Tax gaps

	Accounting for informality, size of agriculture sector, and financial development			Accounting for governance quality		
	(1)	(2)	(3)	(4)	(5)	(6)
	Personal income tax	Corporate income tax	Consumption tax	Personal income tax	Corporate income tax	Consumption tax
Bangladesh	**0.89**	**0.91**	**3.66**	**1.31**	**0.92**	**4.00**
Bhutan	**0.60**	-	**2.90**	**-**	-	**-**
India	-	**0.78**	**-**	-	**0.70**	-
Maldives	**1.12**	-	-	**-**	-	-
Nepal	**0.12**	-	-	**-**	-	-
Pakistan	***0.93***	*0.31*	**3.25**	***1.30***	*0.45*	**4.68**
Sri Lanka	**1.18**	**0.92**	**1.79**	**1.30**	**0.83**	1.62
EMDE:						
average	0.44	0.57	1.50	0.50	0.53	1.63
25th percentile	0.07	0.42	0.65	0.20	0.43	0.32
75th percentile	0.53	0.71	2.10	0.66	0.60	2.81

Sources: Haver Analytics; IMF Government Finance Statistics (database); ILO; UNU-WIDER; USAID Collecting Taxes Database; Vegh and Vuletin (2015); World Development Indicators (database); World Bank Fiscal Survey; World Bank. Appendix table A2.6 lists data sources for each variable used.

Note: Tax gap is the difference between potential and actual tax revenues, expressed as a percent of GDP, where the potential tax revenue accounts for policy controls in addition to tax rate and tax base. Bold indicates value is greater than the average of EMDEs. Tax gap shown only for country and tax type with a tax revenue shortfall greater than EMDE average in Table 2. Potential tax revenues are obtained as the ratio of actual tax revenue and the efficiency score derived from stochastic frontier analysis with tax rate, potential tax base, and additional policy controls. Additional policy control comprises self-employment and financial development for personal income tax (column 1), agricultural output and financial development for corporate income tax and consumption tax (columns 2 and 3). For columns (4)-(6), additional policy control is a governance quality score constructed as the scaled average of the ICRG bureaucracy quality and corruption scores and available for four South Asian countries (Bangladesh, India, Pakistan, and Sri Lanka). Values shown are the average of 2020 to the most recent year. For Pakistan, shortfalls of personal and corporate income tax revenues are the averages since 2015 (in *italics*). Estimation results are in column (4) of appendix tables A2.1-A2.3, and columns (1)-(3) of appendix table A2.4.

Table 4. Revenue increases following policy reforms: Estimates from the literature

	VAT	Personal income tax	Corporate income tax	Direct tax
Total	**83.52**	**85.63**	**51.67**	**-**
	[14.49]	[13.99]	[13.17]	-
Enforcement	**98.58**	**144.49**	54.48	**112.72**
	[30.72]	[28.10]	[35.09]	[23.89]
Facilitation	0.02	21.41	**100.10**	35.72
	[00.01]	[19.99]	[00.50]	[18.80]
Identification	**80.48**	**57.23**	**41.32**	**49.28**
	[20.98]	[17.10]	[12.24]	[10.41]
Tax officials	**97.16**	**134.24**	-	**134.24**
	[25.27]	[11.72]	-	[11.72]

Sources: Okunogbe and Tourek (2024); World Bank.

Note: Direct taxes comprise CIT and PIT. The results of the meta-regression analysis shown here are based on estimated revenue impacts and the standard errors of these estimates from a range of studies. The studies varied widely in their design such that the scale of interventions cannot be compared. Numbers indicate average revenue impact of 87 interventions in 17 countries, estimated in 26 studies. Standard error in brackets. Bolded numbers are statistically significant at 5 percent level.

Appendix 1. Literature review: Tax buoyancies

South Asia's low revenue-to-GDP ratios could reflect small tax bases or a lack of responsiveness of revenues to the region's rapidly growing tax base. The responsiveness of revenues to the tax base is captured by a country's "tax revenue buoyancy," measured as the ratio of changes in tax revenues to changes in the tax base (often assumed to be GDP). A tax revenue buoyancy above one indicates that revenues grow faster than GDP.

A large body of literature has estimated tax revenue buoyancies for specific countries or country groups, including South Asian countries. A systematic review of the literature finds 55 studies that have estimated country-level revenue buoyancies from 1977 until 2019. These studies cover 148 economies, including 112 EMDEs and five countries from South Asia. By construction, robust tax revenue buoyancy estimates are time-invariant across the underlying time period. The meta-analysis therefore presents a purely cross-sectional comparison of recent tax revenue buoyancies and abstracts from possible changes within countries over time. For countries that are covered by multiple studies, estimates are selected from the study with the longest and most recent period; studies published in peer-reviewed journals are prioritized (appendix table A1.1).

In Bangladesh and India, tax buoyancies are broadly in line with those of other EMDEs, whereas Nepal's tax buoyancy ranks in the top quartile of EMDEs and Pakistan's in the bottom quartile (figure 2). On average, South Asia's tax revenue buoyancy is around one, indicating that tax revenues grow proportionally to changes in tax bases, as they do in the average EMDE.

These results suggest two types of policy priorities for South Asia.

Under-taxation of main sources of growth. Below-average tax buoyancies, as in Pakistan, indicate that economic growth is disproportionately generated by under-taxed economic activities. In Pakistan, for example, the agriculture sector accounted for about one-fifth of cumulative growth during 2010–19, compared with less than one-tenth in the average EMDE. In many parts of Pakistan, the agriculture sector faces considerably lower income tax rates than do non-agriculture sectors. A priority for raising tax revenues is therefore to increase taxation of agricultural activity (IMF 2024d).

Economic structure, exemption, tax administration. Elsewhere in South Asia, where tax buoyancies are broadly in line with the EMDE average and around one, low revenue ratios point to weak tax administration, tax bases hollowed out by exemptions, or a composition of economic output that favors undertaxed activities. The following section aims to assess the latter factor: the role of the structure of economies.

Table A1.1. Tax revenue buoyancies from the literature

Economy	*Period*	*Reference*	*Buoyancy*
Algeria	1980-2014	Dudine and Jalles (2018)	1.21
Angola	1980-2017	Gupta, Jalles, and Liu (2022)	1.10
Antigua and Barbuda	1993-2017	Khadan (2020)	1.37
Argentina	1980-2014	Dudine and Jalles (2018)	1.14
Aruba	1993-2017	Khadan (2020)	0.87
Australia	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.90
Austria	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.93
Azerbaijan	1980-2014	Dudine and Jalles (2018)	0.98
Bahamas, The	1993-2017	Khadan (2020)	2.40
Bangladesh	1980-2014	Dudine and Jalles (2018)	1.20
Barbados	1990-2019	Ochieng and Mamingi (2022)	1.07
Belarus	1980-2014	Dudine and Jalles (2018)	0.75
Belgium	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.92
Belize	1993-2017	Khadan (2020)	1.20
Benin	1980-2017	Gupta, Jalles, and Liu (2022)	1.18
Bolivia	1980-2014	Dudine and Jalles (2018)	1.28
Botswana	1982-2001	Botlhole and Agiobenebo (2006)	1.98
Brazil	1980-2014	Dudine and Jalles (2018)	0.98
Bulgaria	1999-2017	Tanchev and Todorov (2019)	0.89
Burkina Faso	1980-2017	Gupta, Jalles, and Liu (2022)	1.29
Burundi	1980-2017	Gupta, Jalles, and Liu (2022)	0.99
Cabo Verde	1980-2017	Gupta, Jalles, and Liu (2022)	1.20
Cameroon	1980-2017	Gupta, Jalles, and Liu (2022)	1.25
Canada	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.92
Central African Republic	1980-2017	Gupta, Jalles, and Liu (2022)	0.68
Chad	1980-2017	Gupta, Jalles, and Liu (2022)	1.40
Chile	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.66
China	1980-2014	Dudine and Jalles (2018)	1.24
Colombia	1980-2014	Dudine and Jalles (2018)	1.25
Comoros	1980-2017	Gupta, Jalles, and Liu (2022)	1.07
Congo, Dem. Rep.	1980-2017	Gupta, Jalles, and Liu (2022)	0.99
Congo, Rep.	1980-2014	Dudine and Jalles (2018)	1.09
Côte d'Ivoire	1980-2014	Dudine and Jalles (2018)	1.04
Croatia	1980-2014	Dudine and Jalles (2018)	1.03
Cyprus	1980-2014	Dudine and Jalles (2018)	1.45
Czechia	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.82
Denmark	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	1.01
Djibouti	1993-2017	Khadan (2020)	0.39

Dominica	1993-2017	Khadan (2020)	1.51
Dominican Republic	1980-2014	Dudine and Jalles (2018)	1.07
Ecuador	1980-2014	Dudine and Jalles (2018)	1.38
Egypt, Arab Rep.	1980-2014	Dudine and Jalles (2018)	0.97
Equatorial Guinea	1980-2017	Gupta, Jalles, and Liu (2022)	0.90
Estonia	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.72
Eswatini	1993-2017	Khadan (2020)	1.58
Ethiopia	1980-2014	Dudine and Jalles (2018)	1.32
Fiji	1993-2017	Khadan (2020)	1.82
Finland	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.91
France	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.93
Gabon	1980-2017	Gupta, Jalles, and Liu (2022)	0.85
Germany	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.91
Ghana	1980-2017	Gupta, Jalles, and Liu (2022)	1.16
Greece	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.81
Grenada	1993-2017	Khadan (2020)	1.20
Guinea	1980-2014	Dudine and Jalles (2018)	1.23
Guinea-Bissau	1980-2017	Gupta, Jalles, and Liu (2022)	1.10
Guyana	1993-2017	Khadan (2020)	2.32
Haiti	1980-2014	Dudine and Jalles (2018)	1.30
Honduras	1980-2014	Dudine and Jalles (2018)	1.03
Hungary	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.85
Iceland	1995-2016	Lagravinese, Liberati, and Sacchi (2020)	0.65
India	1980-2014	Dudine and Jalles (2018)	1.10
Indonesia	1980-2014	Dudine and Jalles (2018)	1.11
Iran, Islamic Rep.	1980–2014	Dudine and Jalles (2018)	1.03
Ireland	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	1.05
Israel	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.88
Italy	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.93
Jamaica	1998–2010	Milwood (2011)	1.09
Japan	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.93
Kazakhstan	1980–2014	Dudine and Jalles (2018)	1.11
Kenya	1980–2017	Gupta, Jalles, and Liu (2022)	1.05
Kiribati	1993–2017	Khadan (2020)	0.72
Korea, Rep.	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.79
Kuwait	1980–2014	Dudine and Jalles (2018)	0.96
Kyrgyz Republic	1980–2014	Dudine and Jalles (2018)	1.18
Lao PDR	1980–2014	Dudine and Jalles (2018)	1.35
Latvia	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.84
Lesotho	1992–2015	Koatsa and Nchake (2017)	1.25
Libya	1980–2014	Dudine and Jalles (2018)	0.07

Luxembourg	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.89
Macao SAR, China	1993–2017	Khadan (2020)	1.65
Madagascar	1980–2017	Gupta, Jalles, and Liu (2022)	1.02
Maldives	1993–2017	Khadan (2020)	2.30
Mali	1980–2017	Gupta, Jalles, and Liu (2022)	1.23
Malta	1993–2017	Khadan (2020)	1.57
Mauritius	1980–2017	Gupta, Jalles, and Liu (2022)	0.99
Mexico	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.90
Moldova	1980–2014	Dudine and Jalles (2018)	1.02
Montenegro	1993–2017	Khadan (2020)	2.18
Morocco	1980–2014	Dudine and Jalles (2018)	1.20
Mozambique	1980–2017	Gupta, Jalles, and Liu (2022)	1.09
Myanmar	1980–2014	Dudine and Jalles (2018)	1.36
Nepal	1980–2014	Dudine and Jalles (2018)	1.41
Netherlands	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.89
New Zealand	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.90
Nicaragua	1980–2014	Dudine and Jalles (2018)	1.22
Niger	1980–2017	Gupta, Jalles, and Liu (2022)	1.31
Nigeria	1980–2014	Dudine and Jalles (2018)	0.86
Norway	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.94
Oman	1980–2014	Dudine and Jalles (2018)	1.27
Pakistan	1979–2015	Shahzada et al. (2016)	0.98
Palau	1993–2017	Khadan (2020)	3.16
Papua New Guinea	1980–2014	Dudine and Jalles (2018)	1.12
Peru	1980–2014	Dudine and Jalles (2018)	1.14
Philippines	1980–2014	Dudine and Jalles (2018)	1.06
Poland	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.81
Portugal	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.84
Qatar	1980–2014	Dudine and Jalles (2018)	1.67
Romania	1980–2014	Dudine and Jalles (2018)	1.07
Russian Federation	1980–2014	Dudine and Jalles (2018)	1.11
Rwanda	1980–2017	Gupta, Jalles, and Liu (2022)	1.13
Samoa	1993–2017	Khadan (2020)	0.88
São Tomé and Principe	1993–2017	Khadan (2020)	0.73
Saudi Arabia	1980–2017	Gupta, Jalles, and Liu (2022)	0.80
Senegal	1980–2017	Gupta, Jalles, and Liu (2022)	1.16
Seychelles	1993–2017	Khadan (2020)	1.82
Sierra Leone	1977–2009	Kargbo and Egwaikhide (2012)	0.95
Singapore	1980–2014	Dudine and Jalles (2018)	0.84
Slovak Republic	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.81
Slovenia	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.86

Solomon Islands	1993–2017	Khadan (2020)	1.96
South Africa	1980–2014	Dudine and Jalles (2018)	1.07
Spain	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.85
St. Kitts and Nevis	1993–2017	Khadan (2020)	1.05
St. Lucia	1993–2017	Khadan (2020)	1.51
St. Vincent and the Grenadines	1993–2017	Khadan (2020)	1.15
Sudan	1980–2014	Dudine and Jalles (2018)	0.60
Suriname	1993–2017	Khadan (2020)	1.74
Sweden	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.95
Switzerland	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.96
Tajikistan	1980–2014	Dudine and Jalles (2018)	1.13
Tanzania	1980–2014	Dudine and Jalles (2018)	1.19
Thailand	1980–2014	Dudine and Jalles (2018)	1.21
Tonga	1993–2017	Khadan (2020)	1.05
Türkiye	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	1.05
Uganda	1980–2017	Gupta, Jalles, and Liu (2022)	1.13
Ukraine	1980–2014	Dudine and Jalles (2018)	1.12
United Arab Emirates	1980–2014	Dudine and Jalles (2018)	1.35
United Kingdom	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.92
United States	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.80
Uruguay	1980–2014	Dudine and Jalles (2018)	1.01
Uzbekistan	1980–2014	Dudine and Jalles (2018)	0.90
Vanuatu	1993–2017	Khadan (2020)	1.16
Venezuela, RB	1980–2014	Dudine and Jalles (2018)	1.04
Viet Nam	1980–2014	Dudine and Jalles (2018)	0.91
Yemen, Rep.	1980–2014	Dudine and Jalles (2018)	0.96
Zambia	1980–2017	Gupta, Jalles, and Liu (2022)	0.96
Zimbabwe	1980–2017	Gupta, Jalles, and Liu (2022)	1.07

Note: Tax buoyancy is the responsiveness of revenues to the tax base, measured as the ratio of changes in tax revenues to changes in the tax base (GDP).

Appendix 2. Regression results of the stochastic frontier analysis

Table A2.1. Personal income tax revenue

	Dependent variable: Personal income tax revenue (% GDP), log					
Variables	**(1)**	**(1.1)**	**(1.2)**	**(2)**	**(3)**	**(4)**
Personal income tax rate, average of highest and lowest rates (%), log	**0.189*** ** [0.065]		**0.260*** ** [0.066]	**0.233*** ** [0.067]	**0.262*** ** [0.061]	**0.338*** ** [0.063]
Personal income tax rate, highest rate (%), log		**0.124** ** [0.049]				
Potential tax base (labor income % GDP), log	**0.671*** ** [0.147]	**0.660*** ** [0.150]	**0.621*** ** [0.135]	**0.632*** ** [0.146]	**0.441*** ** [0.138]	**0.358** ** [0.144]
Self-employment (% total employment), log				**-0.596*** ** [0.085]		**-0.114** ** [0.048]
Financial development index, log					**0.743*** ** [0.039]	**0.724*** ** [0.046]
Constant	-2.288*** [0.610]	-2.167*** [0.637]	-2.407*** [0.610]	-0.123 [0.581]	-0.443 [0.554]	-0.275 [0.618]
Observations	1370	1437	1235	1365	1235	1235
Numbers of countries	111	113	104	111	104	104
Estimation sample period	2004–23	2004–23	2004–21	2004–23	2004–21	2004–21

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets. Results estimated using Stochastic Frontier Analysis with true random effects model (Greene 2005). Sample comprises EMDEs since 2000, with available observations starting in 2004. Personal income tax rate is the average of the highest and lowest rates, except in column (1.1) where the highest rate is used. Column (1.2) uses the same sample as column (4).

Table A2.2. Corporate income tax revenue

	Dependent variable: Corporate income tax revenue (% GDP), log					
Variables	**(1)**	**(1.1)**	**(2)**	**(3)**	**(4)**	**(4.1)**
Corporate income tax rate (%), log	**0.163**** [0.071]	**0.129**** [0.063]	**0.315***** [0.070]	**0.180***** [0.068]	**0.254***** [0.068]	1.525* [0.856]
Corporate income tax rate (%), log squared						-0.213 [0.146]
Potential tax base (market capitalization % GDP), log	**0.056***** [0.017]	**0.060***** [0.016]	**0.031*** [0.017]	**0.038**** [0.018]	**0.036**** [0.015]	**0.032*** [0.018]
Agriculture (% GDP), log			**-0.259***** [0.043]		**-0.099**** [0.040]	**-0.120**** [0.055]
Financial development index, log				**0.344***** [0.062]	**0.278***** [0.065]	**0.253***** [0.876]
Constant	0.581** [0.235]	0.757** [0.209]	0.498** [0.206]	0.856*** [0.214]	0.810*** [0.217]	-1.051 [1.253]
Observations	699	616	698	617	616	616
Numbers of countries	50	46	50	46	46	46
Estimation sample period	2000–22	2002–21	2000–22	2002–21	2002–21	2002–21

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets. Results estimated using Stochastic Frontier Analysis with true random effects model (Greene 2005). Column (1.1) uses the same sample as column (4).

Table A2.3. Consumption tax revenue

	Dependent variable: Consumption tax revenue (% GDP), log						
Variables	**(1)**	**(1.1)**	**(1.2)**	**(2)**	**(3)**	**(4)**	**(4.1)**
Consumption tax rate (%), log	**0.642***** [0.101]	**0.732***** [0.036]	**0.648***** [0.048]	**0.762***** [0.041]	**0.566***** [0.046]	**0.548***** [0.035]	**1.902***** [0.252]
Consumption tax rate (%), log squared							**-0.273***** [0.051]
Potential tax base (consumption % GDP), log	**0.303***** [0.045]	**0.086**** [0.043]	**0.576***** [0.056]	**0.498***** [0.047]	**0.454***** [0.039]	**0.494***** [0.051]	**0.454***** [0.064]
Agriculture (% GDP), log				**-0.140***** [0.020]		**-0.058**** [0.022]	**-0.088***** [0.021]
Financial development index, log					**0.397***** [0.027]	**0.320***** [0.023]	**0.724***** [0.046]
Constant	-0.874** [0.414]	-0.262 [0.185]	-2.079** [0.241]	-1.901*** [0.178]	-0.746*** [0.198]	-0.212 [0.276]	-1.672*** [0.394]
Observations	1913	2118	1483	1891	1673	1483	1483
Numbers of countries	114	114	101	114	109	101	101
Estimation sample period	2000–23	1989–23	2002–21	2000–23	2002–21	2002–21	2002–21

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets. Results estimated using Stochastic Frontier Analysis with

true random effects model (Greene 2005). Total goods and services tax revenue includes revenues from goods and services taxes, sales taxes, value added tax, excise, and other taxes on consumption. Sample includes EMDEs since 2000, except column (1.1), which includes the full sample of EMDEs starting in 1989. Column (1.1) uses the same sample as column (4).

Table A2.4. Trade tax revenue

	Dependent variable: Trade tax revenue (% GDP), log		
Variables	**(1)**	**(2)**	**(3)**
Average tariff rate (%), log	**0.4009*** ** [0.0242]	**0.3564*** ** [0.0232]	**0.4742*** ** [0.0453]
Average tariff rate (%), log squared			**-0.0320** ** [0.0161]
Potential tax base (goods imports % GDP), log	**0.2793*** ** [0.0562]	**0.2664*** ** [0.0471]	**0.2440*** ** [0.0464]
Financial development index, log		**-0.5089*** ** [0.0580]	
Constant	-1.4695*** [0.2068]	-2.0095*** [0.2200]	-0.8406*** [0.1803]
Observations	1810	1747	1810
Numbers of countries	139	132	139
Estimation sample period	2002–21	2002–21	2002–21

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets. Results estimated using Stochastic Frontier Analysis with true random effects model (Greene 2005). Sample includes EMDEs since 2000, with available observations starting in 2002.

Table A2.5. Governance quality

Variables	(1) Personal income tax revenue (% GDP), log	(2) Corporate income tax revenue (% GDP), log	(3) Consumption tax revenue (% GDP), log
Personal income tax rate, average of highest and lowest rates (%), log	0.1395* [0.0721]		
Potential tax base (labor income % GDP), log	0.1729* [0.0890]		
Corporate income tax rate (%), log		0.1525** [0.0636]	
Potential tax base (market capitalization % GDP), log		0.0431** [0.0167]	
Consumption tax rate (%), log			0.7114*** [0.0420]
Potential tax base (consumption % GDP), log			0.3140*** [0.0600]
Average bureaucracy quality and corruption scores (ICRG), log	0.7643*** [0.0888]	0.2489** [0.1003]	0.0906** [0.0384]
Constant	0.3571 [0.6826]	0.8007*** [0.2168]	-1.0774*** [0.2508]
Observations	1010	608	1295
Numbers of countries	75	42	81
Estimation sample period	2004-23	2002-23	2002-23

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets. Results estimated using Stochastic Frontier Analysis with true random effects model (Greene 2005). Sample includes EMDEs since 2000, with available observations starting in 2002. The average bureaucracy quality and corruption scores (ICRG) is a scaled averaged of the bureaucracy quality and corruption indices.

Table A2.6. Data sources of variables used in frontier analysis estimation analysis

Variables	*Sources*	*Note*
Tax revenue variables		
Personal income tax revenue (percent GDP)	UNU-WIDER, supplemented using World Bank Fiscal Survey. Corporate income tax revenue for Bangladesh since 2017 and Pakistan since 2005 extrapolated using IMF Government Finance Statistics and Haver Analytics. Personal income tax revenue for Bangladesh since 2017 computed as the difference between direct tax revenue and corporate income tax revenue.	Excludes social security contributions.
Corporate income tax revenue (percent GDP)		
Direct tax revenue (percent GDP)		
Goods and services tax revenue (percent GDP)		
Trade tax revenue (percent GDP)		
Tax rate variables		
Personal income tax rate, highest rate	Vegh and Vuletin (2015), supplemented using USAID Collecting Taxes Database, and World Bank data.	
Corporate income tax rate		
Value-added or sales tax rate		
Direct tax rate	Constructed as average of personal income tax and corporate income tax rates, weighted by labor income (percent GDP).	
Personal income tax rate, lowest rate	USAID Collecting Taxes Database.	
Average tariff rate	World Bank World Integrated Trade Solution Database.	
Tax base variables		
Personal income tax base: Labor income (percent GDP)	International Labour Organization.	
Corporate income tax base: Market capitalization (percent GDP)	World Development Indicators.	Market capitalization of listed domestic companies.
Alternative corporate income tax base: Investment (percent GDP)	World Development Indicators.	Gross fixed capital formation.
Direct tax base	Constructed as average of labor income and investment, weighted by labor income (percent GDP).	Households and non-profit institutions servicing households' final consumption expenditure.
Goods and services tax base: Consumption (percent GDP)	World Development Indicators.	Merchandise imports (c.i.f. value).
Trade tax base: Imported goods (percent GDP)	World Development Indicators and World Trade Organization.	
Correlate variables		
Self-employment (percent total employment)	International Labour Organization.	
Agriculture (percent value-added)	World Development Indicators.	

Financial development index	IMF Financial Development Index.
Corruption index	International Country Risk Guide (ICRG)

References

Agbeyegbe, T. D., J. Stotsky, and A. WoldeMariam. 2006. “Trade Liberalization, Exchange Rate Changes, and Tax Revenue in Sub-Saharan Africa.” *Journal of Asian Economics* 17 (2): 261–84.

Ajaz, T., and E. Ahmad. 2010. “The Effect of Corruption and Governance on Tax Revenues.” *The Pakistan Development Review* 49 (4): 405–17.

Alba, C., and S. McKnight. 2022. “Laffer Curves in Emerging Market Economies: The Role of Informality.” *Journal of Macroeconomics* 72: 103411.

Alstadsæter, A., S. Godar, P. Nicolaides, and G. Zucman. 2024. *Global Tax Evasion Report 2024*. Paris: Paris School of Economics EU Tax Observatory.

Alstadsæter, A., B. Planterose, G. Zucman, and A. Økland. 2022. “Who Owns Offshore Real Estate? Evidence from Dubai.” Working Paper 1, Paris School of Economics EU Tax Observatory, Paris.

Bachas, P., D. Bhering, and P. Ghosh. 2025. “Equity Versus Efficiency of Indirect Taxes: Evidence from a Large VAT Cut in India.” Mimeo.

Bachas, P., A. Jensen, and L. Gadenne. 2024. “Tax Equity in Low- and Middle-Income Countries.” *Journal of Economic Perspectives* 38 (1): 55–80.

Balán, P., A. Bergeron, G. Tourek, and J. L. Weigel. 2022. “Local Elites as State Capacity: How City Chiefs Use Local Information to Increase Tax Compliance in the Democratic Republic of Congo.” *American Economic Review* 112 (3): 762–97.

Barake, M., and E. Le Pouhaër. 2024. “Tax Revenue from Pillar One Amount A: Country-by-Country Estimates.” *International Tax and Public Finance*. https://doi.org/10.1007/s10797-024-09859-4.

Basri, C., M. Felix, R. Hanna, and B. Olken. 2021. “Tax Administration versus Tax Rates: Evidence from Corporate Taxation in Indonesia.” *American Economic Review* 111 (12): 3827–71.

Baunsgaard, T., and M. Keen. 2010. “Tax Revenue and (or?) Trade Liberalization.” *Journal of Public Economics* 94 (9–10): 563–77.

Bellon, M., Era Dabla-Norris, S. Khalid, and F. Lima. 2022. “Digitalization to Improve Tax Compliance: Evidence from VAT e-Invoicing in Peru.” *Journal of Public Economics* 210 (June): 104661.

Benitez, J. C., M. Mansour, M. Pecho, and C. Vellutini. 2023. “Building Tax Capacity in Developing Countries.” Staff Discussion Note 2023/006, International Monetary Fund, Washington, DC.

Bergeron, A., G. Tourek, and J. L. Weigel. 2023. “The State Capacity Ceiling on Tax Rates: Evidence from Randomized Tax Abatements in the DRC.” Working Paper 31685, National Bureau of Economic Research, Cambridge, MA.

Bergolo, M., R. Ceni, G. Cruces, M. Giaccobasso, and R. Perez-Truglia. 2023. “Tax Audits as Scarecrows: Evidence from a Large-Scale Field Experiment.” *American Economic Journal: Economic Policy* 15 (1): 110–53.

Bergstrom, K., W. Dodds, and J. Rios. 2024. “Optimal Policy Reform.” Mimeo.

Besley, T., and T. Persson. 2014. “Why Do Developing Countries Tax So Little?” *Journal of Economic Perspectives* 28 (4): 99–120.

Bharti, N. K., L. Chancel, T. Piketty, and A. Somanchi. 2024. “Income and Wealth Inequality in India, 1922-2023: The Rise of the Billionaire Raj.” Working Paper 24/09, World Inequality Lab, Paris.

Black, S., I. Parry, and K. Zhunussova. 2022. “More Countries Are Pricing Carbon, but Emissions Are Still Too Cheap.” IMF Blog (blog). July 21, 2022.

Blackman, A. 2006. *Economic Incentives to Control Water Pollution in Developing Countries: How Well Has Colombia's Wastewater Discharge Fee Program Worked and Why?* Washington, DC: Resources for the Future.

Botlhole, T. D., and T. Agiobenebo. 2006. "The Elasticity and Buoyancy of the Botswana Tax System and Their Determinants." *IUP Journal of Financial Economics* 4 (4): 48–62.

Brockmeyer, A., and M. Hernandez. 2016. "Taxation, Information, and Withholding: Evidence from Costa Rica." Policy Research Working Paper 7600, World Bank, Washington, DC.

Brockmeyer, A., and M. Sáenz Somarriba. 2025. "Electronic Payment Technology and Tax Compliance: Evidence from Uruguay's Financial Inclusion Reform." *American Economic Journal: Economic Policy* 17 (1): 242–72.

Capasso, S., F. Ohnsorge, and S. Yu. 2024. "From Financial Development to Informality: A Causal Link." *Public Choice*. https://doi.org/10.1007/s11127-024-01217-6.

Carrillo, P., D. Donaldson, D. Pomeranz, and M. Singhal. 2023. "Ghosting the Tax Authority: Fake Firms and Tax Fraud in Ecuador." *American Economic Review: Insights* 5 (4): 427–44.

Carrillo, P., D. Pomeranz, and M. Singhal. 2017. "Dodging the Taxman: Firm Misreporting and Limits to Tax Enforcement." *American Economic Journal: Applied Economics* 9 (2): 144–64.

Chinese Tax Administration. 2024. "环保税助力中国企业'绿色转型,"[Environmental Protection Tax Helps Chinese Enterprises with 'Green Transition'] April 18, 2024. https://www.chinatax.gov.cn/chinatax/n810219/n810780/c5223028/content.html.

Choudhary, R., F. U. Ruch, and E. Skrok. 2024. "Taxing for Growth: Revisiting the 15 Percent Threshold." Policy Research Working Paper 10943, World Bank, Washington, DC.

Coase, R. 1960. "The Problem of Social Cost." *Journal of Law and Economics* 3 (October): 1–44.

Coelli, T. J., D. S. P. Rao, C. J. O'Donnell, and G. E. Battese. 2005. *An Introduction to Efficiency and Productivity Analysis*. New York: Springer.

Damania, R., E. Balseca, C. de Fontaubert, J. Gill, K. Kim, J. Rentschler, J. Russ, and E. Zaveri. 2023. *Detox Development: Repurposing Environmentally Harmful Subsidies*. Washington, DC: World Bank.

Dechezleprêtre, A., D. Nachtigall, and F. Venmans. 2023. "The Joint Impact of the European Union Emissions Trading System on Carbon Emissions and Economic Performance." *Journal of Environmental Economics and Management* 118 (March): 102758.

Del Carpio, L., S. Kapon, and S. Chassang. 2022. "Using Divide-and-Conquer to Improve Tax Collection." NBER Working Paper 30218, National Bureau of Economic Research, Cambridge, MA.

Dokas, I., M. Panagiotidis, S. Papadamou, and E. Spyromitros. 2024. "The Impact of the Shadow Economy on the Direct-Indirect Tax Mix: Can Central Banks' Independence Mitigate the Effect?" *Journal of Policy Modeling* 46 (3): 475–93.

Dudine, P., and J. T. Jalles. 2018. "How Buoyant Is the Tax System? New Evidence from a Large Heterogeneous Panel." *Journal of International Development* 30 (6): 961–91.

Duflo, E., M. Greenstone, R. Pande, and N. Ryan. 2018. "The Value of Regulatory Discretion: Estimates from Environmental Inspections in India." *Econometrica* 86 (6): 2123–60.

Emran, M., and J. Stiglitz. 2005. "On Selective Indirect Tax Reform in Developing Countries." *Journal of Public Economics* 89 (4): 599–623.

Fan, H., Y. Liu, N. Qian, and J. Wen. 2023. "The Dynamic Effects of Computerizing VAT Invoices in China." Mimeo.

FBR (Federal Board of Revenue). 2024. Tax Expenditure Report 2024. Islamabad: Government of Pakistan.

Forbes. 2024. “Forbes 2024 Billionaires List: The Richest People in The World Ranked.” Forbes, New Jersey.

Garg, G., A. Goyal, and R. Pal. 2017. “Why Tax Effort Falls Short of Tax Capacity in Indian States: A Stochastic Frontier Approach.” *Public Finance Review* 45 (2): 232–59.

Gemmell, N., and J. Hasseldine. 2012. “The Tax Gap: A Methodological Review.” *Advances in Taxation* 20: 203–31.

Gnangnon, S. K. 2022. “Financial Development and Tax Revenue in Developing Countries: Investigating the International Trade Channel.” *SN Business & Economics* 2 (1): 1–26.

Greene, W. 2005. “Fixed and Random Effects in Stochastic Frontier Models.” *Journal of Productivity Analysis* 23 (1): 7–32.

Greenstone, M., R. Pande, N. Ryan, and A. Sudarshan. 2025. “Can Pollution Markets Work in Developing Countries? Experimental Evidence from India.” *Quarterly Journal of Economics*. https://doi.org/10.1093/qje/qjaf009.

Gupta, S., J. T. Jalles, and J. Liu. 2022. “Tax Buoyancy in Sub-Saharan Africa and Its Determinants.” *International Tax and Public Finance* 29 (4): 890–921.

He, P., and B. Zhang. 2018. “Environmental Tax, Polluting Plants’ Strategies and Effectiveness: Evidence from China.” *Journal of Policy Analysis and Management* 37 (3): 493–520.

Hoy, C., L. McKenzie, and M. Sinning. 2021. “Improving Tax Compliance without Increasing Revenue.” Policy Research Working Paper 9539, World Bank, Washington, DC.

Hutton, E. 2017. “The Revenue Administration-Gap Analysis Program: Model and Methodology for Value-Added Tax Gap Estimation.” Technical Notes and Manuals 2017/004, International Monetary Fund, Washington, DC.

ICAP (International Carbon Action Partnership). 2023. “Indian Carbon Credit Trading Scheme.” International Carbon Action Partnership, Berlin.

IMF (International Monetary Fund). 2023. *India: 2023 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for India*. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2024a. *Bangladesh: Second Reviews Under the Extended Credit Facility Arrangement and the Arrangement Under the Extended Fund Facility, and Requests for Rephasing of Access, a Waiver of Nonobservance of a Performance Criterion, and Modifications of a Performance Criterion, and Second Review Under the Resilience and Sustainability Facility Arrangement-Press Release; Staff Report; and Statement by the Executive Director for Bangladesh*. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2024b. *Maldives: 2024 Article IV Consultation-Press Release; Staff Report; and Statement by the Executive Director for Maldives*. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2024c. *Sri Lanka: 2024 Article IV Consultation and Second Review Under the Extended Fund Facility, Request for Modification of Performance Criterion, and Financing Assurances Review-Press Release; Staff Report; and Statement by the Executive Director for Sri Lanka*. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2024d. *Pakistan: 2024 Article IV Consultation and Request for an Extended Arrangement under the Extended Fund Facility-Press Release; Staff Report; and Statement by the Executive Director for Pakistan*. Washington, DC: International Monetary Fund.

Jensen, A. D., and J. L. Weigel. 2024. “No Taxation Without the State: Bringing Tax Administration Back into the Study of Tax Capacity.” Mimeo.

Jondrow, J., C. A. K. Lovell, I. S. Materov, and P. Schmidt. 1982. “On the Estimation of Technical Inefficiency in

the Stochastic Frontier Production Function Model." *Journal of Econometrics* 19 (2-3): 233-238.

Kargbo, B. I. B., and F. O. Egwaikhide. 2012. "Tax Elasticity in Sierra Leone: A Time Series Approach." *International Journal of Economics and Financial Issues* 2 (4): 432–47.

Kathuria, S., and G. Arenas. 2018. "Border Tax Distortions in South Asia: The Impact on Regional Integration." In *A Glass Half Full: The Promise of Regional Trade in South Asia*, edited by S. Kathuria. Washington, DC: World Bank.

Kathuria, V. 2006. "Controlling Water Pollution in Developing and Transition Countries–Lessons from Three Successful Cases." *Journal of Environmental Management* 78 (4): 405–26.

Keen, M., and B. Lockwood. 2010. "The Value Added Tax: Its Causes and Consequences." *Journal of Development Economics* 92 (2): 138–51.

Khadan, J. 2020. "Long and Short-Run Tax Buoyancies in Small States." *Economics Bulletin* 40 (1): 821–27.

Khan, A., A. Khwaja, and B. Olken. 2019. "Making Moves Matter: Experimental Evidence on Incentivizing Bureaucrats through Performance-Based Postings." *American Economic Review* 109 (1): 237–70.

Khwaja, M., D. O'Connell, G. Nagata, G. Whyte, J. E. G. Ossio, K. Naofumi, and N. Javaid. 2021. *Islamic Republic of Pakistan: Performance Assessment Report*. Washington, DC: Tax Administration Diagnostic Assessment Tool.

Koatsa, N. J., and M. A. Nchake. 2017. "Revenue Productivity of The Tax System in Lesotho." Mimeo.

Lagravinese, R., P. Liberati, and A. Sacchi. 2020. "Tax Buoyancy in OECD Countries: New Empirical Evidence." *Journal of Macroeconomics* 63: 103189.

Lompo, A. 2024. "How Does Financial Sector Development Improve Tax Revenue Mobilization for Developing Countries?" *Comparative Economic Studies* 66: 91–125.

Lustig, N. 2022. *Commitment to Equity Handbook: Estimating the Impact of Fiscal Policy on Inequality and Poverty*. Washington, DC: Brookings Institution Press.

Martin, R., M. Muûls, and U. J. Wagner. 2016. "The Impact of the European Union Emissions Trading Scheme on Regulated Firms: What Is the Evidence after Ten Years?" *Review of Environmental Economics and Policy* 10 (1): 129–48.

Martinsson, G., L. Sajtos, P. Strömberg, and C. Thomann. 2024. "The Effect of Carbon Pricing on Firm Emissions: Evidence from the Swedish CO2 Tax." *Review of Financial Studies* 37 (6): 1848–86.

Mascagni, G., A. T. Mengistu, and F. B. Woldeyes. 2021. "Can ICTs Increase Tax Compliance? Evidence on Taxpayer Responses to Technological Innovation in Ethiopia." *Journal of Economic Behavior & Organization* 189 (September): 172–93.

McNabb, K., M. Danquah, and A. Tagem. 2021. "Tax Effort Revisited: New Estimates from the Government Revenue Dataset." WIDER Working Paper 2021/170, UNU-WIDER, Helsinki, Finland.

Mercer-Blackman, V., L. Milivojevic, and V. Mylonas. 2024. "Are Carbon Taxes Good for South Asia." In *Toward a Low-Carbon and Just Energy Transition in Developing Asia*, edited by D. Azhgaliyeva, A. Leal, and B. Shen. Manila, Philippines: Asian Development Bank Institute.

Milwood, T.-A. T. 2011. "Elasticity and Buoyancy of the Jamaican Tax System." Bank of Jamaica, Kingston, Jamaica.

Mittal, S., and A. Mahajan. 2017. "Enforcement in Value Added Tax: Is Third Party Verification Effective?" Working Paper S-89412-INC-1, International Growth Centre, London.

Mogollon, M., D. Ortega, and C. Scartascini. 2021. "Who's Calling? The Effect of Phone Calls and Personal Interaction on Tax Compliance." *International Tax and Public Finance* 28 (1): 1302–28.

NBR (National Board of Revenue Bangladesh). 2024. *Value-Added Tax Expenditure Report FY2023-2024*.

Dhaka: National Board of Revenue Bangladesh.

Nichelatti, E., and H. Hiilamo. 2024. “The Effect of Citizens’ Perception of Governance on Tax Compliance: A Cross-Country Analysis Study for 32 Sub-Saharan African Countries.” *The European Journal of Development Research* 36 (5): 1198–226.

Ochieng, B., and N. Mamingi. 2022. “Estimating the Sizes of Buoyancy and Elasticity of the Tax System in Barbados Over the Period 1990 to 2019.” Working Paper 22/2, Central Bank of Barbados, Bridgetown, Barbados.

OECD (Organisation for Economic Co-operation and Development). 2020. *Taxation in Agriculture*. Paris: OECD Publishing.

Okunogbe, O. 2021. “Becoming Legible to the State: The Role of Identification and Collection Capacity in Taxation.” Policy Research Working Paper 9852, World Bank, Washington, DC.

Okunogbe, O., and F. Santoro. 2023. “Increasing Tax Collection in African Countries: The Role of Information Technology.” *Journal of African Economies* 32 (Supplement_1): i57–83.

Okunogbe, O., and G. Tourek. 2024. “How Can Lower-Income Countries Collect More Taxes? The Role of Technology, Tax Agents, and Politics.” *Journal of Economic Perspectives* 38 (1): 81–106.

Olmstead, S., and J. Zheng. 2021. “Water Pollution Control in Developing Countries: Policy Instruments and Empirical Evidence.” *Review of Environmental Economics and Policy* 15 (2): 261–80.

Parry, I., S. Black, and K. Zhunussova. 2022. “Carbon Taxes or Emissions Trading Systems? Instrument Choice and Design.” Staff Climate Note 6, International Monetary Fund, Washington, DC.

Piggott, J., and J. Whalley. 2001. “VAT Base Broadening, Self Supply, and the Informal Sector.” *American Economic Review* 91 (4): 1084–94.

Rentschler, J., and N. Leonova. 2022. “Air Pollution and Poverty: PM2.5 Exposure in 211 Countries and Territories.” Policy Research Working Paper 10005, World Bank, Washington, DC.

Shah, Jawad. 2023. “Using Computerized Information to Enforce VAT: Evidence from Pakistan.” SSRN Scholarly Paper 4569607, Social Science Research Network, Rochester, NY.

Shahzada, N., M. Siddique, K. Mustafa, Altaf Hussain, and M. A. Abbasi. 2016. “Buoyancy, Elasticity and Stability of Total Tax Revenues: Evidence from Pakistan.” *Abasyn Journal of Social Sciences* 9 (7): 264–77.

Singh, S. C. 2023. “India to Set Emission Reduction Mandates for 4 Sectors, to Start Carbon Trading from 2025.” *Reuters*, September 26, 2023.

Stewart-Wilson, G., and R. Waiswa. 2021. “Taxing Agricultural Income in the Global South: Revisiting Uganda’s National Debate.” Working Paper 121, International Centre for Tax and Development, Brighton, UK.

Tanchev, S., and I. Todorov. 2019. “Tax Buoyancy and Economic Growth: Empirical Evidence of Bulgaria.” *Journal of Tax Reform* 5 (3): 236–48.

Tørsløv, T., L. Wier, and G. Zucman. 2023. “The Missing Profits of Nations.” *Review of Economic Studies* 90 (3): 1499–1534.

UNCTAD (United Nations Conference on Trade and Development). 2024. *World Investment Report 2024: Investment Facilitation and Digital Government*. Geneva: United Nations.

Vegh, C. A., and G. Vuletin. 2015. “How Is Tax Policy Conducted over the Business Cycle?” *American Economic Journal: Economic Policy* 7 (3): 327–70.

Wang, H., and D. Wheeler. 2003. “Equilibrium Pollution and Economic Development in China.” *Environment and Development Economics* 8 (3): 451–66.

World Bank. 2021. *Fiscal Policy for Sustainable Development: Nepal Public Expenditure Review*. Washington, DC: World Bank.

World Bank. 2022. *Maldives Public Expenditure Review: Restoring Fiscal Health*. Washington, DC: World Bank.

World Bank. 2023a. *Bhutan Public Expenditure Review.* Washington, DC: World Bank.

World Bank. 2023b. *Pakistan Federal Public Expenditure Review 2023*. Washington, DC: World Bank.

World Bank. 2023c. "State and Trends of Carbon Pricing 2023." World Bank, Washington, DC.

World Bank. 2023d. *South Asia Development Update: Toward Faster, Cleaner Growth*. October. Washington, DC: World Bank.

World Bank. 2024a. *Sri Lanka Development Update: Opening Up to the Future*. October. Washington, DC: World Bank.

World Bank. 2024b. *South Asia Development Update: Women, Jobs, and Growth*. October. Washington, DC: World Bank.

World Bank. 2024c. *Bangladesh Development Update: Strengthening Domestic Resource Mobilization*. April. Washington, DC: World Bank.

World Bank. 2024d. "State and Trends of Carbon Pricing Dashboard." World Bank, Washington, DC.

World Bank. 2024e. *South Asia Development Update: Jobs for Resilience*. April. Washington, DC: World Bank.

World Bank. 2025a. *South Asia Development Update: Taxing Times*. April. Washington, DC: World Bank.

World Bank. 2025b. "Revenue Dashboard." World Bank, Washington, DC.

World Bank. 2025c. *Sri Lanka Public Finance Review: Towards a Balanced Fiscal Adjustment.* Washington, DC: World Bank.

World Bank. 2025d. *Funding the State in the 21st Century: Data-Driven Approaches for Equitable and Efficient Taxation*. Washington, DC: World Bank.

Zhu, J., Z. Ge, J. Wang, X. Li, and C. Wang. 2022. "Evaluating Regional Carbon Emissions Trading in China: Effects, Pathways, Co-Benefits, Spillovers, and Prospects." *Climate Policy* 22 (7): 918–34.