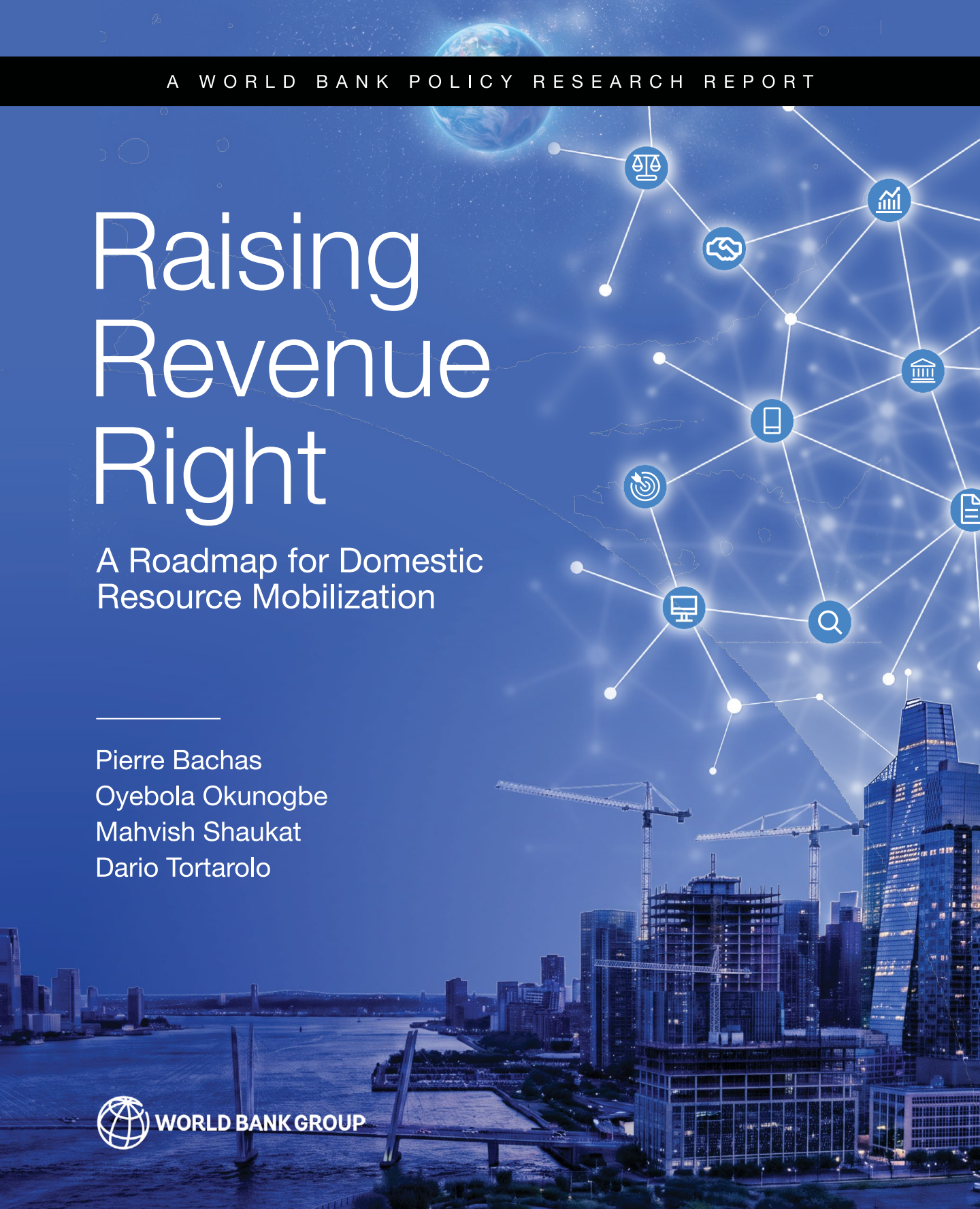
A WORLD BANK POLICY RESEARCH REPORT

Raising Revenue Right

A Roadmap for Domestic Resource Mobilization

Pierre Bachas
Oyebola Okunogbe
Mahvish Shaukat
Dario Tortarolo



WORLD BANK GROUP

"*Raising Revenue Right* offers a clear-headed roadmap for improving the revenue system of developing countries. It is informed by the latest research findings and the latest technological advances in information processing, while being grounded in the realities of tax collection in the developing world. It doesn't promise that policy improvement will be easy, but it does point to policy directions that can deliver more equitable and efficient tax systems. Policy makers would be well-advised to absorb its messages."

—Joel Slemrod, Professor of Economics and Paul W. McCracken Collegiate Professor of Business Economics and Public Policy at the Stephen M. Ross School of Business, University of Michigan

"Raising domestic revenues is a top priority and, in fact, a matter of urgency for most EMDEs in this era of uncertainty and geopolitical fragmentation where development aid and investment flows are much diminished. This volume provides a terrific framework and a workable roadmap for countries to act. From my experience as a former finance minister struggling to fix tax administration and mobilize domestic revenues in Nigeria, I find the book of great practical use for policy makers."

—Ngozi Okonjo-Iweala, Director–General of the World Trade Organization, former Finance Minister of Nigeria, and former Managing Director of Operations at the World Bank

"*Raising Revenue Right* makes a compelling case that domestic resource mobilization is not simply about collecting more but about collecting better. Drawing on a rich body of evidence, the report shows that better-designed taxes, stronger administration, and greater transparency can raise revenue while improving both efficiency and equity. Particularly welcome is its emphasis on protecting poor and vulnerable households while ensuring that those with greater ability to pay contribute their fair share."

—Nora Lustig, Professor Emerita and Founding Director, Commitment to Equity Institute, Tulane University, and Professor, Office of the President, El Colegio de Mexico

"As aid contracts, developing countries are being told to finance more of their own development. This report goes past the familiar benchmark of a target tax-to-GDP ratio to ask which reforms are actually feasible, and where. Its central claim is that most developing countries are not yet up against the classic tradeoff between efficiency and equity and can improve both at once. Technology and transparency are widening that space further. Its treatment of politicians, bureaucrats, and citizens as three parties who must genuinely cooperate reflects a serious engagement with the political economy of taxation. Bachas, Okunogbe, Shaukat, and Tortarolo have produced the rare synthesis that consolidates frontier research and still tells practitioners where to start."

—Adnan Khan, Professor, School of Public Policy, London School of Economics and Political Science, and former Chief Economist to the Foreign, Commonwealth and Development Office of the United Kingdom

Raising Revenue Right

This book, along with any associated content or subsequent updates, can be accessed at https://hdl.handle.net/10986/45448.

Artificial intelligence used for the cover: The following is the prompt used to begin the design process for the cover art: "A cover for a World Bank Policy Research Report called "Raising Revenue Right: A Roadmap for Domestic Resource Mobilization" including technology, transparency, and trust symbols, all linked to taxation". Gemini was used to generate the skyline and globe images.

Artificial intelligence used for the text: ChatGPT and Claude were used only to support the exploratory research, literature reviews, and editing of drafts. All sources included in the report were independently reviewed before being cited.



Reproducible Research Repository
https://reproducibility.worldbank.org

A reproducibility package is available for this book in the Reproducible Research Repository at https://reproducibility.worldbank.org/catalog/633.



Scan to see all titles in the series.

A WORLD BANK POLICY RESEARCH REPORT

Raising Revenue Right

A ROADMAP FOR DOMESTIC RESOURCE MOBILIZATION

Pierre Bachas, Oyebola Okunogbe, Mahvish Shaukat, and Dario Tortarolo



WORLD BANK GROUP

© 2026 International Bank for Reconstruction and Development / The World Bank
1818 H Street NW, Washington, DC 20433
Telephone: 202-473-1000; Internet: www.worldbank.org

Some rights reserved

1 2 3 4 29 28 27 26

This work is a product of the staff of The World Bank with external contributions. The findings, interpretations, and conclusions expressed in this work do not necessarily reflect the views of The World Bank, its Board of Executive Directors, or the governments they represent.

The World Bank does not guarantee the accuracy, completeness, or currency of the data included in this work and does not assume responsibility for any errors, omissions, or discrepancies in the information, or liability with respect to the use of or failure to use the information, methods, processes, or conclusions set forth. The boundaries, colors, denominations, links/footnotes, and other information shown in this work do not imply any judgment on the part of The World Bank concerning the legal status of any territory or the endorsement or acceptance of such boundaries. The citation of works authored by others does not mean The World Bank endorses the views expressed by those authors or the content of their works. Certain artificial intelligence ("AI") tools may have been used in creating this work, as indicated in the work, but all transformative and creative effort expressed in the work was performed by The World Bank staff or external contributors. The World Bank is not responsible for any claims, including for errors or inaccurate information, generated by AI programs not controlled or owned by The World Bank.

Nothing herein shall constitute or be construed or considered to be a limitation upon or waiver of the privileges and immunities of The World Bank, all of which are specifically reserved.

Rights and Permissions



This work is available under the Creative Commons Attribution 3.0 IGO license (CC BY 3.0 IGO), http://creativecommons.org/licenses/by/3.0/igo. Under the Creative Commons Attribution license, you are free to copy, distribute, transmit, and adapt this work, including for commercial purposes, under the following conditions:

Attribution—Please cite the work as follows: Bachas, Pierre, Oyebola Okunogbe, Mahvish Shaukat, and Dario Tortarolo. 2026. *Raising Revenue Right: A Roadmap for Domestic Resource Mobilization.* Policy Research Report. World Bank. doi: 10.1596/978-1-4648-2034-2. License: Creative Commons Attribution CC BY 3.0 IGO

Translations—If you create a translation of this work, please add the following disclaimer along with the attribution: *This translation was not created by The World Bank and should not be considered an official World Bank translation. The World Bank shall not be liable for any content or error in this translation.*

Adaptations—If you create an adaptation of this work, please add the following disclaimer along with the attribution: *This is an adaptation of an original work by The World Bank. Views and opinions expressed in the adaptation are the sole responsibility of the author or authors of the adaptation and are not endorsed by The World Bank.*

Third-party content—The World Bank does not necessarily own each component of the content contained within the work. The World Bank therefore does not warrant that the use of any third-party-owned individual component or part contained in the work will not infringe on the rights of those third parties. The risk of claims resulting from such infringement rests solely with you. If you wish to re-use a component of the work, it is your responsibility to determine whether permission is needed for that re-use and to obtain permission from the copyright owner. Examples of components can include, but are not limited to, tables, figures, or images.

All queries on rights and licenses should be addressed to World Bank Publications, The World Bank, 1818 H Street NW, Washington, DC 20433, USA; e-mail: pubrights@worldbank.org.

ISBN (paper): 978-1-4648-2034-2
ISBN (electronic): 978-1-4648-2360-2
DOI: 10.1596/978-1-4648-2034-2

Artificial intelligence: If AI tools were used in the development of this work, page ii of this work will have further information.
Cover image: Maria Sol Bernasconi / World Bank. Further permission required for use.
Cover design: Na Kyoung Kang and Taiwo Farai (Imago DA).

The Library of Congress Control Number has been requested.

The manufacturer's authorized representative in the European Union for product safety is Mare Nostrum Group B.V., Doelen 72, 4831 GR Breda, The Netherlands. Email: gpsr@mare-nostrum.co.uk.

Contents

Foreword xv

Acknowledgments xix

About the Authors xxi

Overview xxiii

Abbreviations xxxix

Part I Setting the Stage 1

1 A Framework for the Fiscal Frontier 3
A simple framework for how tax systems balance revenue, efficiency, and equity 3
Mapping countries to the fiscal frontier 13
References 19

2 Efficiency and Equity in Current Tax Systems 21
Introduction 21
Tax mix across development levels 22
Efficiency shortcomings in domestic revenue mobilization 30
Equity shortcomings in domestic revenue mobilization 42
Efficiency meets equity: Priorities for reform 49
Annex 2A Efficiency of the main tax instruments 53
Notes 57
References 59

Part II A New Path to the Fiscal Frontier: Technology, Transparency, and Trust 69

3 Technology in Tax Administration 71
Introduction 71
Growing use of technology for taxation 72
Use of technology for core tax functions 80
Essential ingredients for successful technology reforms 93
Policy lessons 97
Annex 3A Sources for figure 3.6 99
Notes 101
References 102

4 Transparency and Taxation of Top Economic Actors 109
Introduction 109
Top economic actors 111
The ABCD of international taxation 122
Opportunities to tax top economic actors 137
Notes 151
References 151

5 Trust and the Political Economy of Taxation 163
Introduction 163
Politicians and citizens 168
Politicians and bureaucrats 181
Bureaucrats and citizens 187
Policy lessons for property tax reform 191
Notes 194
References 194

Part III Toolkit and Applications 207

6 Taxation for Environmental and Industrial Goals 209
Introduction 209
Environmental taxes 210
Tax policy for industrial goals 228
Notes 252
References 255

7 How Much Tax Revenue to Collect and How? A Marginal Value of Public Funds Approach 265
Introduction 265
The WMVPF framework: Choosing how to raise revenue 267
Calculating WMVPFs: Three tax policy examples 269
Should a government raise additional revenue at all? 275
Moving away from optimal tax-to-GDP ratios 277
Annex 7A The Welfare-Weighted Marginal Value of Public Funds 280
Notes 297
References 298

8 Administrative Tax Data for Policy 301
Introduction 301
Innovative data to learn about the economy 304
Building collaborations: Practical models for every need 312
Analytical tools for big administrative data 322
Lurking in the shadows: What are we missing? 331
From tax records to data-driven policy making: A roadmap for strengthening tax data use 335
Note 337
References 337

9 Policy Guidance 343
Introduction 343
How can countries identify tax reforms that are *feasible* and *appropriate?* 343
Linking feasibility and performance: The reform space 346
How can the 3*T*s strengthen core tax instruments? 350
How should countries balance the tax mix? 358
How can countries build the tax systems of the future? 359
References 360

Boxes

1.1 Moving toward the fiscal frontier: Brazil's consumption tax reform 7
1.2 AI and the future of taxation in EMDEs 11
1.3 Measurement considerations in mapping the fiscal frontier 13
2.1 Structure of taxation across development levels 22
2.2 How gaps between personal and corporate taxation create arbitrage 36

2.3 Tax rate dispersion and misallocation 39
2.4 Tax incidence in developing countries 43
3.1 DPI and tax systems 73
3.2 Technology solutions: From most revenue impactful to more tentative 80
3.3 MM taxes: A double-edged sword 84
3.4 AI and ML for tax systems in LMICs 87
4.1 Limited data on MNEs' activities 112
4.2 Architecture of the AEOI: FATCA and CRS 125
4.3 Two-pillar solution to address corporate income tax erosion 134
4.4 Taxing capital: Income or wealth? 138
4.5 Cross-country comparison of PIT exemption thresholds 142
5.1 A closer look at citizens' trust in the state 165
5.2 Political regimes, citizen voice, and taxation 172
5.3 State capacity for taxation 176
5.4 Smart tax reform: Choosing the right strategy and timing 180
5.5 Do SARAs deliver? 184
5.6 Social norms and taxes 188
6.1 Climate clubs and coalitions 221
6.2 Taxonomy of CIT investment incentives 234
6.3 Taxonomy of complementary nontax instruments 239
7.1 Key takeaways on the marginal value of public funds 266
7.2 How to use the WMVPF in practice 269
7.3 Raising the VAT rate in Mexico 270
7.4 Raising the top personal income tax rate in Mexico 272
7.5 Improved tax administration versus raising the CIT rate in Indonesia 273
7.6 Raising tax revenue in Mexico to fund a street-paving project 275
8.1 Breaking data silos for smarter policy 316
8.2 South Africa's National Treasury Secure Data Facility 318
8.3 Ethical governance of tax data 334
9.1 Revenue adequacy and the fiscal frontier 346
9.2 Evidence-based fiscal policy 359

Figures

O.1 Stagnant tax revenues, growing fiscal pressure xxv
O.2 Tax systems in EMDEs are less efficient and less equitable xxvi
O.3 The equity–efficiency frontier (holding revenue fixed) xxvii
O.4 Countries close to and far from the frontier, by structural fundamentals xxviii
O.5 The 3*T*s: Accelerating progress and expanding possibilities xxx

1.1 The fiscal frontier 5
1.2 The fiscal frontier and the status quo 6
1.3 The 3*T*s and the expanded fiscal frontier 9
1.4 Fiscal frontiers and structural fundamentals 10
1.5 Fiscal frontiers at different revenue levels 12
1.6 Fiscal frontiers by tax-to-GDP ratios 16
1.7 Fiscal frontier for countries with strong and weak fundamentals 17
B2.1.1 Tax revenue structure across development levels 23
2.1 Revenue mix across income groups and regions 25
2.2 Tax system efficiency across levels of development, 2018–23 28
2.3 Inequality before and after taxes and transfers, by income level, 2018–23 29
2.4 Statutory tax rates on consumption, corporate, and personal income, 2019 31
2.5 SSC and payroll tax rates and wedges, by income group 32
2.6 Tax thresholds, by income group and region 33
2.7 Tax expenditures as a share of tax revenue, 2018–22 35
B2.2.1 Arbitrage wedges between PIT and CIT 37
B2.3.1 Levels and Dispersion of CIT Rates 40
2.8 Tax efficiency indicators, by income group and region 41
2.9 Welfare impacts of taxes and transfers 45
2.10 Progressivity and redistribution of PIT, 2024 46
2.11 Welfare impacts of direct and indirect taxes 47
2.12 Taxes paid as a share of pretax income, average among poorest 50 percent 48
2.13 Average PIT threshold to poverty and prosperity standards 50
2A.1 Top statutory income tax rates, by income group and type 56
B3.1.1 DPI, by income group 73
3.1 Diffusion of core government systems across countries over time 75
3.2 Technology adoption in tax administration, ISORA data, 2018–23 76
3.3 Innovative solutions adoption in tax administration, ISORA data, 2023 77
3.4 Data sharing in tax administration, OECD data, 2023 78
3.5 Pre-filling in tax administration, OECD data, 2023 79
B3.3.1 Impact of MM taxes on transaction values in Ghana, Kenya, Tanzania, Uganda, and Zambia 86
3.6 Impacts of digital reforms on tax performance: Evidence from the literature since 2011 92
4.1 Importance of MNEs to economic activity and corporate tax revenues 113
4.2 Racing to the bottom in CIT rates 114
4.3 A nuanced take on tax competition 116
4.4 Annual income needed to belong to the richest 1 percent, 2023 118
4.5 Income composition of the top 0.1 percent, by country 120

4.6 Macroeconomic effective tax rates on labor income and capital, by country group and region, 2018 121
4.7 International taxation data generation process 123
4.8 Adoption of BORs 130
B4.5.1 PIT exemption thresholds and wage employment 142
4.9 Factors that affect MNEs' investment decisions 146
4.10 New strategies for tax evasion and avoidance 148
5.1 Political actors and taxation 164
B5.1.1 Trust in government, by income group 165
B5.1.2 Trust in government over time 166
B5.3.1 Tax revenue and corruption, by income and regime type 178
6.1 Environmentally related tax revenues and total carbon pricing over time, by income group 213
6.2 Earmarking of environmentally related taxes 218
6.3 Tax expenditures for investment, 2018–23 231
6.4 Tax incentives for investment, by tax and policy type, 2018–23 236
6.5 Revenue forgone from CIT tax expenditures for investment, by tax incentive and income group 238
6.6 Tax-related obstacles to business activity, 2018–25 248
B7.6.1 Welfare change from two revenue-raising policies and one spending policy in Mexico 276
8.1 Digital expansion in tax administrations, by income group 302
8.2 Administrative tax data generation process 305
8.3 Wage gains in Costa Rica, by type of move, 2006–17 307
8.4 Firm ownership in the Dominican Republic, 2010–18 307
8.5 Likelihood of switching jobs in Brazil, by age group, 1994–2017 308
8.6 VAT amounts declared by sellers and buyers in Uganda, 2013–16 308
8.7 Impact of road flooding on sales in Pakistan, 2011–18 309
8.8 County-level trade flows between formal firms in Kenya, 2015–19 309
8.9 Composition of top incomes in Honduras, 2011–19 310
8.10 Effective tax rate across the income distribution in Brazil, 2019 310
8.11 Reported consumption drops after becoming a business manager in Portugal, 2016–19 310
8.12 VAT rebates in Brazil, by income and consumption levels, 2023 311
8.13 Near-real-time information on consumer prices in Brazil 311
8.14 When do governments pay more? Brazil, 2018–23 312
8.15 Types of collaboration models 313
8.16 Simple descriptive analyses can be very informative 323
8.17 Bunching at a tax notch: Incentives and responses in Honduras 325
8.18 Regression discontinuity: Tax audit risk and recovered revenue in China 327
8.19 Using image-based ML to identify property characteristics in Pakistan 329

8.20 Tracking crises with e-invoicing data in Brazil 330
8.21 Limitations of administrative tax data 332
9.1 Locating countries in the reform space 347
9.2 Locating countries in the reform space: Regional classification 348

Tables

O.1 Reform pathways toward the fiscal frontier via the 3*T*s xxxv
2.1 Policy matrix to improve efficiency and equity in domestic tax systems 52
3.1 Technology maturity in tax systems 98
4.1 Millionaires by region, 2021 117
4.2 Transparency and income taxation 150
5.1 Trust and taxation 193
6.1 Concentration of carbon emissions in South Africa 223
6.2 Best practices for efficient and equitable environmental taxation 227
6.3 Best practices for efficient and equitable investment tax incentives 251
8.1 Suggested elements of data-sharing agreements 315
8.2 Institutional design elements of secure access environments 320
8.3 Policy priorities for strengthening tax data use 336
9.1 Structural fundamentals 344
9.2 Tax system performance: Distance to frontier 345
9.3 Reform pathways toward the fiscal frontier 349
9.4 Reform pathways for income taxation 351
9.5 Reform pathways for consumption taxation 354
9.6 Reform pathways for property taxation 356

Foreword

Rich countries have a tough-love prescription for the developing world: Raise more of your own money.

It's an understandable admonition. For decades, rich countries helped finance development with generous foreign aid. Today, however, wars, national-security priorities, and tighter budgets have elbowed aside that largesse. Aid from major donors fell by more than 23 percent last year, the largest decline on record, and the Organisation for Economic Co-operation and Development expects another drop this year, with the poorest countries taking the hardest hit. Governments from Africa to South Asia are increasingly being told to finance more of their development at home.

But that is easier said than done. Just ask Sweden, one of the world's wealthiest countries and one of the most generous welfare and donor states. In 1926, Sweden was—like Togo in 2026—still a poor, rural economy with a per capita income of about $3,500 adjusted for purchasing power. Sweden's tax revenue was less than 10 percent of its gross domestic product (GDP), less than the 14 percent that Togo now collects.

Developing countries today do not have the luxury that Sweden had a century ago. Their debt burdens are at a record high, interest bills are rising, and their development backlogs are accumulating. In the most heavily indebted countries, one out of two people on average cannot afford a healthy diet. Across all developing economies, the median primary deficit has doubled to 4 percent of GDP over the last 25 years. Yet tax revenues have barely budged since 2010: They hover around 10 percent of GDP in low-income countries, 13 percent in lower-middle-income countries, and 19 percent in upper-middle-income countries.

That's the bad news. The good news is that developing countries need not wait a century to strengthen their finances. *Raising Revenue Right,* the first comprehensive look at how these economies can raise revenue better, points to a faster path. For many governments, that does not require higher tax rates. Some of the most promising new revenue is already hiding in plain sight: tax breaks that can be pared back, profits that can be kept from slipping away, and taxes that are overdue and uncollected. Developing economies forgo roughly one-fifth to one-quarter of their tax collections through tax breaks and exemptions—"tax expenditures" in technical parlance. Multinational companies, meanwhile, shift profits abroad at a hefty cost to poor economies: Every year, low-income countries lose revenue equivalent to about 2.5 percent of GDP as a result.

The pressing task, then, is to capture more of the revenue already within reach. This report offers a roadmap. Call it the 3*T*s framework: technology, transparency, and trust. Technology gives tax authorities better tools to see what is taxable. Transparency gives governments a clearer view of money moving across national borders. Trust gives citizens more reason to believe the system is fair and that everyone is expected to play by the same rules.

Technology can make a remarkable difference, because so much taxable activity still goes unrecorded or is costly to track. In Ghana, GPS-enabled tablets have helped tax collectors locate properties and deliver bills, doubling collections in the process. In Ethiopia, sales registers that automatically reported sales to the tax authority boosted value-added tax revenue by almost 50 percent. In Liberia, officials went door to door to identify properties and their owners and to create an electronic property register. When tax notices showed owners that the government knew their name and property, and warned of penalties, they became four times more likely to pay.

Transparency matters because some of the hardest income to tax is also the easiest to move or hide. Automatic exchanges of bank account information, registers that reveal who really owns a company, and country-by-country reporting by multinationals are making concealment harder. Argentina offers a dramatic example. In 2016, as the country adopted international information-sharing agreements, taxpayers disclosed previously hidden assets worth 21 percent of GDP. Penalties brought in revenue equal to 1.8 percent of GDP, and wealth-tax revenues doubled.

Trust is what turns better tax systems into better compliance. People are more willing to pay when they believe others are paying too, when officials treat them fairly, and when they can see where the money goes. In Freetown, Sierra Leone, residents paid 20 percent more in property taxes when they were shown specific examples of recently delivered public services near their homes, including

improvements in water, sanitation, and education. Better administration can also build confidence—by reducing arbitrary treatment and focusing enforcement on those most likely to be underpaying.

The 3*T*s are mutually reinforcing: Weakening one weakens the whole strategy. They also point toward a different way of thinking about the fiscal challenge facing developing countries. The goal shouldn't simply be to push tax-to-GDP ratios upward. The plain truth is that most developing countries are not collecting revenue already within their reach: 73 percent of countries with lower incomes and weaker government capacity face this problem, but so do 66 percent of countries with stronger economies and institutions.

Closing this gap can raise more resources for investments in infrastructure and essential public services while reducing the burden on the poor and making taxes less of a load on enterprise. *Raising Revenue Right* shows how this call for better domestic resource mobilization is being answered in a few countries and how it can quickly be done in others.

Indermit Gill
Chief Economist and
Senior Vice President for Development Economics
World Bank Group

Acknowledgments

Indermit Gill provided invaluable guidance and encouragement to the authors throughout the development of this report while giving them the intellectual space to shape its analysis and conclusions. The report benefited greatly from peer review by Rajul Awasthi, Chiara Bronchi, Stefano Curto, Andrew Dabalen, Aart Kraay, Joana Naritomi, and Joel Slemrod, as well as from guidance and feedback from Deon Filmer, Somik Lall, Aaditya Mattoo, and Sergio Schmukler.

The authors are grateful to the contributors to the individual chapters: Katy Bergstrom, Sol Bernasconi, Gaston Bernheim, Anne Brockmeyer, William Dodds, Yi Jie Gwee, Christopher Hoy, Jon Jellema, Fabrizio Santoro, Thiago Scot, and Alastair Thomas.

Sol Bernasconi and Gaston Bernheim provided outstanding support throughout the production of this report, including, but not limited to, conducting background research and analytical work, editing chapter drafts, preparing the data replication package, developing the website, and coordinating the publication process.

Joe Rebello and Erin Rice provided valuable editorial services. Kairat Umargaliyev supported the analytical work, including the preparation of datasets and figures, for chapter 3. Jewel McFadden served as acquisitions editor. Chris Davis skillfully led the production process, and Cindy Fisher was the editorial production team lead. Designers Na Kyoung Kang and Taiwo Farai created aspects of the cover, and Greg Edmondson was the proofreader. Datapage provided typesetting services. Deborah Appel-Barker served as print and conversion coordinator.

The authors also thank the many colleagues from across the World Bank Group whose comments and suggestions helped strengthen the report, particularly the DaTax Lab; the Office of the Africa Chief Economist; the Office of the Latin America and the Caribbean Chief Economist; the Office

of the Middle East, North Africa, Afghanistan, and Pakistan Chief Economist; the Office of the Regional Vice President for East Asia and the Pacific; the Office of the Regional Vice President for South Asia; the Prosperity Vertical; the International Finance Corporation; the Communications and External Relations Vice President Unit; the Legal Advisory Services and Knowledge Unit; and the Planet Vice President Unit.

Additional thanks go to Gero Carletto, Manuela Francisco, Francesca Lotti, Ceren Ozer, Pablo Saavedra, and Emilia Skrok for their support and input. The authors are further grateful to Juan Luis Schiavoni, who played a key role in bringing the report to publication, and to Ryan Hahn and Claudia Rivas Rios, who supported development of the website. Comments from Inga Forda for chapter 4; Jonathan Karver and Stuti Khemani for chapter 5; Ana Fernandes, Carolyn Fischer, Tristan Reed, and Govinda Timilsina for chapter 6; and Nathaniel Hendren for chapter 7 were also valuable in refining the report's analysis and key messages. The authors also thank the many people who generously shared figures and data for chapter 8.

The authors thank Georg Wamser and his team from the Research School of International Taxation for kindly providing access to the International Tax Institutions database. They are also grateful to Flurim Aliu and Agustin Redonda from the Council on Economic Policies for providing access to the Global Tax Expenditures Database and for the helpful discussions surrounding its use, as well as to the International Monetary Fund's World Revenue Longitudinal Database team for providing additional data and methodological clarifications. In addition, the team is grateful to Alexandra Campmas for facilitating access to carbon-pricing data and to Rodrigo Deiana for sharing and processing industrial policy datasets.

Artificial intelligence tools, specifically ChatGPT and Claude, were used only to support exploratory research, literature reviews, and editing drafts. All sources included in the report were independently reviewed before being cited.

About the Authors

Pierre Bachas is a senior economist in the World Bank's Development Research Group. He also coordinates the Tax Evasion Program at the International Tax Observatory. His research focuses on public finance, particularly tax and transfer design, international taxation, and the role of digital technology. Previously, he was an assistant professor of finance at the ESSEC Business School in Paris. He holds a PhD in economics from the University of California, Berkeley, and a BSc and an MSc in economics from the London School of Economics.

Oyebola Okunogbe is a senior economist in the World Bank's Development Research Group, focused on public economics and political economy. Her research has studied how governments in lower-income countries can improve revenue collection, with particular attention to the role of technology, tax administration, and politics, and her work was recognized with the Best Paper award by the *American Economic Journal: Economic Policy* in 2023. She is on the board of management of the International Institute of Public Finance and is an affiliated researcher with the Centre for Economic Policy Research, Institute for Fiscal Studies, and International Centre for Tax and Development. A native of Nigeria, she holds a PhD in public policy from Harvard University, an MPA in international development from Harvard Kennedy School, and a BA in economics from Dartmouth College.

Mahvish Shaukat is an economist in the World Bank's Development Research Group, with a focus on public economics and governance. Her research has studied the determinants of tax compliance, particularly tax morale, and implications for tax policy. Her work has also examined approaches to improving efficiency and fairness, as well as strengthening tax–benefit linkages, in collaboration with the tax authority in Pakistan. She holds a PhD in economics from the Massachusetts Institute of Technology, an MA/MS from Stanford University, and a BA from the University of California, Davis.

Dario Tortarolo is an economist in the World Bank's Development Research Group, with a focus on public economics. His research has studied how public policies affect workers, businesses, consumers, and governments, with particular attention to distributional impacts. His work has also examined how governments can address tax avoidance and evasion, especially at the top of the income distribution. Prior to joining the World Bank, he was an assistant professor at the University of Nottingham and a postdoctoral fellow at the Institute for Fiscal Studies. He holds a PhD in economics from the University of California, Berkeley, and a BSc and an MSc in economics from Universidad Nacional de La Plata. He received the National Tax Association's Outstanding Doctoral Dissertation prize in 2020.

All authors are members of the World Bank's DaTax Lab.

Overview

Introduction

Raising revenue right is a defining challenge for emerging market and developing economies (EMDEs). Three problems make action urgent. The first is fiscal pressure. Government revenues have not kept pace with spending, thus squeezing fiscal space. Budget deficits in EMDEs are higher in the 2020s than in previous decades, and in many countries, interest payments exceed spending on health and education.

The second is inefficiency. Many EMDEs impose higher tax rates on firms than do advanced economies, yet they collect less revenue. This is because tax bases are narrow, riddled with loopholes, and highly responsive to taxation. High rates on paper do not translate into high revenues in practice.

The third is fairness. Tax systems are often ill-equipped to protect those with the least. In many EMDEs, the combined effect of taxes and transfers leaves more people in poverty than it lifts out.

This report argues that countries can do better. It presents an integrated framework to help policy makers identify the best combination of efficiency and fairness for raising a given amount of revenue—referred to here as the *fiscal frontier*—and the paths to reach it. The message is not that governments should tax more or grow larger. Rather, they should tax smarter. Many countries can raise more revenue from existing tax rates or achieve better economic and social outcomes while collecting the same amount.

To help countries apply this framework, this report first assesses the state of revenue mobilization and positions each country relative to the fiscal frontier (refer to chapters 1 and 2). It then examines how countries can harness innovations that accelerate progress toward the frontier via advances in the 3*T*s: *technology*, *transparency*, and *trust* (refer to chapters 3, 4, and 5). Next, it provides a toolkit covering three practical areas: deploying taxes beyond their core revenue function as an instrument of environmental and industrial policy, applying the Marginal Value of Public Funds (MVPF) framework to assess whether and how to raise more revenue, and using administrative tax data to generate policy insights (refer to chapters 6, 7, and 8). The concluding policy guidance offers tailored tax reform guidance using a typology based on countries' distance to the fiscal frontier and the underlying structure of their institutions (refer to chapter 9).

The analysis draws on a growing body of public finance research and country case studies, many supported by the World Bank and grounded in administrative data. Although taxation is the focus of this report, comprehensive public finance reform also depends on more efficient and better-targeted public spending. Other components of domestic resource mobilization, including aid, tariffs, and nontax revenues, are covered only briefly.

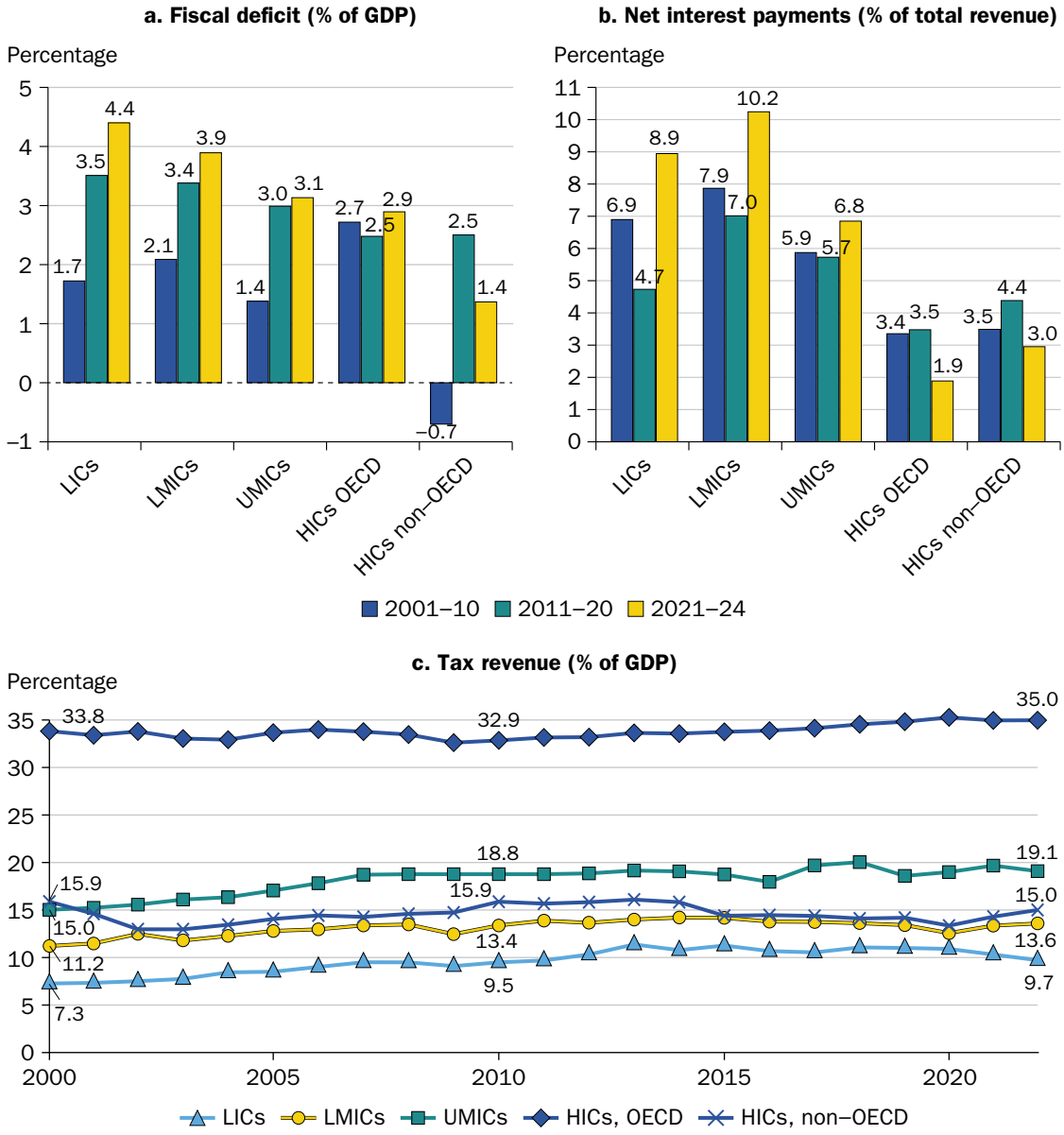
Tax systems in EMDEs

Message 1: Most tax systems in EMDEs are not meeting development needs: They are revenue inadequate, inefficient, and inequitable.

First, tax systems are not raising enough revenues to meet spending needs. Compounded by waning foreign aid, this results in a tight fiscal space. At the turn of the century, in the wake of broad debt relief measures, the median primary deficit in EMDEs was 2 percent of GDP; it has since doubled (refer to figure O.1), resulting in increasing interest payments that divert resources from public services. In contrast, tax revenues as a share of GDP have remained stagnant since 2010—hovering at around 10 percent in low-income countries (LICs), 13 percent in lower-middle-income countries (LMICs), and 19 percent in upper-middle-income countries (UMICs).

Second, inefficiencies have mounted (refer to figure O.2). Wide tax rate differentials, ad hoc exemptions, and loopholes distort behavior and shrink the tax base. Corporate taxation illustrates the problem neatly: Effective tax rates on new investment vary across industries by 30 percent more in LICs than in wealthier ones, steering scarce capital toward tax-favored sectors rather than toward productive ones. High compliance costs further undermine performance, growth, and job creation.

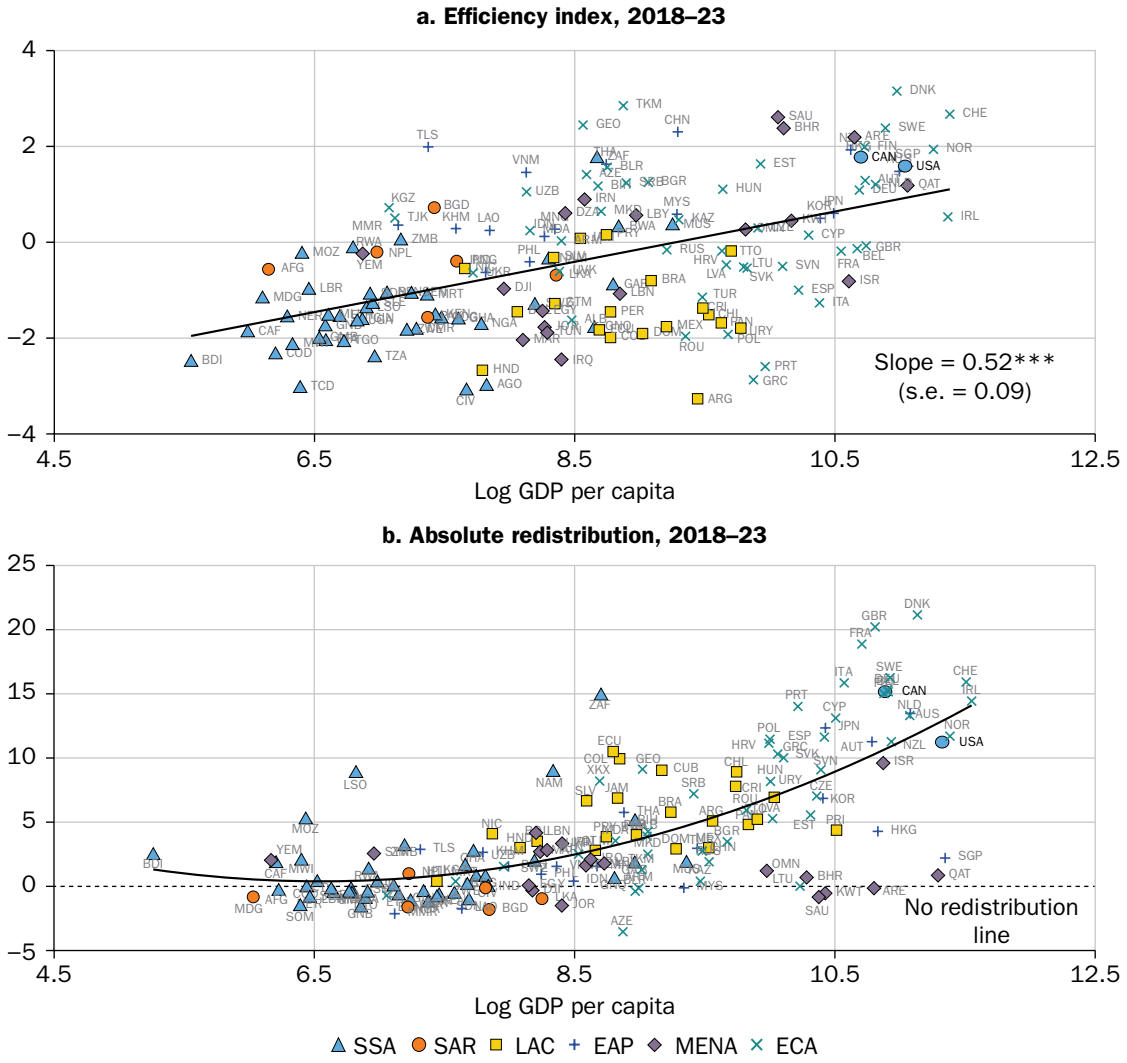
Figure 0.1 Stagnant tax revenues, growing fiscal pressure



Source: Original figure for this publication based on data from the World Revenue Longitudinal Database and World Economic Outlook of the International Monetary Fund.

Note: Values are calculated for countries with population above 1 million in 2024. GDP = gross domestic product; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; OECD = Organisation for Economic Co-operation and Development; UMICs = upper-middle-income countries.

Figure 0.2 Tax systems in EMDEs are less efficient and less equitable



Sources: Original figure for this publication based on data from the United States Agency for International Development, the World Development Indicators, the World Bank Enterprise Surveys, the Research School of International Taxation–International Tax Institutions database, and the World Inequality Database.

Note: Panel a's index is constructed via principal component analysis on six standardized efficiency indicators: VAT C-efficiency, CIT productivity, PIT productivity, dispersion of CIT rates, and firms' reported perceptions of tax rates and tax administration as obstacles to doing business. The reported coefficient and s.e. correspond to the fitted linear relationship between efficiency and log GDP per capita. The slope is significant at the 1 percent level (denoted by *** in the figure). Panel b plots the difference between Gini coefficients for pre- and post-tax-and-transfer income (absolute redistribution) against log GDP per capita with a quadratic fit overlaid. Refer to figures 2.2 and 2.3 for more details on the construction of the tax efficiency and equity indexes. The sample includes 150 countries (panel a) and 156 countries (panel b) with populations above 1 million. CIT = corporate income tax; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; GDP = gross domestic product; LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; PIT = personal income tax; SAR = Southeast Asia; s.e. = standard error; SSA = Sub-Saharan Africa; VAT = value-added tax.

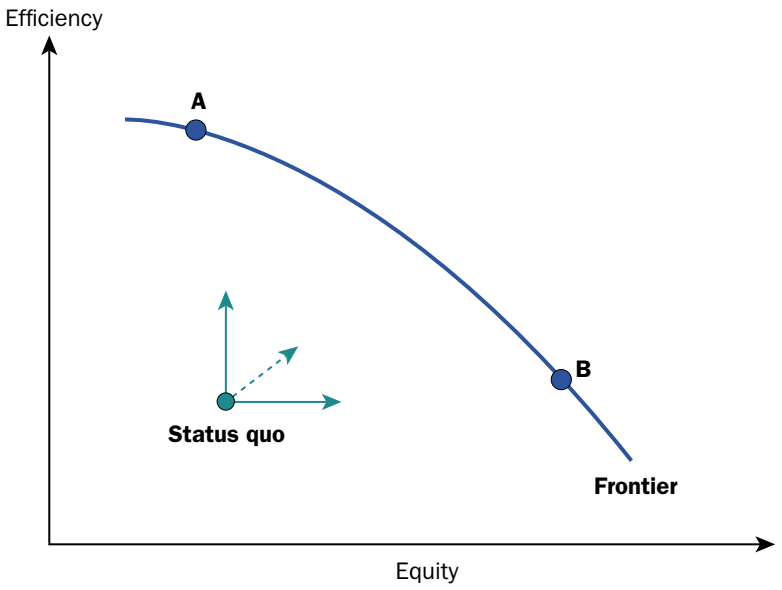
Finally, fairness is elusive. Heavy reliance on consumption taxes, narrow personal income tax bases, and preferential treatment for top incomes make tax systems less progressive, resulting in little difference in the effective tax rates paid by higher- and lower-income households. In some cases, taxes and transfers even push vulnerable households into poverty. The result is a fiscal architecture ill-equipped to finance development, foster inclusive growth, or meet citizens' expectations.

Efficiency and equity in policy reforms

Message 2: Because many EMDEs sit far from the fiscal frontier, policy reforms need not trade off efficiency against equity. Both can improve for any target revenue level.

Revenue, efficiency, and fairness are intertwined; shifting one inevitably affects the others. Consider that countries begin by choosing a revenue target. For any given level of revenue, an equity–efficiency frontier summarizes the best-attainable combination of the two, given a country's structural fundamentals—its economic structure, administrative capacity, and political constraints. Figure O.3 illustrates this framework.

Figure 0.3 The equity–efficiency frontier (holding revenue fixed)

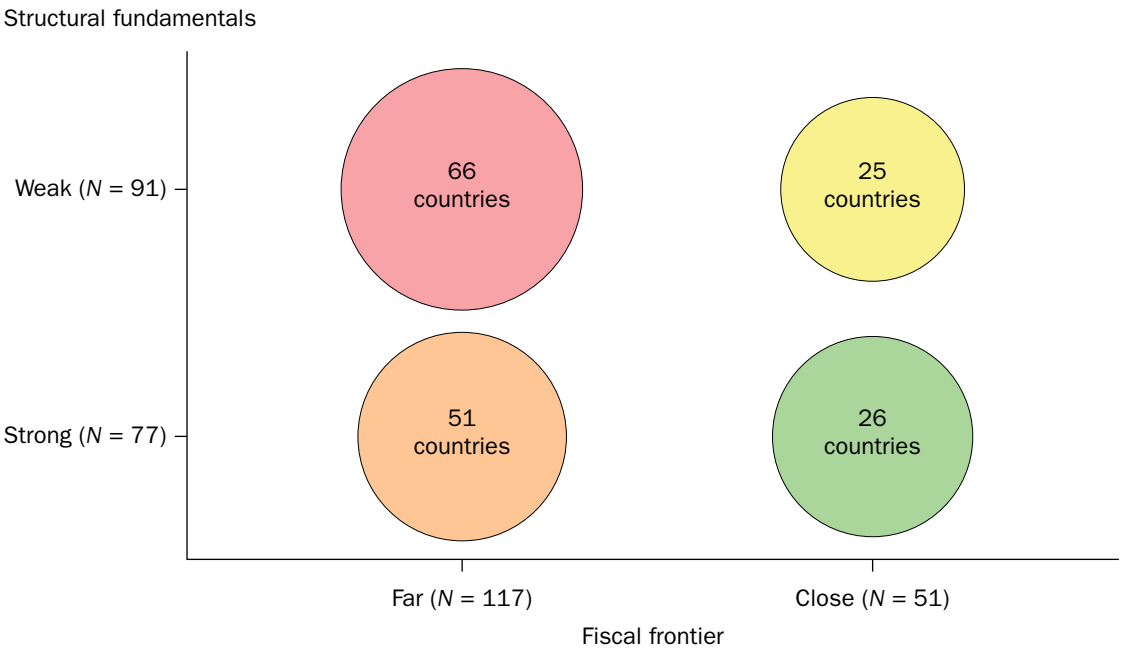


Source: Original figure for this publication.

Countries operating on the frontier (blue line) face the classic public finance tradeoff: Tax revenues increase fairness by paying for public goods and extending government support for those in need, but they come at the cost of economic efficiency. Societies choose their position along the curve—some might opt for point A, with broad, uniform taxes that minimize inefficiencies but lower redistribution; others might favor point B, where higher revenue and steeper progressivity increase fairness at the cost of efficiency.

The majority of countries operate well below this frontier (point status quo) and can improve efficiency and fairness *at the same time* (refer to figure O.4). Even among those with stronger structural fundamentals—such as a sizable formal workforce or high state capacity—our estimates suggest that two-thirds (66 percent) of them fall short. Among countries with weaker fundamentals, the share rises to almost three-quarters (73 percent).

Figure 0.4 **Countries close to and far from the frontier, by structural fundamentals**



Sources: Original figure for this publication based on data from the United States Agency for International Development, the Research School of International Taxation–International Tax Institutions, the World Bank Enterprise Surveys, the World Inequality Database, the World Revenue Longitudinal Database of the International Monetary Fund, the World Development Indicators, the Worldwide Governance Indicators, the International Survey on Revenue Administration, and the Harvard Growth Lab's Atlas of Economic Complexity.

Note: The efficiency–equity fiscal frontiers are defined separately for countries with strong and weak fundamentals. Refer to box 1.3 for the definition of structural fundamentals, tax efficiency and tax equity scores, and calculations of distance to the fiscal frontier.

For countries far from the fiscal frontier, raising revenue need not come at the expense of efficiency or fairness. Poorly designed investment incentives are a case in point. While intended to attract capital, they frequently concentrate benefits among a small group of firms, deliver modest investment gains, erode the tax base, and fuel rent-seeking. Rationalizing these incentives—eliminating untargeted exemptions and streamlining tax rules—can simultaneously expand revenues, improve economic efficiency, and restore fairness.

The potential gains extend well beyond investment incentives alone: Tax concessions of all kinds absorb roughly one-quarter of total tax revenue across income groups, while consumption tax exemptions account for the bulk of forgone revenue in EMDEs, reducing collections by 16–18 percent before taxes are ever paid.

Using the 3*T*s in tax systems

Message 3: Technology, transparency, and trust pave a new path to the frontier.

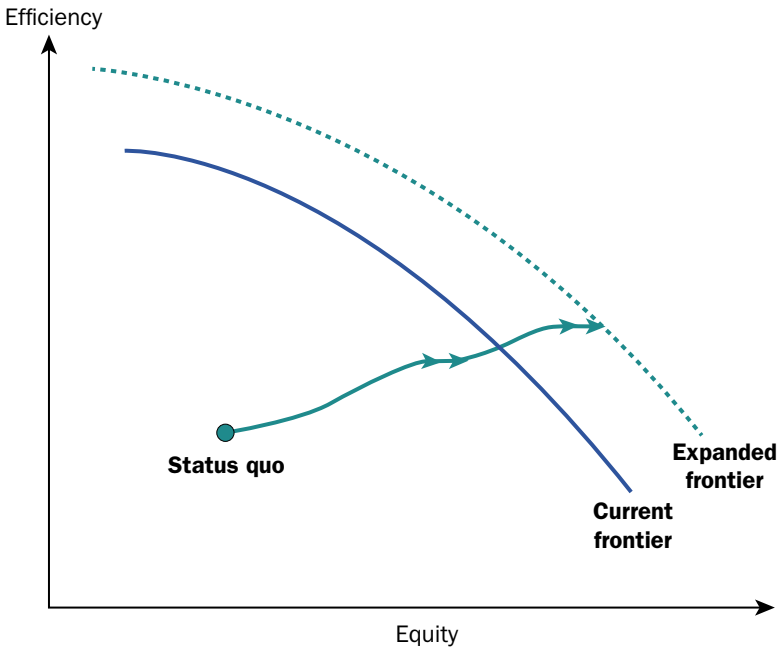
Technology, transparency, and trust—the "3*T*s"—help countries move toward the fiscal frontier faster by making tax systems more efficient and equitable, and, in some cases, leapfrog structural constraints that once limited tax capacity. Digital tools facilitate enforcement, transparency limits opportunities for evasion, and trust strengthens voluntary compliance. Further, as innovation continues and more tools emerge, they also push the frontier outward, expanding both what tax systems can achieve and the range of feasible policy choices (refer to figure O.5).

Technology

Technological advances are handing tax authorities potent new tools for their three core tasks—identifying taxpayers, verifying liabilities, and collecting what is owed. In 2025, 97 percent of countries had a tax management information system, up from 36 percent two decades earlier. Used well, technological innovations can lift revenue, bolster efficiency, and improve fairness all at once.

Consider some of the most-powerful examples. Digital identification systems such as biometric IDs provide a far stronger anchor than traditional tax IDs. When linked to land records or financial accounts, they allow tax authorities to identify individuals who should be on the tax rolls but are not. *Electronic invoicing (e-invoicing),* which transmits transactions directly to the administration, makes it much harder for firms to underreport sales. Digital tax filing reduces compliance costs and streamlines administration; in some countries, tax returns are even pre-populated.

Figure 0.5 The 3*T*s: Accelerating progress and expanding possibilities



Source: Original figure for this publication.

A growing body of evidence shows that digital technologies can deliver large revenue gains, although impacts vary widely across instruments and contexts. In Ghana, the introduction of digital property identification and billing tools doubled property tax collections while freeing inspectors' time to focus on harder cases. In Ethiopia, the rollout of electronic sales registration machines that store information on business transactions and transmit it directly to the tax authority led to an almost 50 percent increase in value-added tax (VAT) revenue.

Yet, technology is not a silver bullet. In many cases, its potential remains untapped: Transaction-level data from e-invoicing systems, for example, frequently sit idle because tax administrations lack the capacity to process and interpret large datasets. Further, while technology tools may uncover unpaid revenues, traditional enforcement capacity is typically required to ensure payment. Moreover, digital tools present new privacy and ethical risks that must be carefully managed.

Realizing technology's promise, therefore, requires more than digital infrastructure: It demands clear institutional strategies, appropriate legal and regulatory frameworks and data governance, and sustained investment in people and processes that are essential to ensure that technology augments the work of tax officials rather than supplanting them.

Transparency

Economic activity and wealth have become increasingly concentrated among multinational enterprises (MNEs) and high-net-worth individuals. Yet, before recent transparency reforms, much of their cross-border activity remained beyond the reach of tax authorities: More than one-third of MNE profits were estimated to be shifted to low-tax jurisdictions, reducing global corporate income tax (CIT) revenues by over 10 percent, and at least 10 percent of global financial wealth was held offshore, with only a small fraction reported to domestic tax authorities.

Over the past decade, a wave of transparency and international coordination reforms has begun to close these gaps. Assets, profits, and ownership structures that once remained hidden behind shell companies and complex cross-border arrangements are becoming visible to tax authorities. These developments can be summarized by the "ABCD" framework.

- *Automatic exchange of financial information* can help end bank secrecy by providing tax authorities with information on residents' offshore financial accounts.
- *Beneficial ownership registries* can identify the individuals who ultimately own or control legal entities, allowing administrations to pierce corporate structures and attribute income more accurately.
- *Country-by-country reporting* requires MNEs to disclose the location of their profits, sales, and employment, providing the foundation for international cooperation on a global minimum tax.
- *Digital services taxation* can help governments claim a fairer share of taxes from MNEs that earn money online, using new profit allocation rules and treaty reforms.

Where implemented, these reforms are reducing opportunities for tax evasion and avoidance. Beneficial ownership registries—rare a decade ago—now cover about two-thirds of the world's population and are used to detect tax mismatches, collusive procurement, and corruption. Offshore transparency has improved substantially: Foreign-owned deposits in tax havens have fallen by one-quarter, and new studies suggest that more than half of the offshore reporting gap may have been closed, revealing an estimated 5 percentage points of GDP. For example, Argentina's 2016 Voluntary Disclosure Program, introduced alongside the country's adoption of automatic exchange of information, illustrates the potential of combining transparency with enforcement: Taxpayers disclosed previously hidden assets equivalent to 21 percent of GDP, generating immediate penalty revenues of 1.8 percent of GDP and a doubling of wealth tax revenues.

Just as important, transparency innovations provide a foundation for redesigning income taxation: slowing the race to the bottom in corporate tax rates, integrating labor and capital taxation, and shifting part of the burden away from middle-income taxpayers to top economic actors. By making income, profits, and ownership more observable, ABCD reforms reduce opportunities for concealment and avoidance, weakening some of the behavioral constraints that have historically limited progressive taxation.

Trust

Trust and the social contract are increasingly considered to be prerequisites to the political feasibility and durability of tax reform. Without trust in public institutions, even well-designed reforms struggle to garner support or sustain compliance. This pattern is evident in repeated cases of reform withdrawal, dilution, or reversal following public opposition. Notable examples include Malaysia's repeal of its goods and services tax in 2018, Jordan's withdrawal and revision of its income tax reform in 2018, Kenya's withdrawal of the Finance Bill in 2024, and the Dominican Republic's withdrawal of its proposed tax modernization reform in 2024.

Trust is determined by the nature of interactions between a triad of actors: politicians, bureaucrats, and citizens. Politicians design policy. To earn citizens' trust, politicians must *listen* to what citizens want from the tax system, *deliver* visible public benefits in return for taxes paid, and *communicate* clearly the costs and benefits of taxation. In Sierra Leone, for example, informing property owners about the services provided by local government increased tax payments by 20 percent.

Building trust also requires aligning the actions of bureaucrats tasked with implementing policy as closely as possible with the intentions of politicians. This begins by *recruiting* competent and well-motivated officials using merit-based methods, *incentivizing* them using an appropriate mix of financial and nonfinancial rewards, and carefully *monitoring* them to ensure accountability. To bypass restrictive civil service policies on recruitment, remuneration, and performance management, 42 percent of countries have opted to collect taxes using a semi-autonomous revenue agency that sits outside the traditional civil service but maintains accountability for its performance. Implementation details determine how well these agencies work in practice.

Frontline bureaucrats shape citizens' experiences with the tax system and their resulting compliance behavior. An important ingredient for trust-building here is *fairness.* Ensuring robust appeal processes and leveraging appropriate technology solutions to mitigate tax official bias helps create a consistent experience with the tax system. A complementary approach is to *strategically match* high-performing officials to the largest taxpayers so that interactions are competent

and credible. A reform in Indonesia that created medium taxpayer offices tripled the staff-to-taxpayer ratio in that segment and led to tax revenues more than doubling. Finally, administration must be *inclusive,* actively reaching women, the less educated population, people in remote areas, and other groups who are often underserved.

Recent experience shows that some developing economies have built more trust between citizens and the state, helped by stronger economic performance and better government capacity. In these countries, governments have more room to carry out ambitious tax reforms. In countries where trust is lower, progress is slower. Better technology and greater transparency can help start a virtuous cycle: improving public services, encouraging people to comply with tax rules, and gradually rebuilding trust.

Artificial intelligence and the 3*T*s

Artificial intelligence (AI) is poised to amplify the impact of the 3*T*s. In tax administration, machine learning is already expanding the toolkit through applications such as targeted audits, automated property valuation, and taxpayer service bots. AI will also alter what governments can see and tax: Richer data and tools make some income streams easier to observe and verify, but AI-intensive production increasingly relies on intangible assets and platforms that concentrate profits in ways that are hard to capture.

Trust, too, will be affected. AI opens new channels for taxpayer communication and service delivery, but opaque algorithms, data misuse, and inadequate oversight can quickly undermine public confidence. Realizing AI's potential requires getting the basics right first. Without sound digital infrastructure, reliable data, robust data governance frameworks, and trained personnel, advanced AI applications will remain out of reach for many EMDEs, and the gap between high- and low-capacity countries could widen.

MVPF and revenue decisions

Message 4: There is no one-size-fits-all tax mix—or government size. The MVPF provides a guide for deciding when and how to raise revenue.

Importantly, the report does not advocate for higher taxes or a larger government. Countries differ in their structural fundamentals and social preferences, and governments near the fiscal frontier

operate successfully at different revenue levels. Therefore, there is no universal optimal tax-to-GDP ratio, and commonly cited minimum thresholds of 15–20 percent should be interpreted with caution.

What matters instead is the marginal cost of raising revenue. The MVPF provides a framework for assessing both whether additional revenue should be raised and which instruments should be used. It compares the social value of additional public spending with the welfare cost of financing it through taxation. Revenue is adequate when these two are equal. In practice, however, high debt burdens, financing constraints, or limited market access may make revenue mobilization a binding short-run objective. In such circumstances, the priority is not whether to raise revenue but how to do so at the lowest economic and social cost.

Implementing MVPF analysis remains at the frontier of policy design. It requires high-quality administrative data, credible estimates of behavioral responses, and explicit judgments about how society values gains and losses across income groups. The data revolution in public finance is making such analysis increasingly feasible. Estimates from Mexico illustrate the approach: Raising an additional dollar through higher top income tax rates reduces welfare by 2 cents, compared with 77 cents through a VAT increase. Intuitively, a VAT increase spreads the burden across all consumers and encourages shifts to the informal sector, whereas higher taxes on top earners fall on individuals whose marginal income society may value less. When the resulting revenue finances high-value public goods, such as roads, the social gains can exceed the costs of raising the funds.

Tailored policy guidance

The policy guidance in chapter 9 applies the framework developed in chapter 1 to provide tailored tax reform guidance on how to leverage the 3*T*s, using a 2-by-2 typology based on countries' fiscal frontier gaps and structural fundamentals. Although technology, transparency, and trust are complementary and important across all country groups, the framework highlights the implementation lever likely to have the greatest impact in each context. Table O.1 summarizes the resulting reform priorities, successful country examples, and tax-mix objectives for each of the four country groups.

Table 0.1 Reform pathways toward the fiscal frontier via the 3*T*s

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming*** **Status:** Poor tax design and weak administrative systems. **Priority: Build foundations with technology.** **Successful examples** • Roll out electronic tax filing.[a] • Strengthen large taxpayer office.[b] • Back property enumeration with credible enforcement.[c] **Tax mix:** Replace transaction taxes with broad-based VAT; use transfers for redistribution.	***Constrained but functional*** **Status:** Functional tax design, but persistent informality and modest administrative capacity. **Priority: Expand coverage with technology.** **Successful examples** • Roll out electronic billing machines.[d] • Use data analytics for compliance monitoring.[e] • Strengthen property valuation systems.[f] **Tax mix:** Complement VAT with a gradual expansion of income and property taxation.
Strong fundamentals	***Capable but underperforming*** **Status:** Strong administrative tools, but inefficiencies in tax design, political economy barriers, and lack of fairness. **Priority: Simplify and build trust.** **Successful examples** • Unify fragmented consumption taxes.[g] • Couple tax amnesty program with credible enforcement.[h] • Evaluate and remove ineffective tax incentives.[i] **Tax mix:** Shift revenue collection toward the most-effective instruments; simplify underperforming taxes.	***Capable and high-performing*** **Status:** Broad-based taxes and data-driven administration. **Priority: Deepen transparency and coordination.** **Successful examples** • Use automatic exchange of financial information.[j] • Connect tax bases through beneficial ownership data.[k] • Use automatic pre-filling of tax returns.[l] **Tax mix:** Raise tax contributions of top earners supported by international coordination to protect mobile tax bases.

Source: Original table for this publication.

Note: VAT = value-added tax.

a. For more information, refer to Okunogbe and Pouliquen (2022).
b. For more information, refer to Basri et al. (2021).
c. For more information, refer to Okunogbe (forthcoming).
d. For more information, refer to Mascagni et al. (2021).
e. For more information, refer to Almunia et al. (2024).
f. For more information, refer to Knebelmann et al. (2026).
g. For more information, refer to Barreix et al. (2025).
h. For more information, refer to Londoño-Vélez and Tortarolo (2025).
i. For more information, refer to Cali et al. (2025).
j. For more information, refer to Johannesen et al. (2026).
k. For more information, refer to Brounstein et al. (2026).
l. For more information, refer to Saez and Seim (2025).

Structure of this Policy Research Report

The following is the structure of this policy research report:

Part I Setting the Stage

- **Chapter 1** A Framework for the Fiscal Frontier
- **Chapter 2** Efficiency and Equity in Current Tax Systems

Part II A New Path to the Fiscal Frontier: Technology, Transparency, and Trust

- **Chapter 3** Technology in Tax Administration
- **Chapter 4** Transparency and Taxation of Top Economic Actors
- **Chapter 5** Trust and the Political Economy of Taxation

Part III Toolkit and Applications

- **Chapter 6** Taxation for Environmental and Industrial Goals
- **Chapter 7** How Much Tax Revenue to Collect and How? A Marginal Value of Public Funds Approach
- **Chapter 8** Administrative Tax Data for Policy
- **Chapter 9** Policy Guidance

References

Almunia, Miguel, Jonas Hjort, Justine Knebelmann, and Lin Tian. 2024. "Strategic or Confused Firms? Evidence from 'Missing' Transactions in Uganda." *Review of Economics and Statistics* 106 (1): 256–65. https://direct.mit.edu/rest/article-abstract/106/1/256/109918/Strategic-or-Confused-Firms-Evidence-from-Missing?.

Barreix, Alberto Daniel, Melina De Souza Rocha Lukic, and José Barroso Tostes Neto. 2025. *The Three Innovative Features of VAT in Brazil's Indirect Tax Reform*. Inter-American Development Bank. https://publications.iadb.org/en/three-innovative-features-vat-brazils-indirect-tax-reform.

Basri, M. Chatib, Mayara Felix, Rema Hanna, and Benjamin A. Olken. 2021. "Tax Administration versus Tax Rates: Evidence from Corporate Taxation in Indonesia." *American Economic Review* 111 (12): 3827–871. https://www.aeaweb.org/articles?id=10.1257/aer.20201237.

Brounstein, Jakob, Pierre Bachas, and Alex Bajana. 2026. "The Transparency Tax: Discouraging Firm Ownership via Tax Havens in Ecuador." Unpublished Paper. https://tinyurl.com/TransparencyTaxEcuador.

Calí, Massimiliano, Giorgio Presidente, and Thiago Scot. 2025. *The Elusive Impact of Corporate Tax Incentives*. Policy Research Working Paper 11061. World Bank. https://openknowledge.worldbank.org/entities/publication/4a0277e4-beab-46df-af96-e24ffa5702c4.

Johannesen, Niels, Lauge Larsen, and Nadine Riedelet. 2026. "Does Global Financial Transparency Improve Tax Compliance in Developing Countries? WIDER Working Paper 2026/58. United Nations University–World Institute for Development Economics Research. https://sa-tied.wider.unu.edu/article/does-global-financial-transparency-improve-tax-compliance-in-developing-countries.

Knebelmann, Justine, Victor Pouliquen, and Bassirou Sarr. 2026. "Discretion versus Algorithms: Bureaucrats, Tax Equity, and Acceptability." IFS Working Paper 26/34. Institute of Fiscal Studies. https://ifs.org.uk/sites/default/files/2026-05/WP202634-Discretion-versus-algorithms-bureaucrats-tax-equity-and-acceptability.pdf.

Londoño-Vélez, Juliana, and Dario Tortarolo. 2025. "Revealing 21% of GDP in Hidden Assets: Evidence from Argentina." *Journal of Public Economics* 250: 105471. https://www.sciencedirect.com/science/article/pii/S0047272725001690.

Mascagni, Giulia, Andualem T. Mengistu, and Firew B. Woldeyes. 2021. "Can ICTs Increase Tax Compliance? Evidence on Taxpayer Responses to Technological Innovation in Ethiopia." *Journal of Economic Behavior and Organization* 189: 172–93. https://www.sciencedirect.com/science/article/pii/S0167268121002407.

Okunogbe, Oyebola. Forthcoming. "Becoming Legible to the State: The Necessary but Not Sufficient Role of Identification in Taxation." *American Economic Review*. https://www.aeaweb.org/articles?id=10.1257/aer.20230586.

Okunogbe, Oyebola, and Victor Pouliquen. 2022. "Technology, Taxation, and Corruption: Evidence from the Introduction of Electronic Tax Filing." *American Economic Journal: Economic Policy* 14 (1): 341–72. https://www.aeaweb.org/articles?id=10.1257/pol.20200123.

Saez, Emmanuel, and David G. Seim. 2025. "Wealth Tax Enforcement in Sweden: Filing Requirements and Pre-Populated Returns." NBER Working Paper 33419. National Bureau of Economic Research. https://www.nber.org/papers/w33419.

Abbreviations

AAMNE	Analytical Activities of MNEs
ADB	Asian Development Bank
AEOI	Automatic Exchange of Information
AEs	advanced economies
AI	artificial intelligence
API	application programming interface
B2B	business-to-business
B2C	business-to-consumer
BCA	border carbon adjustment
BEPS	Base Erosion and Profit Shifting
BO	beneficial owner
BOR	beneficial ownership registry
CAMA	computer-assisted mass appraisal
CBAM	carbon border adjustment mechanism
CbCR	country-by-country reporting
CCDRs	Country Climate and Development Reports
CEO	chief executive officer
CEQ	Commitment to Equity
CFC	controlled foreign company
CGE	computable general equilibrium
CIAT	Inter-American Center of Tax Administrations
CIT	corporate income tax

COP	Conference of the Parties
CRS	Common Reporting Standard
CV	coefficient of variation
DFS	digital financial services
DLA	data license agreement
DPI	digital public infrastructure
DRM	domestic resource mobilization
DST	digital service tax
EAP	East Asia and Pacific
ECA	Europe and Central Asia
EFD	electronic fiscal device
EMDEs	emerging market and developing economies
EMTR	effective marginal tax rate
EOIR	Exchange of Information on Request
ETR	effective tax rate
ETS	emissions trading scheme/system
EU	European Union
FATCA	Foreign Account Tax Compliance Act
FATF	Financial Action Task Force
FATS	Foreign Affiliate Statistics
FFI	foreign financial institution
FMIS	financial management information system
GDP	gross domestic product
GIS	Geographic Information System
GMT	Global Minimum Tax
GNI	gross national income
GST	goods and services tax
GTED	Global Tax Expenditure Database
GTMI	GovTech Maturity Index
HICs	high-income countries
HNWI	high-net-worth individual
HR	human resources

IBFD	International Bureau of Fiscal Documentation
ID	identification
IDB	Inter-American Development Bank
ID4D	Identification for Development
IEC	Informality Engel Curve
IIR	Income Inclusion Rule
IMF	International Monetary Fund
IOTA	Intra-European Organisation of Tax Administrations
IP	internet protocol
ISORA	International Survey on Revenue Administration
IT	information technology
ITAS	Integrated Tax Administration System
ITI	international tax institution
ITTI	Inventory of Tax Technology Initiatives
IVS	Integrated Values Surveys
LAC	Latin America and the Caribbean
LICs	low-income countries
LIS	Luxembourg Income Study
LMICs	lower-middle-income countries
MENA	Middle East and North Africa
MICs	middle-income countries
MIS	management information system
ML	machine learning
MM	mobile money
MOU	memorandum of understanding
MNE	multinational enterprise
MRV	monitoring, reporting, and verifying
MTO	medium taxpayer office
MVPF	Marginal Value of Public Funds
NPV	net present value
NT–SDF	South Africa National Treasury Secure Data Facility
OECD	Organisation for Economic Co-operation and Development

p.c.	per capita
PCA	principal component analysis
PIN	personal identification number
PIT	personal income tax
p.p.	percentage point
PINE	Policy Instruments for the Environment
PPP	purchasing power parity
QDMTT	Qualifying Domestic Minimum Top-up Tax
R&D	research and development
RD	regression discontinuity
SAR	South Asia Region
SARA	semi-autonomous revenue authority
SARS	South African Revenue Service
s.e.	standard error
SEZ	special economic zone
SFA	stochastic frontier analysis
SMEs	small and medium enterprises
SSA	Sub-Saharan Africa
SSC	social security contribution
STTR	Subject to Tax Rule
TADAT	Tax Administration Diagnostic Assessment Tool
TCP	total carbon price
TIN	tax identification number
TiVA	Trade in Value-Added Data
TMIS	tax management information system
TTR	top tax rate
TPAF	Tax Policy Assessment Framework
TOT	turnover tax
UK	United Kingdom
UMICs	upper-middle-income countries
UN	United Nations

UNU–WIDER	United Nations University–World Institute for Development Economics Research
US	United States
USD	US dollars
UTPR	Under-Taxed Profits Rule
VAT	value-added tax
VDP	Voluntary Disclosure Program
WHT	withholding tax
WMVPF	Welfare-Weighted Marginal Value of Public Funds
WTP	willingness-to-pay

Part I
Setting the Stage

CHAPTER 1

A Framework for the Fiscal Frontier

Prepared by Pierre Bachas, Oyebola Okunogbe, Mahvish Shaukat, and Dario Tortarolo

A simple framework for how tax systems balance revenue, efficiency, and equity

All countries confront the same core challenges: mobilizing sufficient revenue to finance public goods and social protection, limiting efficiency distortions, and ensuring that the tax-and-transfer system is equitable.

- *Revenue* refers to the resources governments raise through taxation, expressed as a share of GDP.
- *Efficiency* entails limiting distortions to economic behavior—labor supply, production, investment, and consumption—while ensuring that taxes are administered transparently, at low administrative and compliance cost, and with minimal scope for avoidance and evasion.
- *Equity* encompasses both *vertical equity*—the principle that higher-income individuals contribute more—and *horizontal equity*—the principle that individuals with similar incomes are treated alike.

These three dimensions are interconnected: Progress along one dimension might entail tradeoffs or complementarities with the others.

Building on these definitions, this chapter introduces a framework for analyzing how countries position themselves along the revenue–efficiency–equity frontier. It uses this lens to assess current performance and to guide the reform priorities developed throughout the report. We first examine how efficiently and equitably countries raise a *given* level of revenue, and how certain reforms can

simultaneously enhance both efficiency and equity. We then analyze the tradeoffs that arise once the scope for such improvements is exhausted and how policy choices may vary with revenue needs and structural constraints.

Setting the revenue target

The framework takes a country's desired tax revenue level as given. Tax-to-GDP ratios vary both because societies differ in their preferred size of government and because countries face capacity and political constraints that limit what is feasible to collect in practice. We abstract from this distinction here. The key point is that, for any given revenue level, countries can differ widely in how efficiently and equitably they raise it. Chapter 7 revisits how much revenue governments *should* collect, using the Marginal Value of Public Funds (MVPF) framework to weigh the benefits of additional public spending against the costs of taxation.

Defining the fiscal frontier

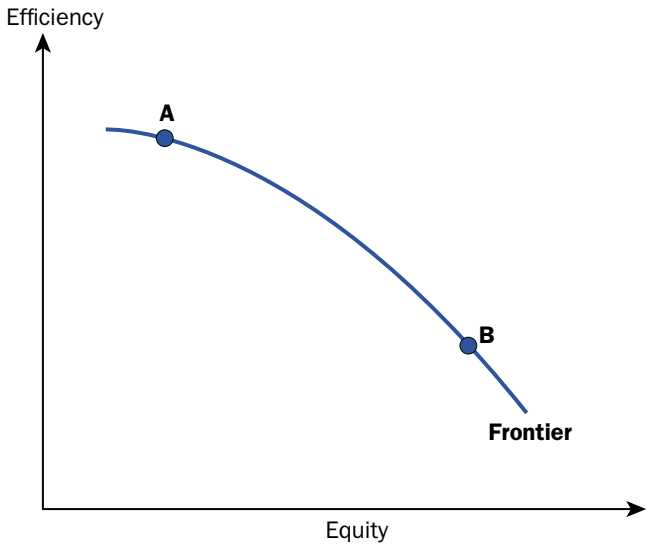
The framework underpinning this report is illustrated in figure 1.1. For any given tax revenue target, and for a country's underlying structural fundamentals, the *fiscal frontier* captures the best balance a country could achieve between efficiency and equity if policies were optimally designed and administrative capacity fully utilized. The framework sets aside other roles that tax policy may play. In practice, tax policy can also be used to correct market failures and internalize externalities—for example, through Pigouvian taxes on pollution (refer to chapter 6).

A country operating on the frontier confronts the classic public finance tradeoff: Policies that improve equity typically reduce efficiency, and vice versa. Different points along the frontier reflect different social preferences and tolerances for inequality. For example, a country may choose point A, with a uniform income tax rate that preserves efficiency—by limiting distortions and keeping compliance simple—while delivering limited redistribution. Alternatively, it may choose point B, with progressive income tax rates that enhance equity at the cost of greater distortions and administrative complexity. Similar tradeoffs arise across tax instruments. In settings with high informality, consumption taxes often generate revenue reliably but tend to be less progressive (point A), whereas progressive income taxes may strengthen equity but at higher efficiency and administrative cost (point B). We return to the implications for the tax mix in chapters 2 and 9.

Defining the status quo

In practice, many countries—especially emerging market and developing economies (EMDEs)—operate inside, rather than on, the frontier. Rather than confronting the fundamental

Figure 1.1 The fiscal frontier



Source: Original figure for this publication.

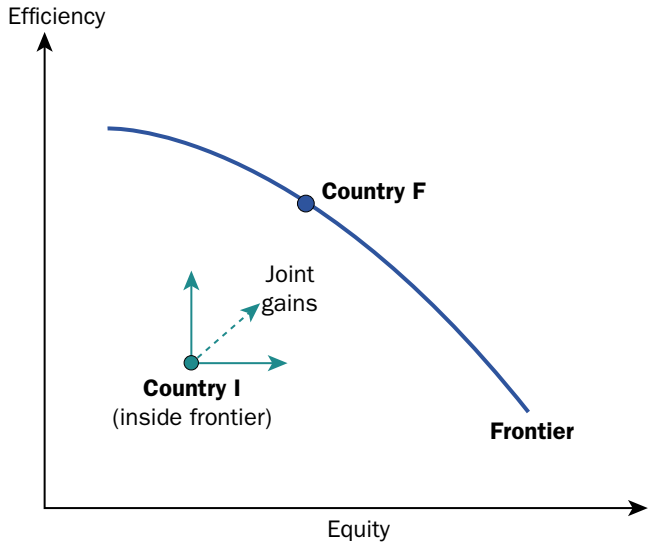
Note: The frontier represents the best-attainable balance between efficiency and equity for a predetermined level of tax revenue. Points A and B illustrate alternative policy choices along the frontier, reflecting alternative priorities between efficiency, administrative simplicity, and redistribution based on social preferences.

efficiency–equity tradeoff, they face more basic constraints: Weaknesses in policy design and administrative capacity prevent them from achieving the levels of efficiency and equity that are feasible for their chosen level of revenue, given their economic structure.

Common reasons for operating below the frontier include differentiated tax rates across sectors, regions, and income types; tax base erosion through exemptions and special regimes; and administrative weaknesses, including limited use of technology and third-party data and ineffective enforcement (as discussed in chapter 2). These shortcomings reduce revenue while undermining efficiency—by distorting economic decisions—and equity—by allowing well-connected groups to avoid taxes and shifting the burden onto poorer taxpayers.

When countries operate below the frontier, public finance reforms can simultaneously enhance efficiency and equity by addressing design and implementation flaws. A simple example illustrates this point (refer to figure 1.2). Consider two countries—Country F, operating on the frontier, and Country I, operating inside it—both collecting 10 percent of GDP in tax revenue, with similar structural fundamentals and levels of public spending. Country F relies on moderate rates applied to broad tax bases, with few exemptions and effective enforcement. Country I raises the same

Figure 1.2 The fiscal frontier and the status quo



Source: Original figure for this publication.

Note: This figure compares two countries raising the same amount of tax revenue. Country F operates at the frontier, while Country I operates inside the frontier. Points inside the frontier reflect policy and administrative shortcomings that allow simultaneous improvements in efficiency and equity for a fixed level of tax revenue.

revenue through high statutory rates on narrow bases, reflecting special concessions and weak compliance. Although their revenue levels are identical, Country F achieves higher efficiency—by generating fewer distorsions—and greater equity—by limiting loopholes for well-connected groups. By broadening tax bases and reducing reliance on high statutory rates, while keeping revenue constant, Country I can improve both efficiency and equity before confronting the underlying efficiency–equity tradeoff.

The distance between the *status quo interior point* and the *current frontier possibility set* represents unrealized potential, reflecting reforms that could, in principle, generate Pareto improvements, making some taxpayers better off without making others worse off. Capturing these gains, however, is often politically challenging (as discussed in chapter 5).

Two concrete examples illustrate how countries can move closer to—or further away from—the fiscal frontier. Brazil's 2023 revenue-neutral consumption tax reform shows how unifying a fragmented tax system can move a country closer to the frontier, improving efficiency and equity simultaneously (refer to box 1.1). By contrast, the spread of mobile money transaction taxes in several African countries illustrates how administrative and political constraints can steer

governments to raise revenue with suboptimal instruments, keeping them inside the frontier. By taxing each transfer, these levies trigger sharp declines in digital payments (around 20–30 percent in the first months after adoption) and fall disproportionately on lower-income users, undermining financial inclusion (refer to box 3.3 in chapter 3).

Box 1.1 Moving toward the fiscal frontier: Brazil's consumption tax reform

Prepared by Thiago Scot

Brazil's pre-2023 consumption tax lay well inside the efficiency–equity frontier, combining significant distortions with regressivity. Decades of incremental reforms had produced a highly fragmented structure of federal, state, and municipal taxes, each with distinct bases, rates, and exemptions (Cebreiro Gomez et al. 2025; Rocha 2024). Firms operating across states and sectors faced different taxes for similar goods, high compliance costs, and legal uncertainty. Partial crediting and cumulative taxes encouraged vertical integration and distorted production choices, while an origin-based system fueled tax competition among states and discouraged integrated national supply chains. In addition, these taxes disproportionately affected poorer households (Lara Ibarra et al. 2025; Palomo et al. 2025).

A historic reform enacted in 2023 replaces this patchwork with an integrated value-added tax (VAT). The reform draws on the experience of other federations such as Canada and India. Five existing taxes on goods and services are consolidated into a federal tax (Contribuição sobre Bens e Serviços) and a subnational tax (Imposto sobre Bens e Serviços) operating under uniform rules, a broad base, and the destination principle. The design preserves states' fiscal autonomy but eliminates the multiple bases and rules fragmenting the internal market. The reform is revenue neutral, with rates adjusting to keep the tax burden fixed.

The shift to a modern VAT could generate sizable efficiency gains. Full input credits eliminate cascading and tax-driven production decisions. Destination-based taxation aligns revenue with final consumption and curbs local fiscal competition, supporting an integrated national market. The reform also builds on Brazil's digital tax infrastructure: E-invoicing and integrated administration facilitate credit verification, refunds, and compliance, reinforcing VAT neutrality (Barreix et al. 2025).

The reform also addresses the equity limitations of consumption taxes. Poorer households bore a disproportionate burden, as exemptions proved an ineffective redistributive tool.

(Continued)

Box 1.1 Moving toward the fiscal frontier: Brazil's consumption tax reform *(continued)*

The reform introduces VAT cashbacks for poor households identified through the national social registry (Cadastro Único). Vulnerable households are compensated directly, building on subnational experience—most notably Rio Grande do Sul's Devolve–Imposto sobre Circulação de Mercadorias e Serviços. The reform marks a shift toward personalized, data-driven transfers that advance equity without sacrificing efficiency (Bachas et al. 2025; World Bank 2026).

Finally, the reform shows how major tax reforms can succeed in a politically complex federation. Long transition periods allow firms to adapt, while the phased reallocation of revenues across states and municipalities avoids abrupt fiscal losses and tempers opposition. This extended horizon, coupled with shared governance, secured agreement where earlier efforts failed. Brazil's experience suggests that, with credible transitions, digital tools, and explicit compensation, efficiency and equity gains can advance together.

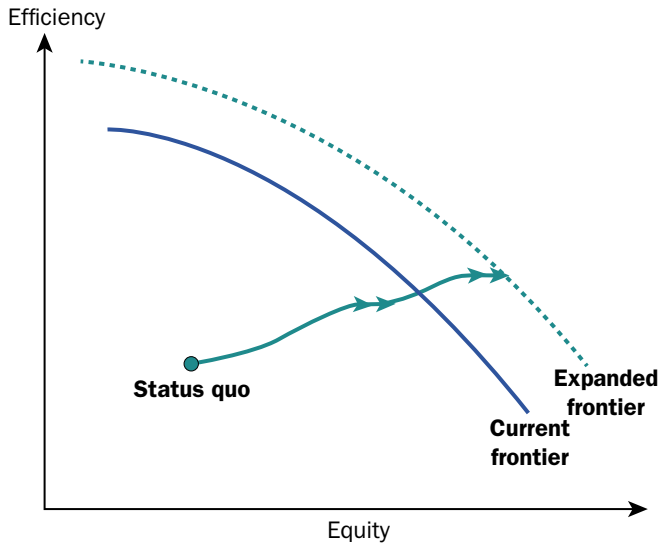
Defining the expanded frontier

This report adopts a forward-looking perspective, arguing that countries increasingly face a new possibility set enabled by *technology*, *transparency*, and *trust*—the "3*T*s." These forces expand the scope for domestic resource mobilization (DRM) beyond improvements in statutory policy design alone. As illustrated in figure 1.3, the gap between the "current frontier" and an "expanded frontier" captures the potential gains from leveraging these developments—the central theme of chapters 3, 4, and 5. Digital tools, real-time and third-party data, cross-border information exchange, and a stronger social contract between citizens and the state can alter administrative feasibility and compliance behavior, thereby shifting the frontier outward. For example, artificial intelligence (AI) applied to granular digital data may generate substantial efficiency gains in tax enforcement and taxpayer service delivery (refer to box 1.2).

The role of structural fundamentals

Fiscal frontiers need not be the same across countries. A key dimension of the framework is a country's *structural fundamentals,* which shape the set of efficiency–equity combinations *feasible* at a given revenue level. Slow-moving features of a country determine the fiscal frontier that it faces (Besley and Persson 2013; Burgess and Stern 1993), much as technology shifts a firm's production frontier. These fundamentals can be grouped into three broad dimensions: economic structure, revenue administration capacity, and political and institutional constraints.

Figure 1.3 The 3*T*s and the expanded fiscal frontier



Source: Original figure for this publication.

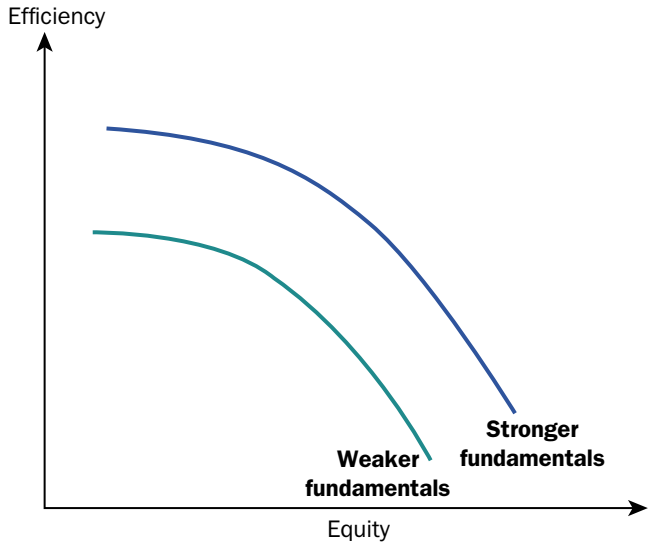
Note: By improving information, enforcement, and compliance, technology, transparency, and trust shift the frontier outward, allowing countries to achieve higher efficiency and equity at a given revenue level. The arrows illustrate how the 3*T*s can enable faster progress from the status quo by easing administrative and political constraints while also expanding the frontier itself.

- *Economic structure* determines the size and observability of tax bases and includes features such as the extent of self-employment, firm structure, sectoral composition, urbanization, financial development, and economic integration.
- *Revenue administration capacity* reflects the ability of tax authorities to perform core functions effectively and can be proxied by indicators such as taxpayer registration coverage and the skills and training of tax officials.
- *Political and institutional constraints* affect both the feasibility and credibility of tax reform and can be proxied by measures of governance quality, state capacity, and perceptions of tax fairness.

Together, these dimensions influence tax base observability, compliance, administrative effectiveness, and political support for reform, thereby determining the feasible tradeoffs between efficiency and equity. Countries with stronger fundamentals face a more outward fiscal frontier than those with weaker fundamentals (refer to figure 1.4).

Structural fundamentals evolve over time—and may themselves be shaped by tax policy—but such changes are typically gradual (with possible exceptions under rapid AI diffusion; refer to box 1.2).

Figure 1.4 Fiscal frontiers and structural fundamentals



Source: Original figure for this publication.

Note: Holding tax revenue constant, differences in structural fundamentals can shift the efficiency–equity frontier. Countries with stronger fundamentals face a more outward fiscal frontier than countries with weaker fundamentals. For a given level of revenue collection, these countries can be both more efficient and more equitable; alternatively, for a given level of efficiency and equity, they can collect more revenue.

Therefore, in the short to medium run, we treat these fundamentals as fixed constraints facing policy makers. This implies that fiscal frontiers can differ across countries. In the empirical analysis and policy discussion that follow, we operationalize this idea by grouping countries according to the strength of their underlying structural fundamentals, proxied by various measures.

Understanding revenue levels and shifting frontiers

Thus far, the discussion has focused on how countries perform relative to what is feasible for a given tax revenue level. A natural next question is what happens when governments seek to collect more revenue. The implications depend critically on whether a country is operating inside the frontier or at it.

For countries operating at or near the frontier, raising additional revenue necessarily involves tradeoffs. Higher revenue targets typically require tax hikes that increase behavioral distortions, reducing efficiency, while the resulting revenues—if well spent—expand public goods and social protection, improving equity. As illustrated in figure 1.5, moving to higher revenue levels shifts the efficiency–equity frontier: The set of feasible outcomes rotates counterclockwise, reflecting lower efficiency but greater scope for redistribution, holding structural fundamentals fixed.

Box 1.2 AI and the future of taxation in EMDEs

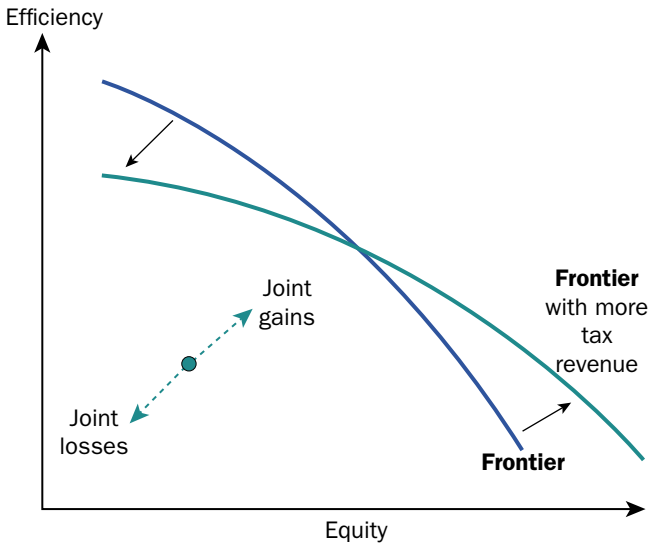
In the near term, artificial intelligence (AI) will likely expand the fiscal frontier. By leveraging digital public infrastructure, richer data, and generative AI, tax administrations can strengthen enforcement and taxpayer services (refer to chapter 3). Machine learning can improve audit selection, fraud detection, and real-time compliance, while AI-powered assistants can reduce compliance costs through chatbots, pre-filled returns, and instant guidance (Junquera et al. 2025). Together, these advances can raise revenue without higher tax rates, expanding the fiscal frontier.

These gains critically depend on governance. Weak data protection, limited technical capacity, vendor dependence, or opaque algorithms may undermine accountability and erode taxpayer trust. Because trust is itself a pillar of the expanded frontier, poorly governed AI risks offsetting the gains it promises.

AI may gradually reshape tax bases and the tax mix. AI-intensive production relies on intangible assets, data, and platforms, increasing profit mobility and the importance of economic rents. As value creation becomes less tied to physical presence, corporate tax bases may become harder to tax, especially in lower-capacity countries exposed to profit shifting (refer to chapter 4). Meanwhile, greater digitization and traceability can strengthen consumption taxes and withholding. Some tax bases may become easier to tax, while others become more mobile and harder to capture.

Over time, AI may have deeper structural effects on the economy, with important implications for tax policy. If automation raises the capital share of income, labor income taxation may become less important, increasing reliance on consumption taxes and the taxation of rents (Korinek and Lockwood 2026). If AI also widens inequality, the case for taxing capital may strengthen despite its distortive effects (Acemoglu et al. 2020; Bastani and Waldenström 2024). For many emerging market and developing economies, however, the greater challenge may be that AI-related rents and intangible assets are often located abroad, weakening domestic corporate tax capacity even as digital services expand locally. Policy responses may include VAT on digital services, withholding taxes on cross-border payments, and stronger source-country taxing rights through international coordination.

Figure 1.5 Fiscal frontiers at different revenue levels



Source: Original figure for this publication.

Note: The efficiency–equity frontier depends on the level of tax revenue, holding structural fundamentals fixed. As revenue targets increase, the frontier shifts—rotating counterclockwise—reflecting higher distortionary costs alongside greater scope for redistribution.

For countries operating inside the frontier, the situation is different. When revenue is mobilized through administratively simple but distortive instruments, or through base narrowing and rate increases, reforms can push countries deeper inside the efficiency–equity space—reducing both efficiency and equity. By contrast, raising revenue by broadening tax bases, removing ineffective or regressive tax expenditures, or strengthening enforcement at the top of the distribution can raise revenue without harming efficiency or equity—and may even improve them.

Choosing whether and how to raise additional revenue

Once revenue targets are allowed to vary, policy makers face a further question: whether to raise *more* revenue at all, and through *which* instruments. Chapter 7 addresses this using the MVPF framework, which evaluates whether a small revenue increase—paired with additional public spending—yields benefits that exceed the economic and social costs of taxation. Crucially, the MVPF framework also helps identify which margins to adjust. Starting from where countries are today, often inside the frontier, it provides a disciplined way to compare alternatives such as broadening VAT bases, strengthening income taxation, or relying on administratively simple but distortive tools like mobile money taxes. Applying the MVPF in practice, however, requires careful and systematic policy evaluation, often using administrative microdata—a topic covered in chapter 8.

Mapping countries to the fiscal frontier

Building on the conceptual framework, we map countries into a revenue–efficiency–equity space. We measure how efficiently and equitably countries raise similar amounts of tax revenue and benchmark each country against the best-performing countries observed in the data. The analysis is inevitably constrained by the availability and comparability of cross-country measures of efficiency and equity (refer to box 1.3). The broad patterns are informative, but the precise position of any individual country should, therefore, be interpreted with caution.

Box 1.3 Measurement considerations in mapping the fiscal frontier

Measuring tax efficiency. We construct an index of tax efficiency that measures how effectively countries raise revenue while minimizing administrative burdens and economic distortions. The index combines six indicators: value-added tax, corporate income tax, and personal income tax productivity; firms' perceptions of tax rates and tax administration; and the dispersion of effective corporate tax rates across sectors. These reflect three dimensions of efficiency: *revenue productivity* (how well statutory rates translate into collections), *administrative efficiency* (the cost of compliance), and *economic neutrality* (the extent of uneven sectoral tax burdens). We aggregate them using principal components analysis. To improve country coverage, missing values for these indicators are imputed based on GDP per capita, region, income classification, and small-island and resource-rich status. While transparent and comparable, the index captures only selected dimensions of tax efficiency.

Measuring fiscal equity. The equity score measures the redistributive impact of taxes and transfers, defined as the percentage of reduction in the Gini coefficient between *pretax-and-transfer* and *post-tax-and-transfer* incomes. Higher values indicate greater redistribution. The equity score does not capture other dimensions of inequality, such as wealth or regional disparities, nor the fairness of the resulting income distribution. The efficiency and equity scores are standardized, so both are expressed in comparable standard deviation units.

Proxies for structural fundamentals. Structural fundamentals are summarized by an index that aggregates six indicators using principal components analysis: employee share, economic complexity, control of corruption, taxpayer registration coverage, tax staff per capita, and tax administration innovation. Missing values for these indicators are imputed using the same approach as for the tax efficiency indicators. In the baseline specification, countries with scores above zero are classified as having strong fundamentals.

(Continued)

Box 1.3 Measurement considerations in mapping the fiscal frontier *(continued)*

The empirical fiscal frontier. A large literature estimates *tax effort* using stochastic frontier analysis (SFA), which models the maximum attainable revenue given a country's economic, demographic, and institutional characteristics (refer to McNabb et al. 2021, for a recent review). However, SFA is highly sensitive to variable selection, functional form, and model specification, limiting the method's transparency. We instead construct the fiscal frontier directly from observed outcomes. Countries lie on the frontier if no peer with similar fundamentals achieves both higher efficiency and higher equity. The frontier, therefore, traces the outer envelope of observed performance in efficiency–equity space, highlighting countries that combine the strongest observed performance on both dimensions. Finally, we define the distance to the frontier as the balanced improvement in both efficiency and equity required for a country to reach its relevant frontier. Countries are classified as "close" to the frontier if they lie on the frontier, or if their distance from it is at most 50 percent of the average distance among countries in the same fundamentals group. All other countries are classified as "far" from the frontier.

Like any cross-country benchmarking exercise, these estimates may be affected by measurement error, data availability, country coverage, and the choice of indicators. The results should, therefore, be interpreted as broad patterns and indicative performance gaps—not as precise country rankings or definitive assessments of individual countries.

Grouping by tax revenue

Countries are first grouped by their tax-to-GDP ratio, using a harmonized definition of *tax revenue* that includes direct taxes (corporate income tax, personal income tax, property taxes, and payroll taxes) and indirect taxes (VAT, trade taxes, and other indirect taxes) but excludes social security contributions, grants, and nontax revenues. This definition ensures that comparisons focus on core tax instruments.

Drawing the fiscal frontier

We draw the fiscal frontier using two complementary groupings. First, we compare countries with similar tax-to-GDP ratios. Second, we group countries according to the strength of their structural fundamentals while accounting for differences in tax-to-GDP ratios so that revenue is held constant.

Within each comparison group, a country lies on the fiscal frontier when no peer performs better on both efficiency and equity. The frontier, therefore, represents the best combinations of efficiency and equity observed among comparable countries.

For countries below the frontier, we measure the improvement in both efficiency and equity needed to reach it. We refer to this gap as the *country's distance to the frontier:* the greater the improvement required, the farther the country is from the frontier. Comparing countries with better-performing peers helps reveal performance gaps and identify practices associated with stronger tax systems.

Understanding fiscal frontiers by tax-to-GDP ratios

Figure 1.6 presents countries in efficiency–equity space across four panels: countries with tax-to-GDP ratios of up to 15 percent (panel a), between 15 and 20 percent (panel b), and above 20 percent (panel c), as well as all countries together (panel d). In each revenue group, most countries lie well below the frontier, indicating substantial scope to improve both efficiency and redistribution. The frontier also shifts outward as tax revenue rises. At higher tax-to-GDP levels, the frontier flattens, allowing countries to achieve greater redistribution without a proportional loss in efficiency. Together, these patterns highlight both substantial room for improvement and the potential for simultaneous gains in efficiency and equity.

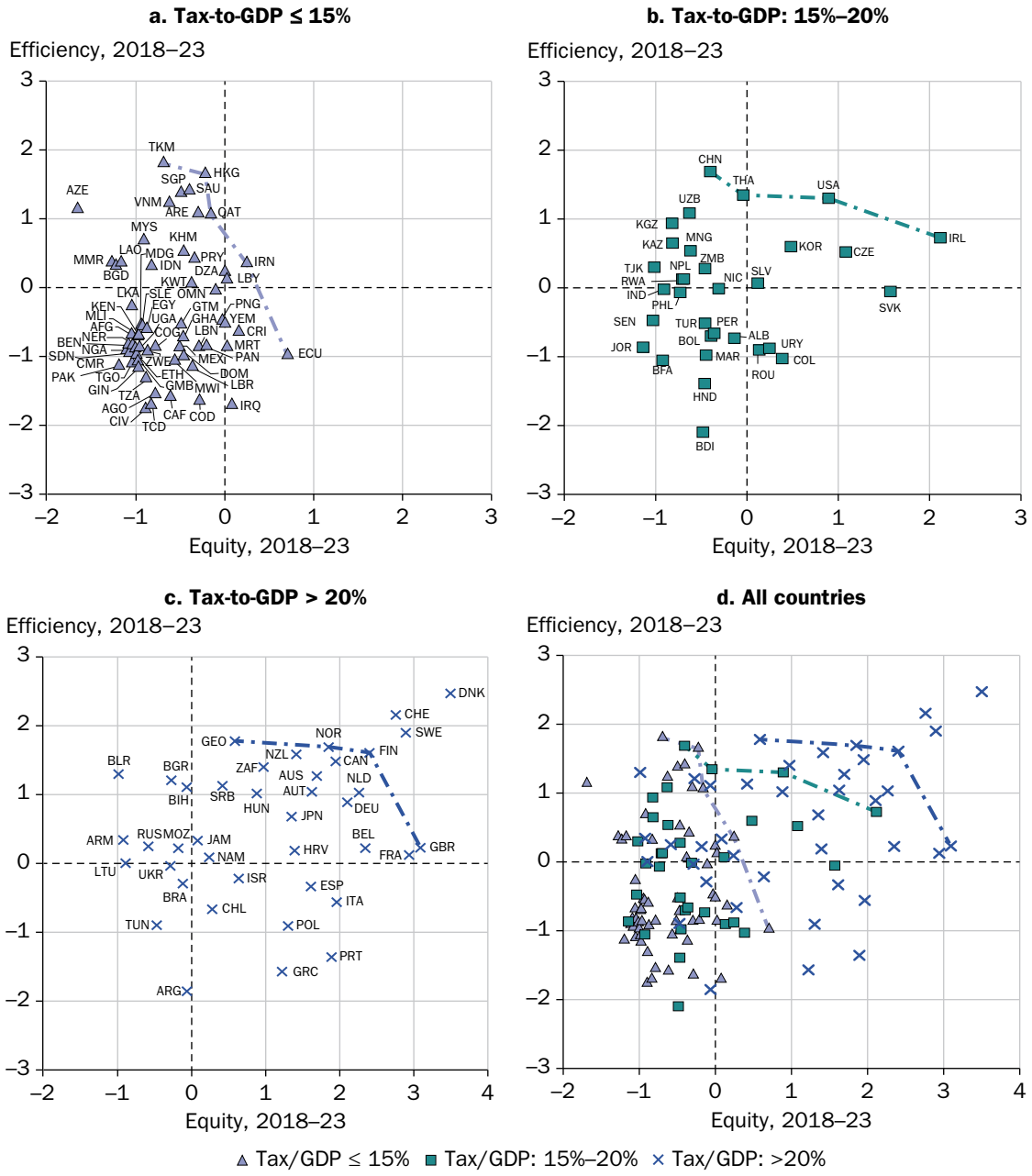
Comparing fiscal frontiers across tax-to-GDP ratios helps assess revenue adequacy—that is, how efficiency and equity vary with the amount of revenue collected. But revenue levels alone do not determine what tax systems can feasibly achieve. The framework used throughout this report, therefore, benchmarks countries against peers with similar structural fundamentals.

Understanding fiscal frontiers by structural fundamentals

Next, we classify countries by the strength of their structural fundamentals using an index based on six indicators: employee share in total employment, economic complexity, taxpayer registration coverage, tax staff per capita, tax administration innovation, and control of corruption. Together, these indicators capture important features of a country's economic structure, administrative capacity, and institutional constraints.

Figure 1.7 illustrates the efficiency–equity frontier for countries with strong and weak structural fundamentals. Panel A shows countries with stronger fundamentals (an index score above zero), and panel B shows those with weaker fundamentals (a score below zero). The comparison accounts for countries' tax-to-GDP groups, helping isolate the role of underlying fundamentals. We mark countries as "close" to the frontier (green and yellow dots) if they lie on the frontier, or if their distance from it is at most 50 percent of the average distance among countries in the same fundamentals group. All other countries are marked as "far" from the frontier (orange and red dots).

Figure 1.6 Fiscal frontiers by tax-to-GDP ratios



(Continued)

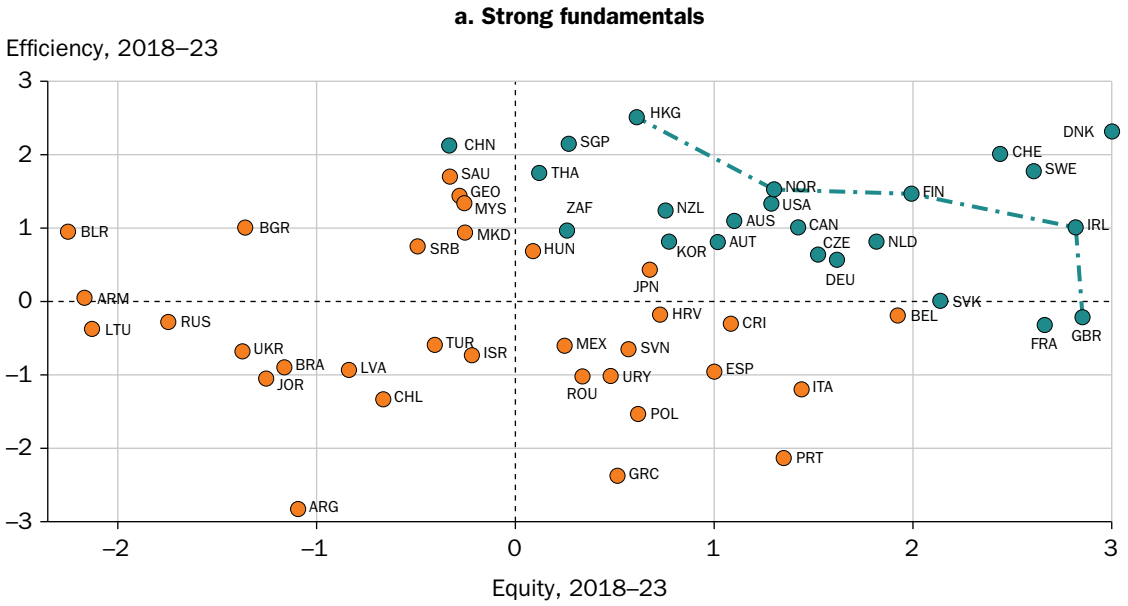
Figure 1.6 Fiscal frontiers by tax-to-GDP ratios *(continued)*

Sources: Original figure for this publication based on data from the United States Agency for International Development, the Research School of International Taxation–International Tax Institutions, the World Bank Enterprise Surveys, the World Inequality Database, the World Revenue Longitudinal Database of the International Monetary Fund, and the World Development Indicators.

Note: The efficiency–equity fiscal frontiers are defined separately for countries grouped by their average tax-to-GDP ratios over 2018–23 (≤15 percent, 15–20 percent, or >20 percent). Countries lie on the fiscal frontier (dashed lines) if they are nondominated within their comparison group—that is, no other country in the group achieves both higher efficiency and higher equity. Refer to box 1.3 for details on the construction of the efficiency and equity scores. Panel d combines countries and frontiers from panels a, b, and c. The sample includes 132 countries with population above 2.5 million. Denmark (DNK), Switzerland (CHE), and Sweden (SWE) are excluded from the fiscal frontier as efficiency–equity outliers. Country codes are from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups. GDP = gross domestic product.

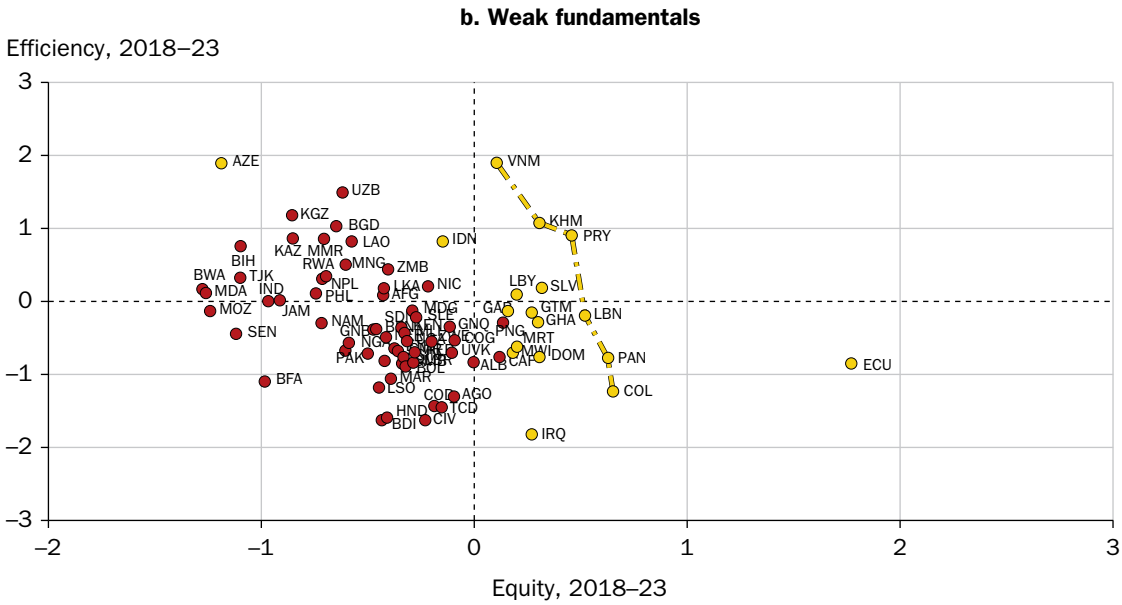
Most countries operate well below the fiscal frontier. Among countries with stronger fundamentals, two-thirds (66 percent) fall short. For countries with weaker fundamentals, the share rises to almost three-quarters (73 percent). The frontier for countries with weaker fundamentals is steeper, reflecting their more limited ability to redistribute income at a given revenue level. Even so, the results suggest that these countries can achieve meaningful gains in both efficiency and equity via tax reforms. Structural constraints shape what is feasible, but they do not prevent countries from making substantial improvements in the short term.

Figure 1.7 Fiscal frontier for countries with strong and weak fundamentals



(Continued)

Figure 1.7 Fiscal frontier for countries with strong and weak fundamentals *(continued)*



Sources: Original figure for this publication based on data from the United States Agency for International Development, the Research School of International Taxation–International Tax Institutions, the World Bank Enterprise Surveys, the World Inequality Database, the World Revenue Longitudinal Database of the International Monetary Fund, the World Development Indicators, the Worldwide Governance Indicators, the International Survey on Revenue Administration, and the Harvard Growth Lab's Atlas of Economic Complexity.

Note: The efficiency–equity fiscal frontiers are defined separately for countries with strong fundamentals (panel a) and for countries with weak fundamentals (panel b). Fundamentals are constructed via principal component analysis, including six indicators: share of employees, economic complexity, control of corruption, taxpayer registration coverage, tax staff per capita, and an innovation in tax administration score. Countries lie on the fiscal frontier (dashed lines) if they are nondominated within their comparison group—that is, no other country in the group achieves both higher efficiency and higher equity. We control for tax-to-GDP groups (as defined in figure 1.6: <15 percent, 15–20 percent, and >20 percent of GDP) in the construction of efficiency and equity scores. Refer to box 1.3 for additional details on the construction of these scores. Countries are classified as "close" to the frontier (green and yellow dots) if they lie on the frontier, or if their distance from it is at most 50 percent of the average distance among countries in the same fundamentals group. All other countries are classified as "far" from the frontier (orange and red dots). The sample includes 131 countries with population above 1.5 million. Denmark (DNK), Switzerland (CHE), and Sweden (SWE) are excluded from the fiscal frontier as efficiency–equity outliers. Ecuador (ECU) is excluded from the fiscal frontier as an equity outlier. Country codes are from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.

Taken together, structural fundamentals and distance from the relevant fiscal frontier provide the two dimensions of the country taxonomy used throughout the report. Countries are classified as having weak or strong fundamentals and as being far from or close to their respective frontier. This distinction helps separate constraints on what is feasible from gaps in how effectively existing capabilities are being used, providing the basis for the tailored policy guidance in chapter 9.

References

Acemoglu, Daron, Andrea Manera, and Pascual Restrepo. 2020. "Does the US Tax Code Favor Automation?" *Brookings Papers on Economic Activity* 51 (1): 231–85.

Bachas, Pierre, Tatiana Flores, Gabriel Lara Ibarra, et al. 2025. "VAT Cashback Programs in Practice: The Case of Devolve–ICMS in Rio Grande do Sul, Brazil." Prosperity Insight Series. World Bank.

Barreix, Alberto Daniel, Melina De Souza Rocha Lukic, and José Barroso Tostes Neto. 2025. *The Three Innovative Features of VAT in Brazil's Indirect Tax Reform*. Inter-American Development Bank.

Bastani, Spencer, and Daniel Waldenström. 2024. "AI, Automation and Taxation." CEPR Discussion Paper 19045, Centre for Economic Policy Research.

Besley, Timothy, and Torsten Persson. 2013. "Taxation and Development." In *Handbook of Public Economics,* vol. 5, edited by Alan J. Auerbach, Raj Chetty, Martin Feldstein, and Emmanuel Saez, 51–110. Elsevier.

Burgess, Robin, and Nicholas Stern. 1993. "Taxation and Development." *Journal of Economic Literature* 31 (2): 762–830.

Cebreiro Gomez, Ana, Christina Kolerus, Guilherme Dal Pizzol, Pablo Moreira, and Miguel Pecho. 2025. "Brazil's VAT Reform: Ensuring Revenue Neutrality." IMF Working Papers 266. International Monetary Fund.

Junquera, Raúl, Ivan Krsul, Vladimir Calderón, Joey Ghaleb, and Cristian Lucas. 2025. "From Theory to Practice: A Strategic AI Integration Model for Revenue Administrations." Prosperity Insight Series. World Bank.

Korinek, Anton, and Lee Lockwood. 2026. "Public Finance in the Age of AI: A Primer." NBER Working Paper 34873. National Bureau of Economic Research.

Lara Ibarra, Gabriel, Rafael Macedo Rubião, and Eduardo Fleury. 2025. "Indirect Taxes in Brazil: Assessing the Distributional Effects of Potential Tax Reforms." *Intertax* 53 (3): 293–320.

McNabb, Kyle, Michael Danquah, and Abrams M. E. Tagem. 2021. "Tax Effort Revisited: New Estimates from the Government Revenue Dataset." WIDER Working Paper 170. United Nations University–World Institute for Development Economics Research.

Palomo, Theo, Davi Bhering, Thiago Scot, Pierre Bachas, Luciana Barcarolo, Celso Campos, Javier Feinmann, Leonardo Moreira, and Gabriel Zucman. 2025. *Tax Progressivity and Inequality in Brazil: Evidence from Integrated Administrative Data.* Report 9. EU Tax Observatory.

Rocha, Melina. 2024. "Tax Reform in Brazil and the Unique Federal Arrangement to Implement Its Dual VAT." Blog post from Kluwer International Tax Blog, February 2024.

World Bank. 2026. *Leveraging Digital Public Infrastructure for Payment Delivery and Inclusion: Insights from a Personalized VAT Cashback Program in Brazil*. World Bank.

CHAPTER 2

Efficiency and Equity in Current Tax Systems

Prepared by Maria Sol Bernasconi, Jon Jellema, Alastair Thomas, and Dario Tortarolo

Introduction

Designing tax systems that *raise sufficient revenue* while *minimizing efficiency costs* and *ensuring equity* remains a fundamental challenge worldwide. Governments levy taxes to finance public spending, redistribute income, and correct market failures, but the means by which they do this matter enormously. On the efficiency side, taxation inevitably distorts individual and firm decisions across multiple domains: labor market choices (participation, hours, and effort), business decisions (entrepreneurship, firm size, entry, and exit), capital allocation (savings, investment, and innovation), and even location choices. These behavioral responses, along with tax avoidance and evasion, create efficiency costs that can dampen productivity and economic growth.

At the same time, equitable tax systems—those that treat taxpayers with similar ability to pay alike *(horizontal equity)* and place higher burdens on those with greater ability to pay *(vertical equity)*—are essential for the legitimacy and sustainability of tax-and-transfer systems and for reducing income inequality, which is persistently high in most emerging market and developing economies (EMDEs). Taxes perceived to violate these equity principles may lead to social unrest and an erosion of tax morale and trust.

The gap between principle and practice, however, is particularly acute in EMDEs, where tax systems often fail to achieve all core objectives. This chapter reviews these shortcomings, drawing on classic and recent public finance research to highlight where *efficiency* and *equity* costs arise in the main national taxes—corporate income tax (CIT), personal income tax (PIT), social security

contributions (SSCs), and value-added tax (VAT).[1] These shortcomings help explain why many countries operate inside the fiscal frontier defined in chapter 1. A country lies on the frontier when, for a given revenue target and set of structural fundamentals, it cannot improve efficiency without sacrificing equity, or vice versa. The evidence, however, reveals substantial scope to improve both dimensions *simultaneously,* even before considering how technology, transparency, and trust can expand the frontier, as discussed in chapters 3, 4, and 5.

This chapter proceeds as follows. The following section highlights key disparities in tax design between high-income countries (HICs) and EMDEs, illustrating both the constraints within which EMDEs operate and their impact on efficiency and equity. The next sections examine in detail the efficiency cost of tax systems in EMDEs, as well as consider the equity limitations. The final section brings efficiency and equity together to identify tax reforms that can move the system closer to the equity–efficiency frontier.

Tax mix across development levels

Before examining the specific distortions and inequities embedded in individual tax instruments, it is useful to look at the overall structure of tax systems across country income groups and regions. Tax composition signals which tax bases governments rely on most and hints at the constraints they face in broadening others, thereby indicating the scope for raising revenue efficiently and equitably. Box 2.1 offers a concise guide to the main tax instruments and illustrates how their relative importance shifts as countries develop.

Box 2.1 Structure of taxation across development levels

Governments raise revenue through different "tax handles." Some are collected at the border; others are collected on consumption, income, profits, or property. Their relative importance shifts as countries develop. Figure B2.1.1 shows, for each major instrument, how its share of total tax revenue varies with gross domestic product per capita. Five key patterns emerge:

1. **Income-based taxation becomes more important.** As countries grow richer, personal income taxes and social security contributions—often collected through

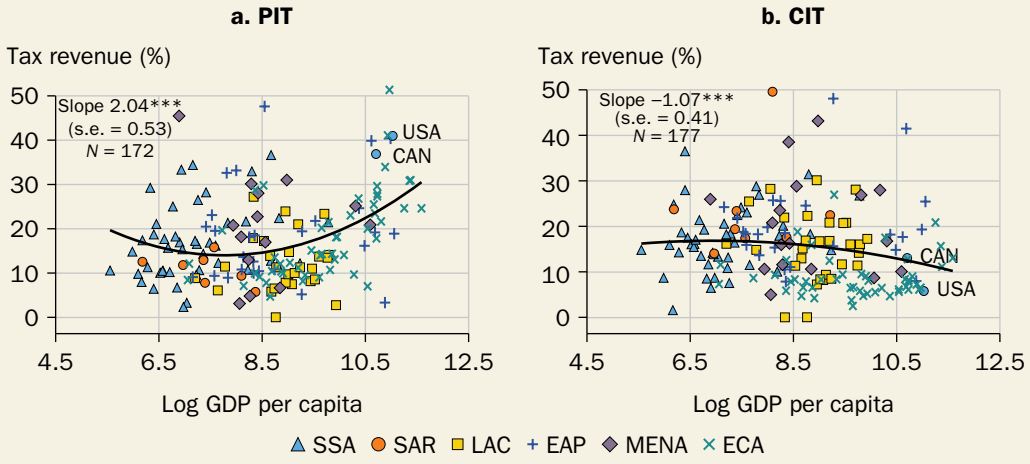
(Continued)

Box 2.1 Structure of taxation across development levels *(continued)*

payroll withholding—account for a larger share of tax revenue. These taxes require formal employment relationships, reliable income reporting, and administrative capacity.

2. **Consumption taxes remain central but relatively less dominant.** Broad-based consumption taxes, such as value-added taxes and excises, are key revenue sources at all income levels. Yet, their share of tax revenue tends to decline as income taxation expands.
3. **Corporate income taxes play a meaningful and stable role.** They contribute substantially to tax revenue across income levels and regions, and their share tends to remain stable or decline modestly as countries develop.
4. **Reliance on trade taxes declines sharply.** Low-income countries collect a nontrivial share of revenue from customs duties, which are relatively simple to administer at ports and border crossings. As economies diversify and integrate into global markets, trade taxes fall as a share of total revenue.
5. **Taxes on property grow but remain small.** Taxes on real estate, wealth, and inheritance increase sharply with income levels, but even in advanced economies, they typically account for a modest share of total tax revenue.

Figure B2.1.1 Tax revenue structure across development levels



(Continued)

Box 2.1 Structure of taxation across development levels *(continued)*

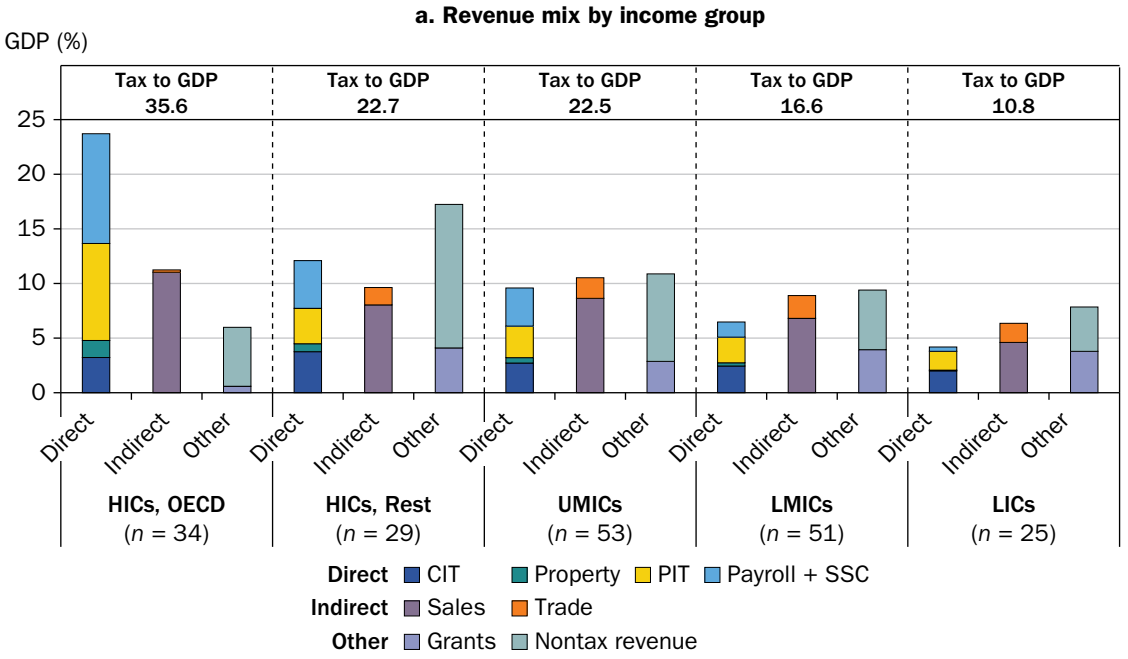


Source: Original figure for this publication using data from the International Monetary Fund's World Revenue Longitudinal Database.

Note: Each panel plots the share of a given tax instrument in total tax revenue against GDP per capita. The reported coefficient, s.e., and number of countries correspond to the fitted linear relationship in each panel. All slopes are significant at the 1 percent level (denoted by *** in the figure). Data by revenue type represent country averages for 2018–22. "Property taxes" include recurrent property, wealth, and inheritance taxes; "sales taxes" include VAT, general sales and turnover taxes, excise taxes, and other taxes on sales and production; "SSC" includes social security contributions and payroll taxes; and "trade taxes" include customs duties and export taxes, excluding VAT and excise on imports. CIT = corporate income tax; EAP = East Asia and Pacific; ECA = Europe and Central Asia; GDP = gross domestic product; LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; PIT = personal income tax; SAR = South Asia; s.e. = standard error; SSA = Sub-Saharan Africa; VAT = value-added tax.

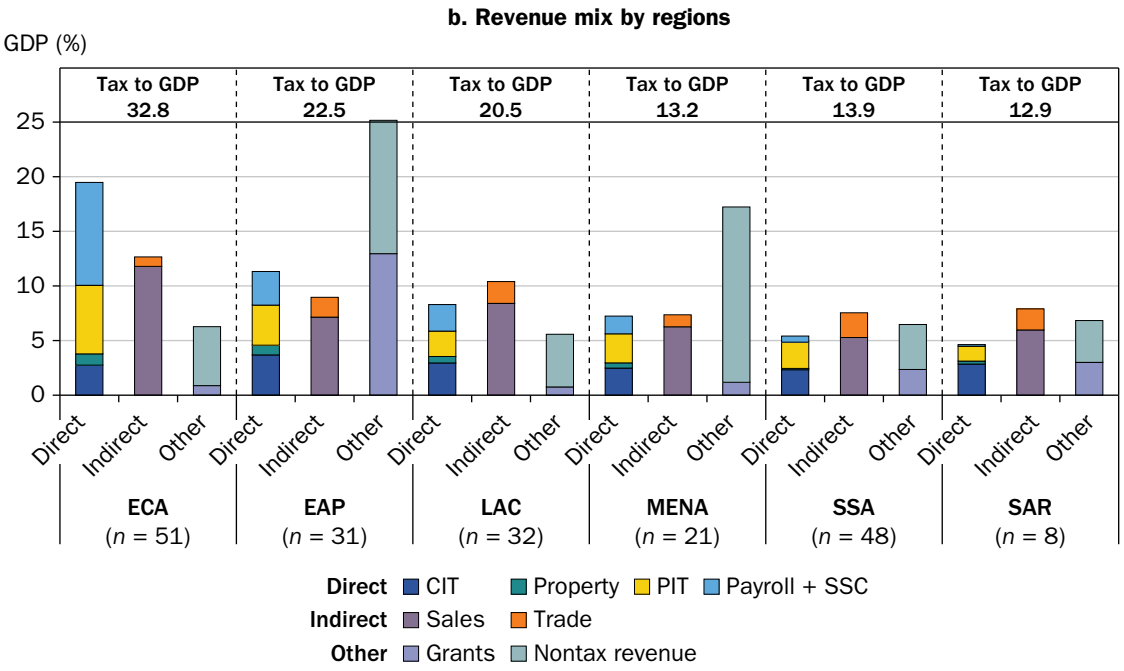
Tax levels and tax structures vary markedly with the level of development (refer to figure 2.1). HICs collect substantially more tax revenue as a share of gross domestic product (GDP) than EMDEs: In Organisation for Economic Co-operation and Development (OECD) countries, the average tax-to-GDP ratio stood at 36 percent between 2018 and 2022, compared with 23 percent in upper-middle-income countries (UMICs), 17 percent in lower-middle-income countries (LMICs), and just 10.8 percent in low-income countries (LICs). The most-striking structural differences between these countries lie in direct taxes predominantly on labor income, with PITs, payroll taxes, and SSCs accounting for a much larger share of both GDP and total revenue in advanced economies. In EMDEs, in contrast, indirect taxes bring in more revenue than direct taxes, and trade taxes are a significant source of indirect tax revenue. Non-OECD countries also rely significantly on *grants* and *nontax revenues.*

Figure 2.1 Revenue mix across income groups and regions



(Continued)

Figure 2.1 Revenue mix across income groups and regions *(continued)*



Source: Original figure for this publication using data from the International Monetary Fund's World Revenue Longitudinal Database.

Note: Data by revenue type represents country averages from 2018 to 2022. The sample includes 191 economies. Average tax-to-GDP ratios are calculated as the sum of direct and indirect taxes within each income group or region. "Property" includes real property taxes, wealth, and inheritance taxes; "Sales" include value-added tax (VAT, including general sales and turnover taxes), excise taxes, and other unallocated taxes on sales and production; "SSC" includes social security contributions and payroll taxes; and "Trade" includes customs duties and export taxes (excludes VAT and excise on imports). Other taxes (not classified in any revenue category but included in tax-to-GDP ratios) represent, on average, 0.8 percent of GDP in HICs (OECD), 1.07 percent in HICs (non-OECD), 1.34 percent in UMICs, 0.96 percent in LMICs, 0.35 percent in LICs, 1.05 percent in ECA, 0.62 percent in EAP, 1.58 percent in LAC, 0.32 percent in MENA, 1.06 percent in SSA, and 0.63 percent in SAR. CIT = corporate income tax; EAP = East Asia and Pacific; ECA = Europe and Central Asia; GDP = gross domestic product; HICs = high-income countries; LAC = Latin America and the Caribbean; LICs = low-income countries; LMICs = lower-middle-income countries; MENA = Middle East and North Africa; OECD = Organisation for Economic Co-operation and Development; PIT = personal income tax; SAR = South Asia; SSA = Sub-Saharan Africa; SSCs = social security contributions; UMICs = upper-middle-income countries.

The tax mix in EMDEs is not optimal relative to canonical tax model benchmarks. Under certain assumptions, progressive direct taxes on income, paired with uniform commodity taxation, are preferable for both efficiency and equity (Atkinson and Stiglitz 1976; Diamond and Mirrlees 1971). However, these tax mix patterns echo classic theories of fiscal development (Besley and Persson 2013, 2014; Burgess and Stern 1993): As economies formalize and state capacity improves, governments tend to rely more on direct income taxation and less on taxing transactions, goods, and services (refer to box 2.1).

Tax mixes often reflect institutional and legal histories as well as contemporary political, social, and technical constraints. Many tax patterns in EMDEs are the result of "third-best" policy choices made under binding practical constraints (Tanzi and Zee 2001). Historically, tax reforms have focused on "second-best" prescriptions that prioritize production efficiency—minimizing distortions to firms' input choices and production decisions—while assuming strong enforcement capacity. This approach overlooks the fundamental information and compliance challenges that developing countries face. The prevalence of seemingly inefficient taxes in EMDEs often reflects an underlying shadow economy in which firms and workers operate informally, leaving no paper trail.

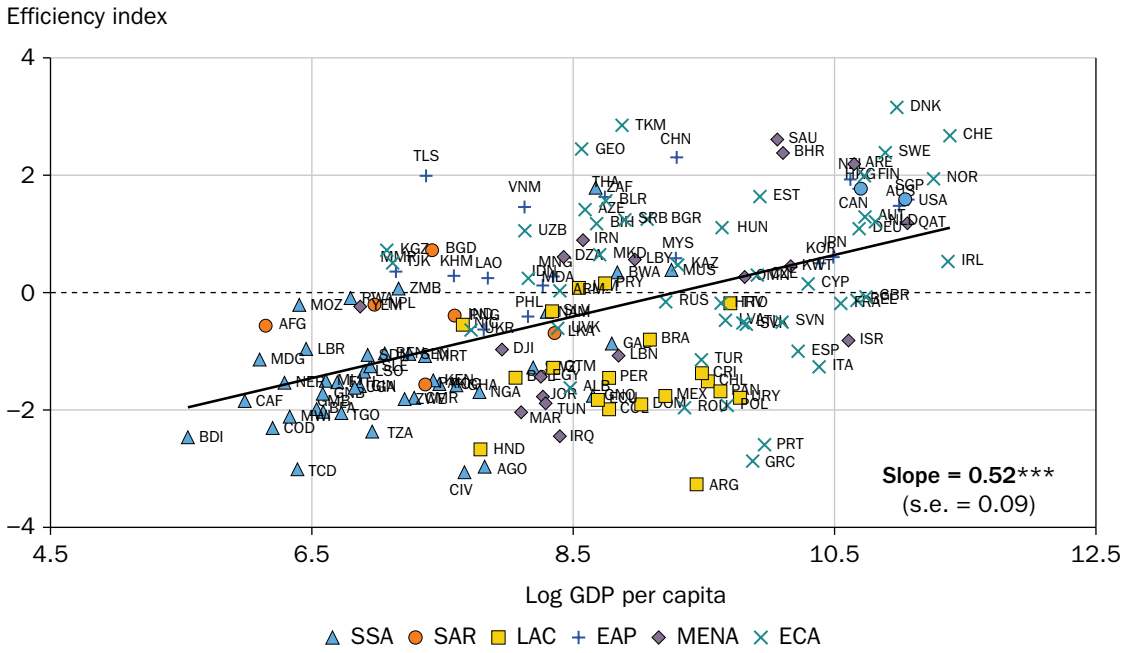
In this context, broad-based income taxation becomes administratively challenging, and firms can escape taxes entirely by using cash and operating outside the financial system (Gordon and Li 2009), forcing governments to resort to trade taxes, cascading turnover taxes, or transaction levies, such as mobile money taxes (refer to box 3.3 in chapter 3). Despite their production inefficiencies, these options are easier to collect and harder to evade. They allow EMDEs to generate stable revenues where alternative taxes might fail (Best et al. 2015; Kleven et al. 2016).

"Third-best" taxes can become entrenched and hard to dismantle. Even as state capacity strengthens, suboptimal tax structures often persist. In such cases, a more cost-effective strategy is to gradually shift the tax mix toward instruments that raise revenue at the lowest welfare cost rather than relying on taxes that are merely easier to administer (refer to chapter 7).

Deliberate policy choices also create inefficiency and revenue loss. Tax expenditures and preferential treatments are often adopted without rigorous ex ante assessment, leaving tax systems with narrower bases and a patchwork of rates that undermine system integrity. They rarely undergo systematic ex post evaluation, leaving their effectiveness uncertain. In many cases, they miss their stated goals, weaken revenues, and exacerbate administrative constraints.

As a result of these policy choices and of limited administrative capacity, tax systems in EMDEs are generally less efficient than in HICs. Figure 2.2 illustrates this by presenting a broad summary indicator of tax system efficiency. The composite indicator combines three measures of revenue performance (VAT C-efficiency, CIT productivity, and PIT productivity) with three more closely related to economic efficiency (dispersion of CIT rates and firms' reported perceptions of tax rates and tax administration as obstacles to doing business). It should, therefore, be interpreted as a broad measure of tax system performance rather than economic efficiency in the strict welfare sense.[2]

Figure 2.2 Tax system efficiency across levels of development, 2018–23



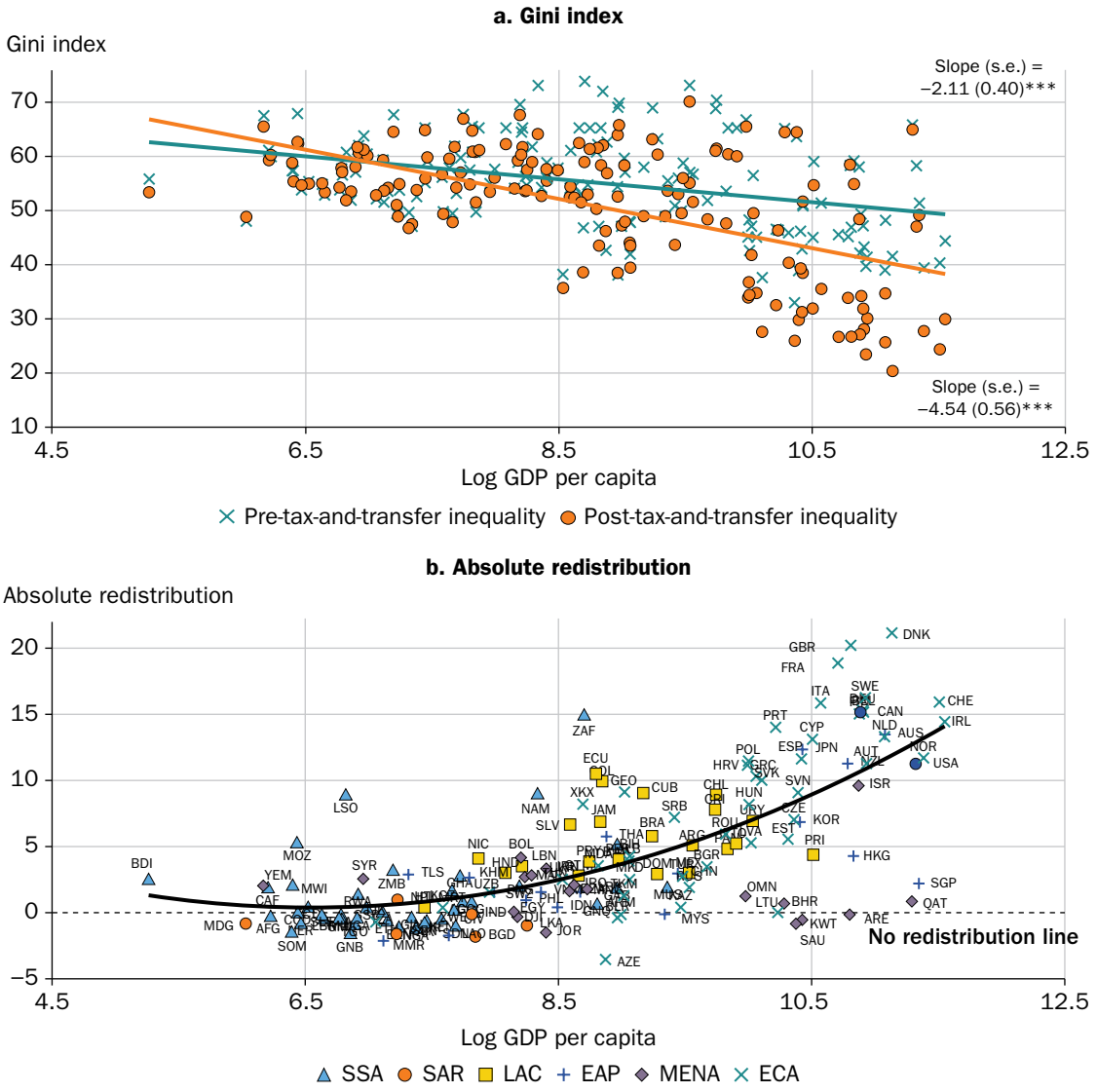
Sources: Original figure for this publication using data from the United States Agency for International Development, the World Development Indicators, the World Bank Enterprise Surveys, and the Research School of International Taxation's International Tax Institutions databases.

Note: This figure plots a composite tax efficiency index against the log of GDP per capita across 150 countries with populations above 1 million. The reported coefficient and s.e. correspond to the fitted linear relationship between the variables. The slope is significant at the 1 percent level (denoted by *** in the figure). The index is constructed via PCA on six standardized efficiency indicators: VAT C-efficiency, CIT productivity, PIT productivity, dispersion of CIT rates, and firms' reported perceptions of tax rates and tax administration as obstacles to doing business. The first PCA is used as the composite index, as it explains most of the variation, and all variables load positively (that is, contribute in the same direction). VAT C-efficiency and the two World Bank Enterprise Surveys perception measures have the strongest weights. Country-level averages are computed over 2018–23. Country codes are from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups. CIT = corporate income tax; GDP = gross domestic product; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; PCA = principal component analysis; PIT = personal income tax; SAR = South Asia; s.e. = standard error; SSA = Sub-Saharan Africa; VAT = value-added tax.

Because EMDEs mostly rely on indirect consumption taxes, they also struggle to deliver substantial income redistribution through progressive domestic revenue mobilization. Figure 2.3 illustrates this: In poorer countries, the Gini coefficient changes little between pre- and post-tax-and-transfer income, whereas redistribution becomes progressively larger in UMICs and HICs.[3]

The limited redistribution through taxes and transfers in EMDEs puts more pressure on expenditure programs to achieve equity goals. However, it also suggests that EMDEs need to rely more on alternative sources of tax progressivity, including more effective capital income, property, and wealth taxation, and by addressing tax avoidance and evasion among high-income earners more effectively. The section "Equity Shortcomings in Domestic Revenue Mobilization" discusses these sources in greater detail.

Figure 2.3 Inequality before and after taxes and transfers, by income level, 2018–23



Sources: Original figure for this publication using data from the World Inequality Database (from Alvaredo et al. 2024) and the World Development Indicators. The World Inequality Database constructs comprehensive pre- and post-tax-and-transfer income measures following the Distributional National Accounts methodology, matching national income aggregates (for more details, refer to Blanchet et al. 2024).

Note: Panel a displays Gini coefficients for pre- (blue crosses) and post-tax-and-transfer income (red circles) against log GDP per capita in 2023, with a linear fit overlaid. Both slopes are significant at the 1 percent level (denoted by ***). Pre-tax-and-transfer corresponds to factor income, adding pensions and subtracting contributions. Panel b plots the difference between the two Gini indexes (absolute redistribution), with a quadratic fit overlaid. The sample includes 156 countries with populations above 1 million. To maximize coverage, we compute simple averages over 2018–23 for each country. Regions are distinguished by markers and colors. Country codes are from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups. EAP = East Asia and Pacific; ECA = Europe and Central Asia; GDP = gross domestic product; LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; SAR = South Asia; s.e. = standard error; SSA = Sub-Saharan Africa.

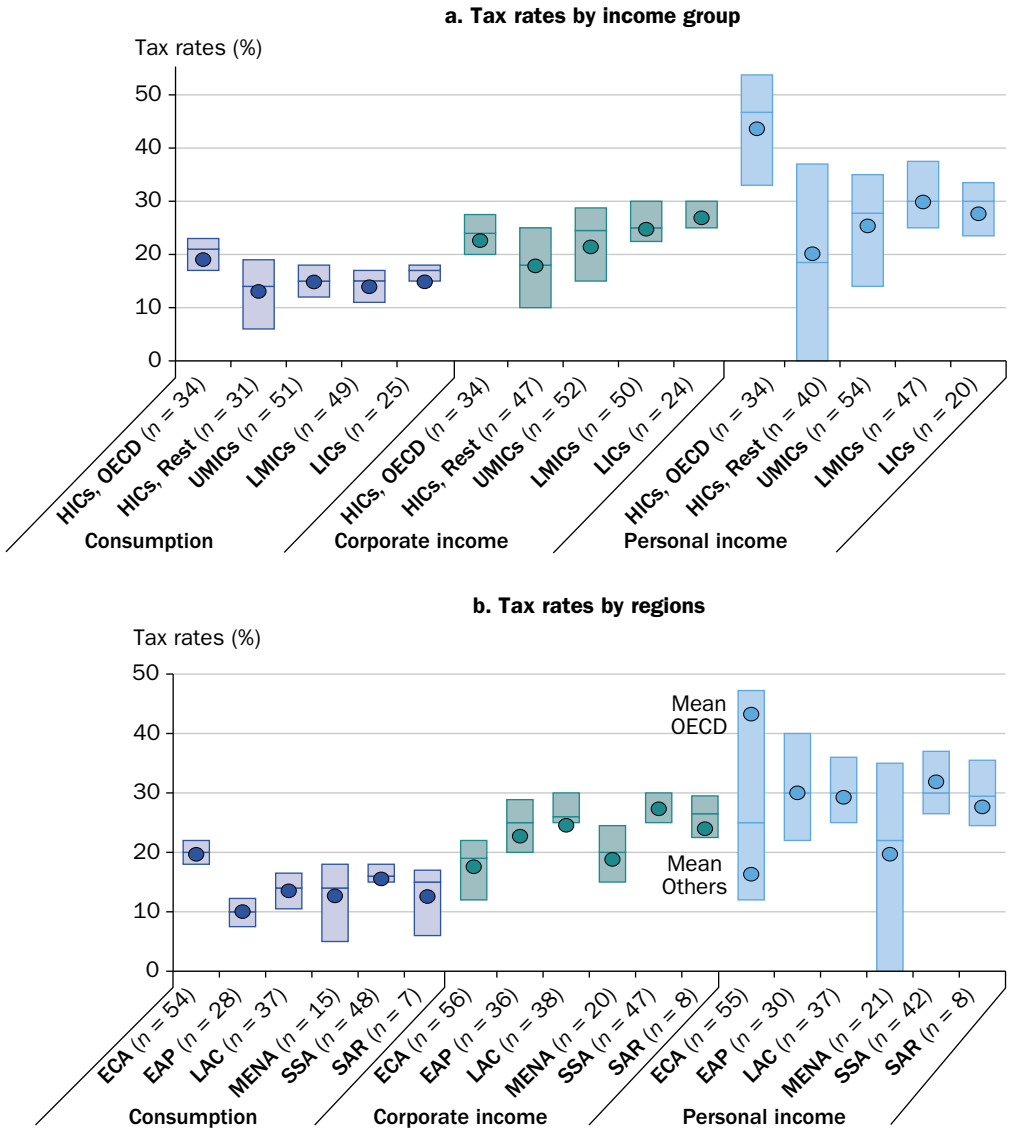
Efficiency shortcomings in domestic revenue mobilization

Any tax that alters price signals and affects economic behavior reduces efficiency relative to a no-tax benchmark. Within broader policy objectives, sound tax design, therefore, seeks to raise revenue while minimizing distortions—albeit recognizing this need not guarantee higher efficiency in the presence of other market failures (Bergquist et al. 2026). More efficient tax systems are also generally more supportive of growth and job creation, as taxes can discourage work, consumption, saving, and investment (Lee and Gordon 2005). A standard implication is that efficiency losses rise with the tax rate and with the responsiveness of the tax base.

For a given revenue goal, this logic favors lower rates on broader bases over higher rates on narrower ones. In practice, however, many countries deviate from this "broad-base, low-rate" benchmark. In EMDEs, the main efficiency challenges tend to stem less from high statutory rates than from porous tax bases, uneven treatment across taxpayers and sectors, and limited enforcement capacity. The discussion that follows examines each of these cross-cutting challenges in turn. Annex 2A summarizes the efficiency benchmarks for VAT, CIT, and PIT, as well as the principal ways in which their design and implementation depart from those benchmarks.

High statutory rates are not the main problem in EMDEs. While efficiency concerns in HICs often center on high tax rates, this issue is generally less pressing in EMDEs. As figure 2.4 shows, statutory rates on major taxes are usually lower in EMDEs than in HICs. Top PIT rates and standard VAT rates are, on average, higher in HICs—especially for the PIT, reflecting more progressive rate schedules. EMDEs tend to apply higher headline rates mainly in the CIT, which may hinder investment (Lee and Gordon 2005). A similar pattern appears in labor taxation: Employer SSC rates are broadly comparable across income groups, but employee SSC rates decline sharply with development (refer to figure 2.5, panel a). As a result, labor tax wedges are substantially lower in EMDEs (refer to figure 2.5, panel b). Taken together, these patterns suggest that high statutory rates are a less immediate efficiency concern for labor and consumption taxes in EMDEs, although they may matter more for corporate taxation. Annex 2A examines how the design of VAT, CIT, and PIT systems shapes efficiency through rates, thresholds, and exemptions.

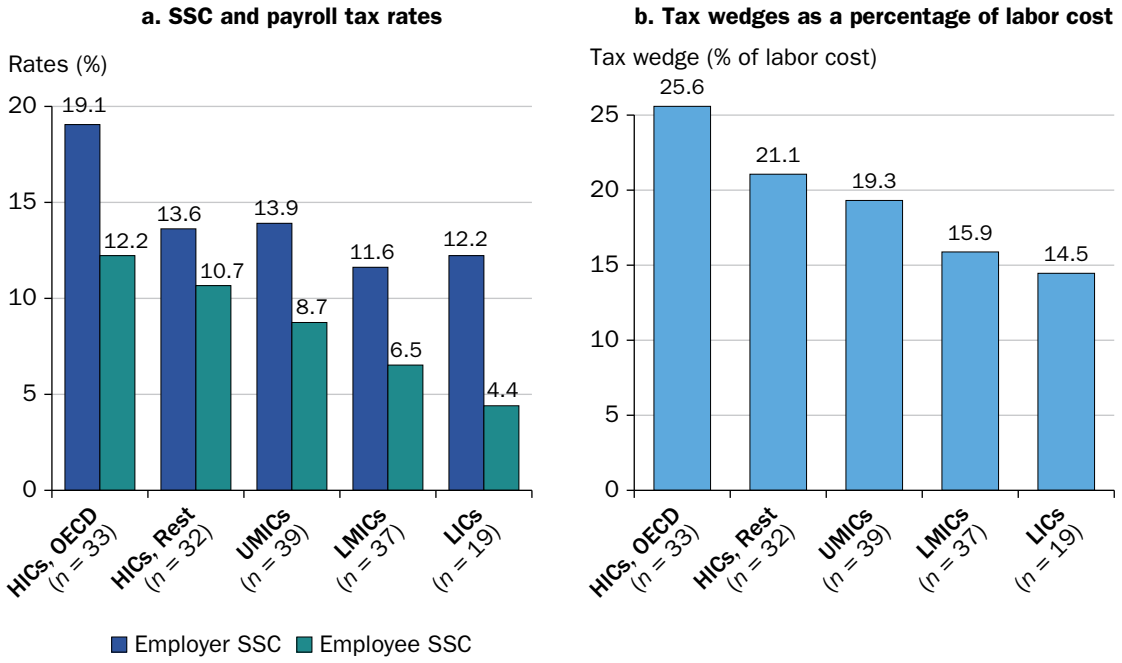
Figure 2.4 Statutory tax rates on consumption, corporate, and personal income, 2019



Sources: Original figure for this publication using the United States Agency for International Development Collecting Taxes database and the Research School of International Taxation's International Tax Institutions database.

Note: Each box in the figure represents the 25th–75th percentile range, with the horizontal line indicating the median and the circle showing the unweighted mean. The sample covers 190 economies for consumption taxes, 207 for CIT, and 195 for PIT. Parentheses below income groups and regions indicate the number of countries in each group. The top PIT rate combines national and average subnational rates, which are especially relevant in OECD countries. PIT rates are primarily drawn from the International Tax Institutions database based on the *Ernst & Young Guides,* supplemented with missing observations from the United States Agency for International Development database. CIT = corporate income tax; EAP = East Asia and Pacific; ECA = Europe and Central Asia; HICs = high-income countries; LAC = Latin America and the Caribbean; LICs = low-income countries; LMICs = lower-middle-income countries; MENA = Middle East and North Africa; OECD = Organisation for Economic Co-operation and Development; PIT = personal income tax; SAR = South Asia; SSA = Sub-Saharan Africa; UMICs = upper-middle-income countries.

Figure 2.5 SSC and payroll tax rates and wedges, by income group

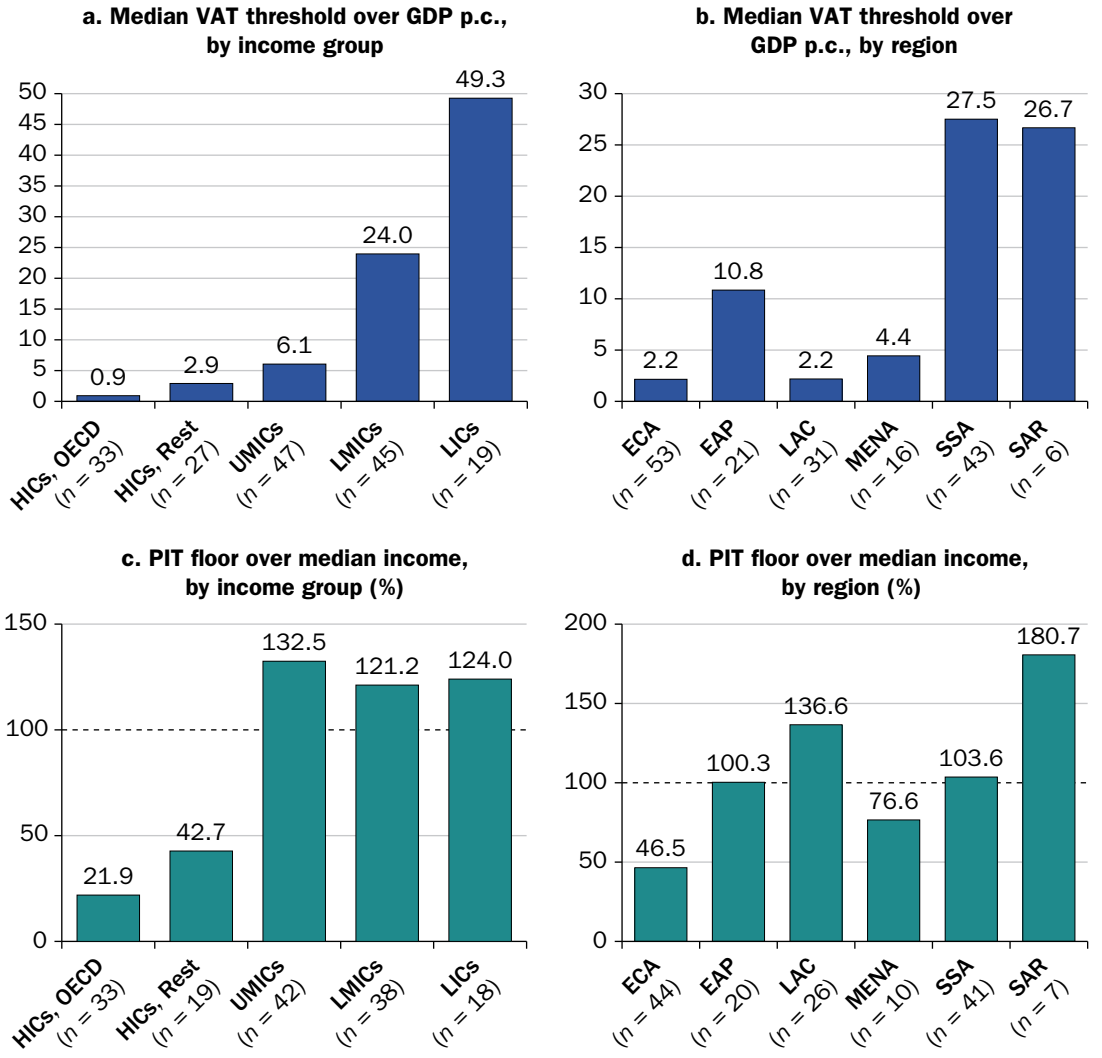


Sources: Original figure for this publication using the *Ernst & Young Personal Tax and Immigration Guide 2023–24* and the PricewaterhouseCoopers, KPMG, and U.S. Social Security Administration websites, among others.

Note: "Tax wedge" is the difference between an employer's total labor costs and an employee's net take-home pay, expressed as a percentage of the total labor costs. For simplicity, we do not consider PIT; therefore, the calculations correspond to a typical worker below the PIT exemption threshold. We construct the tax wedge as Wedge = (employer rate + employee rate) / (1 + employer rate) × 100. This measure captures the extent to which SSC and payroll tax on labor income discourage employment for a typical worker not yet subject to PIT. For countries with progressive SSC rates, the simple average between the minimum employer–employee rate and the maximum employer–employee rate was considered. The rates for countries without SSC were set to zero. CIT = corporate income tax; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; OECD = Organisation for Economic Co-operation and Development; PIT = personal income tax; SSC = social security contributions; UMICs = upper-middle-income countries.

Porous tax bases weaken both revenue performance and economic efficiency. In EMDEs, the more pressing issue is not high rates but narrow bases. These have two main causes: high exemption thresholds and simplified regimes, which exclude or lightly tax large shares of taxpayers, and exemptions and preferential treatments, which reduce liabilities for those taxed. The first margin is particularly acute. VAT registration thresholds average about 50 times GDP per capita in LICs, 24 times in LMICs, and 6 times in UMICs, compared with just 1.6 times in HICs (refer to figure 2.6, panels a, b, c, and d). PIT liability also begins much higher in the income distribution: above 120 percent of median income in the typical EMDE, compared with 22 percent in HICs. As a result, PIT in most EMDEs is confined to the top of the distribution, limiting its role as a broad-based revenue and redistributive instrument.

Figure 2.6 Tax thresholds, by income group and region



Sources: Original figure for this publication. For panels a and b: the United States Agency for International Development's Collecting Taxes database, the International Monetary Fund's Tax Policy Assessment Framework, and the World Development Indicators. For panels c and d: the *Ernst & Young Worldwide Personal Tax and Immigration Guide 2023–24,* among others (for example, PricewaterhouseCoopers, tax expenditure reports, and general tax codes), and the World Inequality Database.

Note: Panels a and b show the median country ratio of the VAT registration threshold to current GDP per capita for years 2019 or 2020, depending on data availability. Panels c and d show the average country ratio of the PIT exemption threshold to the median pretax national income for years 2023 or 2024. The "VAT exemption threshold" is the level of annual taxable turnover above which registration for VAT is required. The "PIT exemption threshold" denotes the point at which a single, childless individual becomes liable after allowances, deductions, and tax credits. "Median pretax national income" is the income level required to enter the top 50 percent of the income distribution in each country (World Inequality Database, Distributional National Accounts methodology). EAP = East Asia and Pacific; ECA = Europe and Central Asia; GDP = gross domestic product; HICs = high-income countries; LAC = Latin America and the Caribbean; LICs = low-income countries; LMICs = lower-middle-income countries; MENA = Middle East and North Africa; OECD = Organisation for Economic Co-operation and Development; p.c. = per capita; PIT = personal income tax; SAR = South Asia; SSA = Sub-Saharan Africa; UMICs = upper-middle-income countries; VAT = value-added tax.

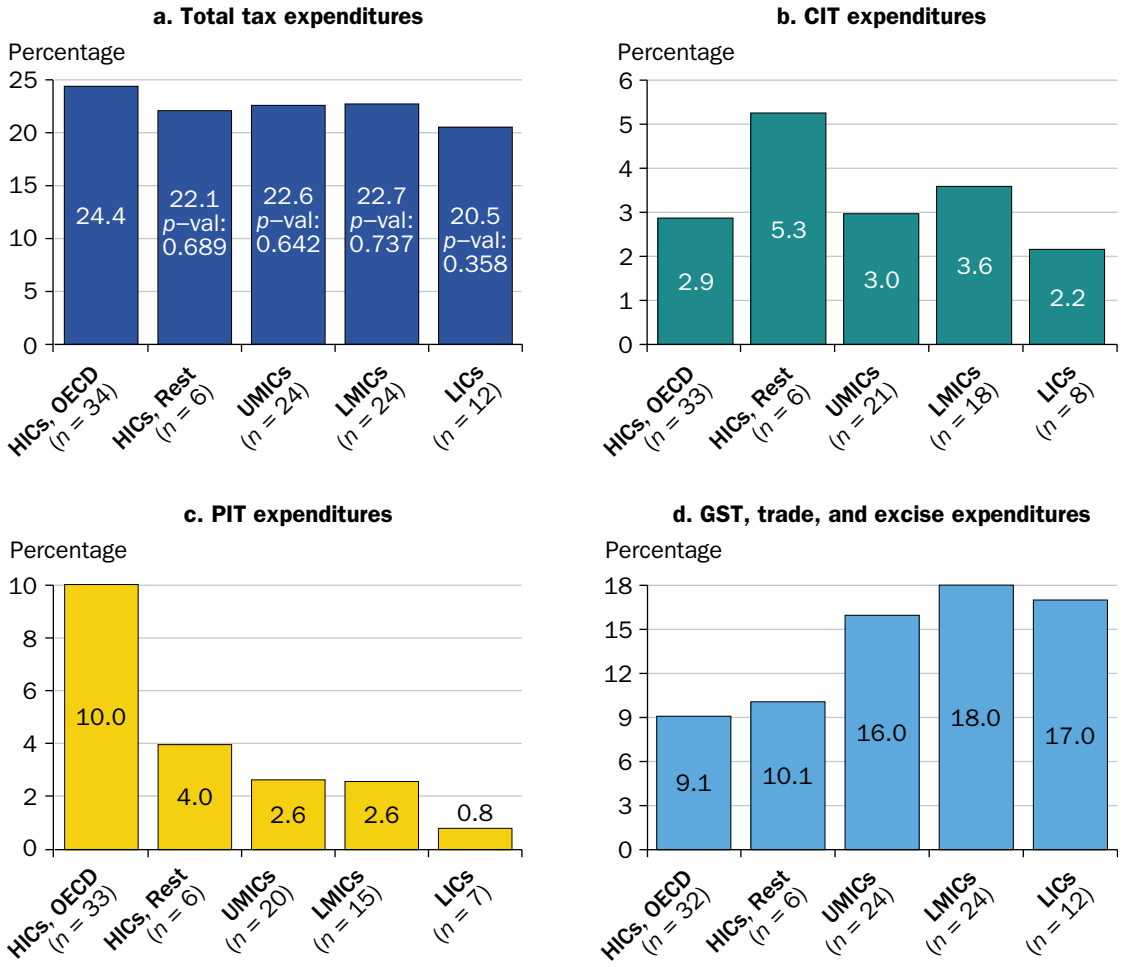
Exemption thresholds bring benefits but also create distortions. They exempt small firms and low-income workers for whom compliance and administrative costs may exceed potential revenue gains (Jensen 2022; Keen and Mintz 2004). But they can also distort resource allocation, fragment VAT chains, and discourage firm growth around the cutoff (Bachas et al. 2019; de Paula and Scheinkman 2010; Gadenne et al. forthcoming; Garicano et al. 2016; Guner et al. 2008). A large micro literature documents firm responses to tax thresholds (Kleven 2016), although credible causal evidence on aggregate growth effects remains limited. Studies in India, Pakistan, Thailand, and the United Kingdom suggest that firm growth slows near registration cutoffs and accelerates when thresholds are raised (Bashir et al. 2024; Choudhary and Gupta 2024; Liu et al. 2024; Muthitacharoen et al. 2021). Thresholds may also improve efficiency in some settings by reducing downside risk to entrepreneurship and encouraging firm creation (Ando 2021).

The policy challenge is, therefore, to set thresholds high enough to avoid disproportionate compliance burdens on small firms and low-income workers but not so high that they exclude large parts of the tax base and weaken efficiency, revenue adequacy, and equity (Keen and Mintz 2004).

Simplified regimes can ease entry into formality, but their effects are limited. Common across EMDEs, they reduce compliance costs and tax burdens below a sales threshold, sometimes in exchange for formal registration and access to social protection. Their effectiveness, however, remains uncertain. Well-designed programs can increase registration, yet newly formalized firms often exhibit little subsequent growth or job creation. Their fiscal costs can also exceed the additional revenue collected, reflecting weak compliance and the cost of contributory benefits (Benhassine et al. 2018; Bruhn and McKenzie 2014; Farias and Hsu Rocha 2026). Simplified regimes can, therefore, lower entry barriers and modestly broaden the tax net, but they are not a scalable solution to informality.

A second major source of base erosion is the use of exemptions and preferential treatments that reduce the tax due. Tax expenditures—including deductions, reduced rates, and other reliefs—are sizable across all income groups, averaging about one-quarter of total tax revenue (refer to figure 2.7). Levels are broadly similar across income groups, although somewhat lower in EMDEs (at 20–23 percent of revenue) than in OECD countries (24 percent). The composition, however, differs sharply. In OECD countries, PIT expenditures dominate, averaging about 10 percent of tax revenue. In EMDEs, most tax expenditures come from goods and services taxes (GSTs), accounting for roughly 16–18 percent of tax revenue. This pattern mirrors the underlying tax mix, with developing economies relying more heavily on consumption taxes (refer to figure 2.1). Concessions on the CIT account for a relatively similar share across groups. Although cross-country comparisons are imperfect,[4] the evidence underscores the scale of forgone revenue and the scope for base-broadening reform.

Figure 2.7 Tax expenditures as a share of tax revenue, 2018–22



Source: Original figure for this publication based on data from the Global Tax Expenditure Database.

Note: Sample sizes vary across tax types depending on data availability. "GST, trade, and excise expenditures" include VAT, GST, excise taxes, trade taxes (for example, customs duties), financial transaction taxes, fees and user charges, carbon and pollution taxes, and stamp duties, among others. CIT = corporate income tax; EAP = East Asia and Pacific; ECA = Europe and Central Asia; GST = goods and services tax; HICs = high-income countries; LAC = Latin America and the Caribbean; LICs = low-income countries; LMICs = lower-middle-income countries; MENA = Middle East and North Africa; OECD = Organisation for Economic Co-operation and Development; PIT = personal income tax; SAR = South Asia; SSA = Sub-Saharan Africa; UMICs = upper-middle-income countries; VAT = value-added tax.

Misaligned and dispersed tax rates create costly distortions. Statutory rates alone (refer to figure 2.4) do not reveal disparities in effective tax burdens across organizational forms, income types, firms, sectors, and geography.[5] Misalignment between PIT and CIT rates can encourage taxpayers to reclassify or shift income across tax bases, generating deadweight loss and reducing revenue.[6] Box 2.2 documents these PIT–CIT arbitrage wedges across countries and shows that

incentives to earn income through personal or corporate forms vary systematically between EMDEs and advanced economies.[7] Tax rate dispersion across firms, sectors, and regions can likewise distort resource allocation and lower aggregate output and productivity (Carrillo et al., 2023). Box 2.3 presents novel cross-country evidence on CIT dispersion, showing that poorer countries tend to have both higher tax rates and greater cross-industry variation. Together, these findings suggest that reducing misalignment and dispersion across tax bases, sectors, and regions could yield substantial efficiency gains.[8] Measuring the magnitude and consequences of these wedges in EMDEs remains an important area for research.

Box 2.2 How gaps between personal and corporate taxation create arbitrage

Misalignments between personal income tax (PIT) and corporate income tax (CIT) rates create a wedge that can distort both real and reported behavior: Firms may choose legal form, financing, and payout strategies for tax rather than business reasons, while taxpayers may reclassify income across bases to reduce liability. This results in lower efficiency, weaker revenue mobilization, and a misallocation of capital toward tax-favored structures.

Corporate profits are first taxed at rate *tc*, and then net-of-tax profits are taxed again at rate *tdistrib* (via dividends taxed at *td* or capital gains taxed at *tcg* upon sale of shares). Unincorporated businesses, by contrast, are taxed only once at the individual rate *ti* (for example, the top marginal PIT rate). At first approximation, incorporation is advantageous whenever $(1 - tc) \times (1 - tdistrib) > 1 - ti$: Each dollar of profit leaves more take-home income if routed through the corporate tax system than if taxed directly under the PIT. We summarize this incentive with the *arbitrage wedge,* defined as the percentage difference in take-home income between incorporating and reporting the same profit as personal income:

$$\text{Arbitrage Wedge} = \left[\frac{\left(1-t_c\right)\left(1-t_{distrib}\right)}{1-t_i}-1\right]\times 100 \qquad \text{(EB2.2.1)},$$

where positive values indicate an incentive to incorporate, and negative values imply that personal taxation is more favorable.

Figure B2.2.1 shows that, on average, tax systems in emerging market and developing economies discourage incorporation: Arbitrage wedges are negative, so reporting income as an individual is more advantageous. Between 2010–11 and 2019–20, this disincentive narrowed in low-income countries (from –12.7 percent to –6.7 percent) and lower-middle-income countries

(Continued)

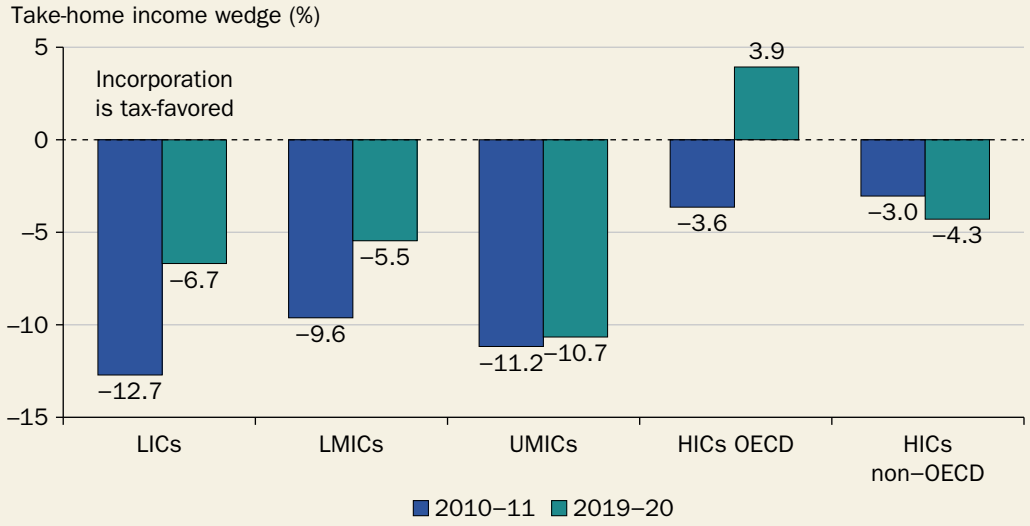
Box 2.2 How gaps between personal and corporate taxation create arbitrage *(continued)*

(from –9.6 percent to –5.5 percent), while upper-middle-income countries saw little change and maintained a large negative wedge of about –11 percent. By contrast, high-income Organisation for Economic Co-operation and Development (OECD) countries shifted from a slightly negative wedge (–3.6 percent) to a positive one (+3.9 percent). As of 2020, only OECD economies exhibit, on average, a tax bias in favor of incorporation, but this average masks substantial cross-country variation in both the size and sign of these wedges, as shown in the right panel, so it should not be overinterpreted.

This comparison abstracts from other determinants of organizational form, including social security contributions, limited liability, nontax costs and benefits, and the possibility of consuming through the firm. Still, it captures the core arbitrage created by nonaligned tax rates. Closer alignment between PIT and CIT rates can improve both efficiency and revenue mobilization, although such reforms must also weigh equity and compliance considerations, as discussed further in chapter 4.

Figure B2.2.1 Arbitrage wedges between PIT and CIT

a. Average take-home income wedge, by income group

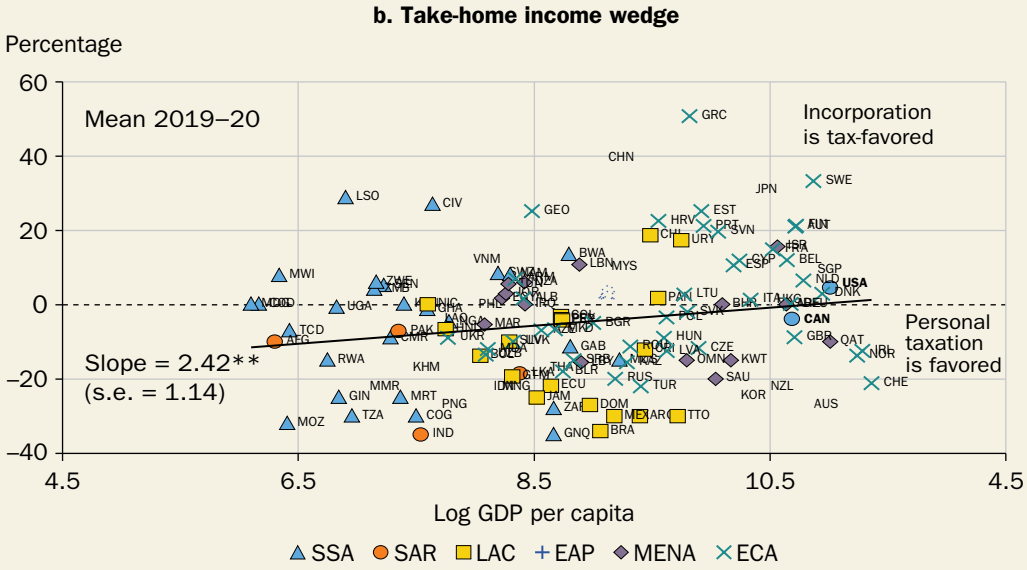


(Figure Continued)

(Continued)

Box 2.2 How gaps between personal and corporate taxation create arbitrage *(continued)*

Figure B2.2.1 Arbitrage wedges between PIT and CIT *(continued)*



Source: Original figure for this publication based on data from the Research School of International Taxation's International Tax Institutions database compiled by Wamser et al. (2025).

Note: This figure illustrates cross-country differences in tax incentives to incorporate, measured as the percentage gap in take-home income from earning profits through the corporate tax system (after corporate and distribution taxes) versus being taxed directly under PIT (top marginal rate). Positive values indicate a tax advantage to incorporation; negative values indicate that personal taxation is more favorable. "Arbitrage wedge" is defined as $[(1 - tc) \times (1 - tdistrib) / (1 - ti) - 1] \times 100$, where *tc* is the statutory corporate tax rate, *tdistrib* is the tax on distributed profits (via dividends taxed at *td* or capital gains taxed at *tcg*), and *ti* is the top PIT rate. Panel a shows average wedges across income groups for 2010–11 and 2019–20. Panel b displays country-level wedges for 2019–20 plotted against the log of GDP per capita. In panel b, the reported coefficient and s.e. correspond to the fitted linear relationship between the variables. The slope is significant at the 5 percent level (denoted by ** in the figure). The sample includes 129 countries (6 LICs, 31 LMICs, 37 UMICs, 34 HICs from OECD, 21 HICs non-OECD) with populations above 1 million, ensuring consistent coverage over time. Country codes are from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups. CIT = corporate income tax; EAP = East Asia and Pacific; ECA = Europe and Central Asia; GDP = gross domestic product; HICs = high-income countries; LAC = Latin America and the Caribbean; LICs = low-income countries; LMICs = lower-middle-income countries; MENA = Middle East and North Africa; OECD = Organisation for Economic Co-operation and Development; PIT = personal income tax; SAR = South Asia; s.e. = standard error; SSA = Sub-Saharan Africa; UMICs = upper-middle-income countries.

Weak enforcement and informality sharply reduce tax efficiency. High informality, tax avoidance, and tax evasion—rooted in limited administrative capacity—remain central efficiency challenges in EMDEs.[9] Their impact is visible in figure 2.8, which compares VAT, CIT, and PIT efficiency across income groups relative to OECD high-income economies. Using standard indicators that combine the effects of policy design and compliance,[10] a clear pattern emerges: LICs perform worst across all three taxes, while middle-income countries (MICs) tend to lie closer to high-income benchmarks. UMICs perform comparably to OECD economies in VAT and CIT collection, and LMICs show similar CIT productivity, suggesting that administrative capacity and policy design interact differently across taxes. In the case of VAT, low performance reflects both policy gaps—notably exemptions and reduced rates (refer to figure 2.7)—and weak compliance (Morrow et al. 2022).

Box 2.3 Tax rate dispersion and misallocation

Corporate taxes matter not only in their level but also in how they vary across sectors, activities, and locations. The effective marginal tax rate (EMTR) is a standard measure of the tax wedge on new investment, combining statutory rates, the tax base, and incentive provisions (Auerbach 2018). When EMTRs differ widely within a country, capital may flow toward tax-favored sectors or regions rather than to its most-productive use. Such dispersion can contribute to resource misallocation and lower aggregate output (Adarov 2025; Hsieh and Klenow 2009; Restuccia and Rogerson 2017).

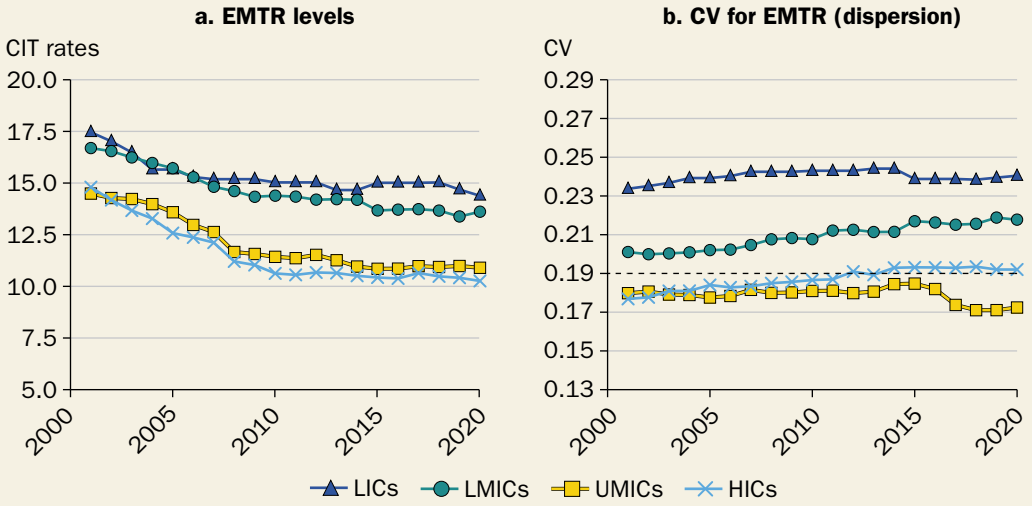
To assess these distortions, we use Research School of International Taxation's International Tax Institutions data compiled by Wamser et al. (2025), covering 220 countries and 19 industries from 2001 to 2020. We measure within-country dispersion using the coefficient of variation (CV) of EMTRs across industries.[a]

Figure B2.3.1 shows that both average CIT rates and dispersion are systematically higher in low-income countries (LICs) than in high-income countries (HICs). The average CV of EMTRs is about 0.25 in LICs, compared with 0.19 in HICs—a difference of roughly 30 percent. Moreover, despite the global decline in statutory CIT rates, dispersion has remained broadly stable over time. In capital-scarce settings, such gaps can distort investment decisions and reduce output and productivity.

(Continued)

Box 2.3 Tax rate dispersion and misallocation *(continued)*

Figure B2.3.1 Levels and Dispersion of CIT Rates



Source: Original figure for this publication based on the Research School of International Taxation's International Tax Institutions data compiled by Wamser et al. (2025).

Note: "EMTR" is a measure of the marginal tax burden on a hypothetical marginal investment project (Devereux and Griffith 1998). These forward-looking tax rates are computed by Mc Auliffe et al. (2023) at the country–industry–year level by weighting asset-specific depreciation allowances with industry-level asset shares. This approach covers seven asset categories: buildings, machinery, intangible fixed assets, office equipment, computers, vehicles, and inventories. Thus, EMTRs capture the typical asset composition in a given country and industry. We use a balanced panel of 144 countries (9 LICs, 37 LMICs, 37 UMICs, and 61 HICs). CIT = corporate income tax; EMTR = effective marginal tax rate; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

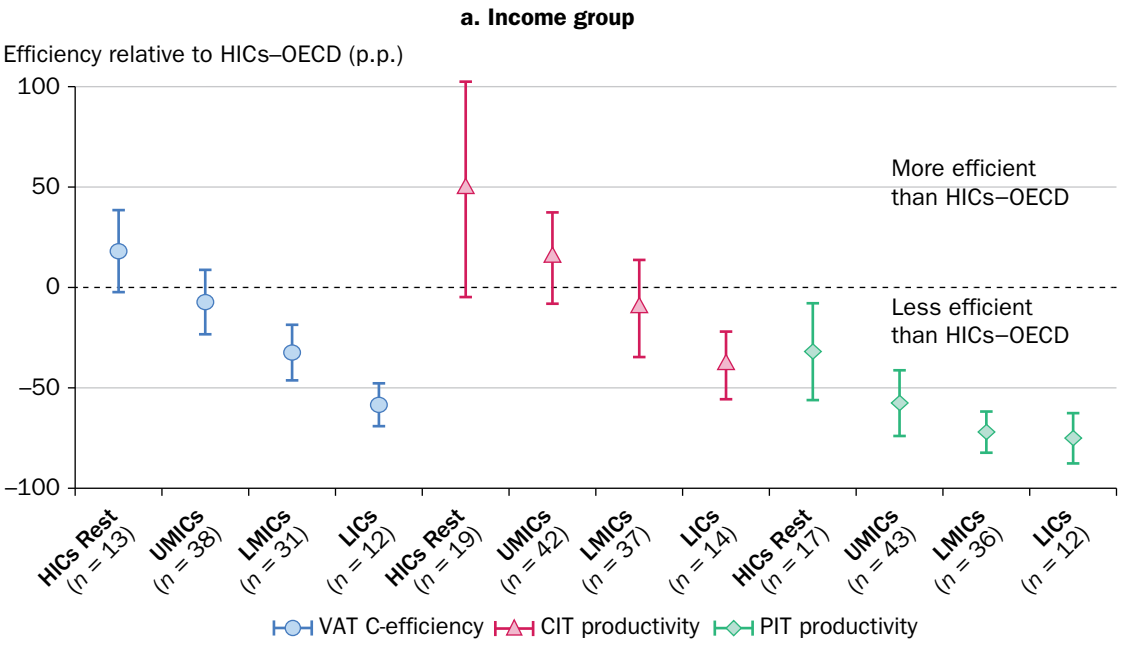
These patterns suggest that corporate tax systems in emerging markets and developing economies are often less neutral than those in advanced economies. Reducing dispersion—by aligning rates across sectors and curbing special provisions—could, therefore, yield meaningful efficiency and revenue gains, especially where capital is scarce and misallocation costs are high.

a. This exercise focuses on sectoral dispersion. Spatial variation across jurisdictions can also be large and distortionary, as Fajgelbaum et al. (2019) show for US state taxes. Similar concerns arise in countries with strong regional fiscal autonomy, such as Argentina, Brazil, India, and Pakistan.

The core challenge is the interaction of design and enforcement. Across taxes, the main efficiency shortcomings reflect the interaction of statutory design, porous bases, and limited enforcement capacity. Annex 2A illustrates how these issues play out in the VAT, CIT, and PIT. In principle, the VAT is one of the least-distortionary taxes, but its advantages are diluted in practice by exemptions, reduced rates, high thresholds, informality, and weak administration. The CIT raises substantial revenue but can distort both real activity and profit reporting, especially where statutory rates are high and tax bases are porous. The PIT plays only a limited role in most EMDEs because exemption thresholds are high, but where it applies, it can still generate strong avoidance incentives and interact with SSCs to distort work and formality.

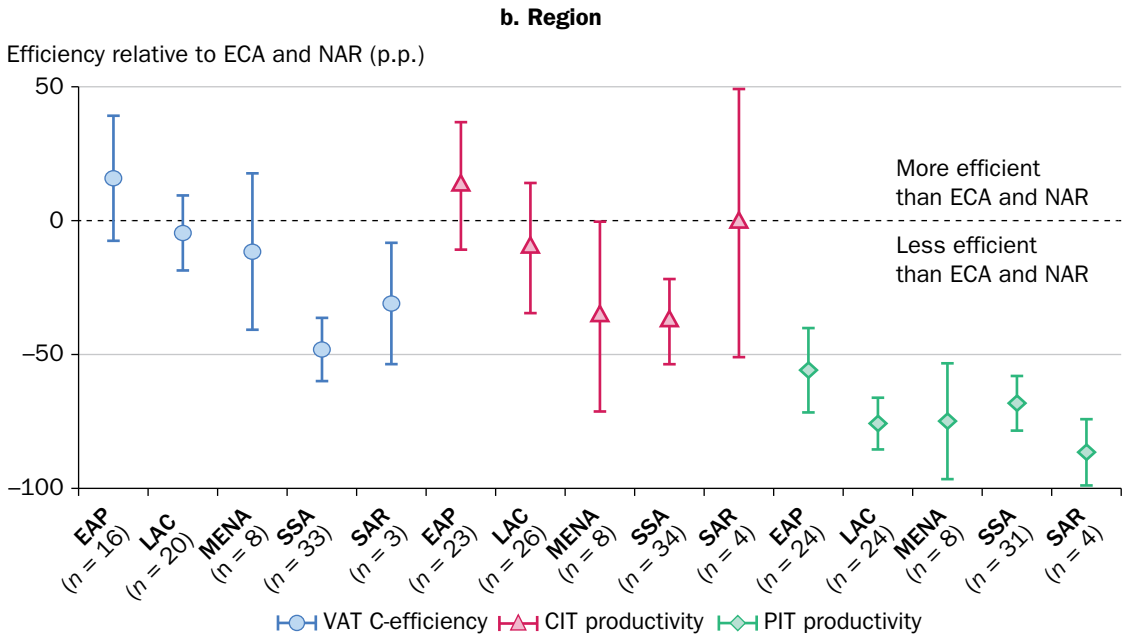
Strengthening tax design and compliance is, therefore, central to improving both efficiency and revenue adequacy in EMDEs. At the same time, the relative importance of different margins remains poorly understood, underscoring the need for further empirical work to support evidence-based tax policy.

Figure 2.8 Tax efficiency indicators, by income group and region



(Continued)

Figure 2.8 Tax efficiency indicators, by income group and region *(continued)*



Source: Original figure for this publication using data from the U.S. Agency for International Development's Collecting Taxes database.

Note: Reported values are coefficients from the regression

$$ln(yi) = \alpha_0 + \alpha_1 \cdot HIC\ Rest_i + \alpha_2 \cdot UMIC_i + \alpha_3 \cdot LMIC_i + \alpha_4 \cdot LIC_i + \alpha_i, \quad (EF2.8.1),$$

where y_i denotes the respective efficiency measure. Coefficients below (above) zero indicate lower (higher) efficiency relative to OECD HICs in panel a and to ECA and NAR countries in panel b; vertical bars show 95 percent confidence intervals. Efficiency measures are averaged over 2019–23. Parentheses below each group indicate the number of countries. VAT C-efficiency is the ratio of actual VAT collections to the revenue that results from applying the standard rate to total consumption. A perfectly broad-based VAT with full compliance would yield a ratio of nearly 100 percent. CIT productivity is the ratio of CIT revenue (as a percent of GDP) to the statutory CIT rate. PIT productivity is the ratio of PIT revenue (as a percent of GDP) to the weighted average *PIT rate*, defined as the average of the lowest and highest marginal rates weighted by the income thresholds at which they apply (or by the flat rate in single-rate systems). The averages for VAT, CIT, and PIT measures for HIC–OECD are 55, 13, and 29, respectively. For ECA and NAR, they are 54, 16, and 28. CIT = corporate income tax; EAP = East Asia and Pacific; GDP = gross domestic product; HICs = high-income countries; LAC = Latin America and the Caribbean; LICs = low-income countries; LMICs = lower-middle-income countries; MENA = Middle East and North Africa; NAR = North America; OECD = Organisation for Economic Co-operation and Development; PIT = personal income tax; p.p. = percentage point; SAR = South Asia; SSA = Sub-Saharan Africa; UMICs = upper-middle-income countries; VAT = value-added tax.

Equity shortcomings in domestic revenue mobilization

The equity role of taxation. Equity is inherently normative: What is considered fair or just varies across individuals and cultures and over time, as well as across socioeconomic, political, and fiscal contexts (World Values Survey 2025). In general, an equitable tax system will achieve both vertical and horizontal equity. *Vertical equity* requires those who are better off to pay proportionally more taxes than those who are less well off in line with the principles of "ability to pay" or "equal sacrifice." *Horizontal*

equity, by contrast, requires that taxpayers in similar circumstances pay similar taxes. While vertical equity is closely linked to tax progressivity, horizontal equity is about equal treatment among equals.

Progressivity is usually defined as an average tax *rate* that rises with pretax income (or another appropriate welfare metric).[11] Within the broader fiscal system, taxes—alongside transfers—advance social goals such as redistribution and poverty reduction.[12]

EMDEs are constrained in their ability to achieve tax equity goals. Their underutilization of progressive PIT and heavy reliance on VAT restricts tax systems' ability to achieve progressivity, redistribution, and the "do-no-harm" principle.[13] Simultaneously, EMDEs' widespread use of exemptions and concessions leads to horizontal inequities and reduces efficiency. Limited use of other direct taxes (on capital income, property, and wealth), as well as significant tax avoidance and evasion by top income earners, further limit the ability to achieve equity goals. Box 2.4 discusses how the burdens of PIT, CIT, and VAT may be distributed in EMDEs.

Box 2.4 Tax incidence in developing countries

EMDEs present distinctive challenges for tax incidence analysis. Understanding equity requires knowing who is legally liable for each tax, who ultimately bears its economic burden, and by how much. This is often difficult in developing countries, where informality, weak third-party reporting, and limited administrative data can blur both statutory and effective incidence.a The Commitment to Equity Assessment archive helps fill this gap by providing harmonized estimates of "who pays how much" in taxes for more than 80 countries across income groups and regions.b

PIT. The statutory taxpayer may be the individual earning the income, the employer, or the financial institution withholding the tax. But the economic burden of PIT is generally assumed to fall on those whose pretax income is reduced. In EMDEs, however, high informality weakens third-party enforcement and makes it harder to identify who is actually paying PIT (Bachas, Jensen, and Gadenne 2024). This not only narrows the tax base but can also generate horizontal inequities among individuals with similar incomes but different income sources.

CIT. The statutory incidence of CIT falls on the corporation, but its economic burden is harder to trace. Part of it may fall on owners, part on workers through lower wages or employment, and part may be shifted through tax planning or profit shifting (Crivelli et al. 2016; OECD 2013). In practice, ownership structures are often opaque (Kopczuk and Zwick 2020), and the evidence on labor incidence remains limited and mixed. Recent studies suggest that workers can bear some of the burden, but the size and distribution of these effects vary widely across settings

(Continued)

Box 2.4 Tax incidence in developing countries *(continued)*

(for example, for Germany and the United States, refer to Fuest et al. 2018; Kennedy et al. 2026; Risch, 2023). Evidence in this regard from developed and developing countries is scant and inconclusive. In some cases, concessional tax treatment of corporate income can also make the overall tax system less progressive, as shown for Brazil by Palomo et al. (2025).

VAT. VAT is usually collected and remitted by firms, but its economic burden generally falls on consumers through higher prices. Under a single-rate system with no exemptions, VAT burdens would be proportional to consumption expenditure.[c] In EMDEs, however, exemptions, reduced rates, registration thresholds, and informality often make VAT mildly progressive in relative terms (Bachas, Gadenne, and Jensen 2024; Thomas 2022). Even so, VAT concessions often deliver larger aggregate benefits to richer households and may be regressive in practice (Wai-Poi et al. 2025; Warwick et al. 2022). Their effects may also be limited when tax cuts are not fully passed through to prices (Benzarti et al. 2024). Exemptions can also create nontransparent burdens through input tax nondeductibility and cascading (Chandler et al. 2025).

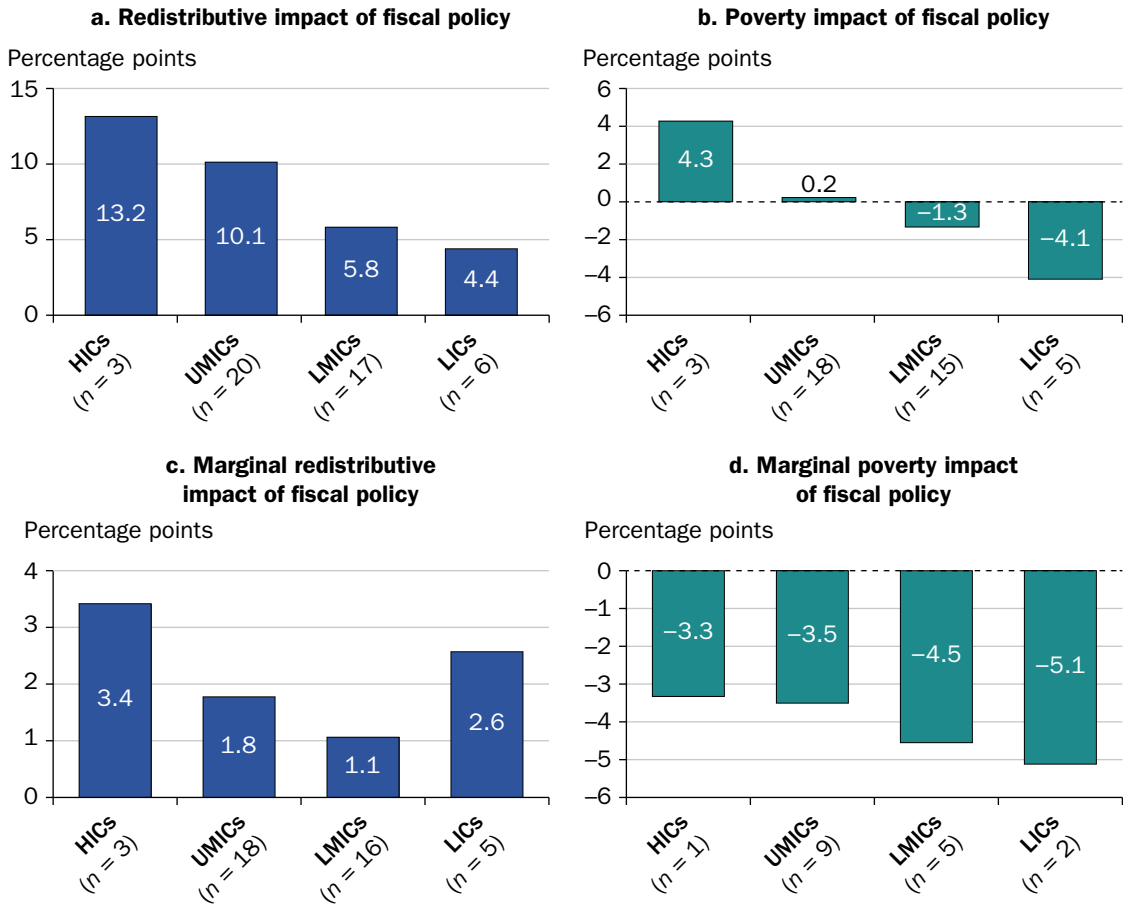
a. Countries at all income levels rely on a similar set of tax instruments: Direct taxes apply to sources of income (such as labor, corporate, investment, or capital income), while indirect taxes apply to uses of income (such as consumption or savings).

b. The CEQ approach was developed by the Commitment to Equity Institute at Tulane University and estimates, with few exceptions, the economic burden of the effective incidence of taxes. For its methodology, applications, and software, refer to Lustig (2022). The CEQ Standard Indicators catalog the data sources in each country assessment. Coverage is neither random nor comprehensive: Data-poor countries are underrepresented, and income classifications generally reflect the timing of each assessment. Group averages should, therefore, be interpreted as descriptive of the countries covered rather than representative of each income group, and they may mask within-group heterogeneity.

c. Thomas (2022) shows that, for point-in-time incidence analysis, VAT burdens should be measured relative to consumption expenditure rather than income, to remove the influence of savings decisions.

EMDEs' taxes redistribute less and impoverish more. Figure 2.3 shows that redistribution through taxes and transfers rises with income. Using CEQ assessments for a smaller set of countries, Figure 2.9 provides a more detailed picture. Taxes and transfers lower inequality by an average of 13 percentage points and reduce the poverty headcount rate by just over 4 percentage points in HICs; in LICs, they lower inequality by approximately 4 percentage points but increase the poverty headcount rate by 4 percentage points.[14] Taxes alone reduce inequality by 3.4 percentage points in HICs and between 1.1 and 2.6 percentage points in LICs and LMICs (panel c); in LMICs and LICs, however, they increase the poverty headcount rate by between 4.5 and 5.0 percentage points (panel d). Moreover, these aggregate changes can conceal individual losses: The poverty headcount may fall even as some initially poor individuals become poorer or some nonpoor individuals fall into poverty. Higgins and Lustig (2016) define these losses as fiscal impoverishment and develop measures to capture them.

Figure 2.9 Welfare impacts of taxes and transfers



Source: Original figure for this publication based on data from Commitment to Equity Master Workbooks.

Note: In panel a, "redistributive impact of fiscal policy" is the difference in Gini coefficients estimated over prefiscal and postfiscal income distributions. A positive (negative) redistributive impact indicates that fiscal policy (both taxes and transfers) accounts for a reduction (increase) in the Gini coefficient from prefiscal to postfiscal income. In panel b, "poverty impact of fiscal policy" is the difference in the poverty headcount ratio estimated over the prefiscal and postfiscal income distributions. A positive (negative) poverty impact indicates that fiscal policy accounts for a reduction (increase) in the poverty rate from prefiscal to postfiscal income.[a] Countries with null redistributive or poverty impacts were excluded from the calculation of averages by income group. In panel c, "marginal redistributive impact of fiscal policy" is the difference in the Gini coefficient, and in panel d, "marginal poverty impact of fiscal policy" is the poverty headcount ratio when the fiscal instrument in question (in this case, taxes) is included and excluded from the income aggregate. A positive (negative) marginal redistributive impact indicates that the fiscal instrument accounts for a reduction (increase) in the Gini coefficient. A positive (negative) poverty impact indicates that the fiscal instrument accounts for a reduction (increase) in the poverty rate. For all panels, countries were classified by income group at the time the Commitment to Equity data were collected. HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; PPP = purchasing power parity; UMICs = upper-middle-income countries.

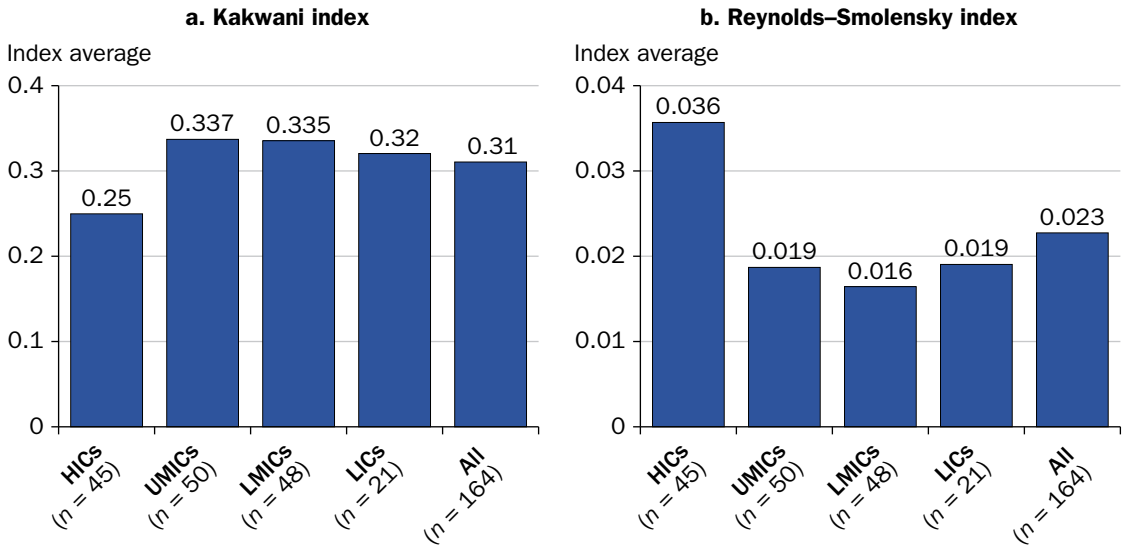
a. Poverty headcount rates are estimated using the relevant income group-specific US dollar PPP (2011) international poverty lines: $1.90 per person per day line for LICs, $3.20 per person per day line for LMICs, and $5.50 per person per day line for UMICs and HICs.

EMDEs rely heavily on VAT and collect relatively little from direct income taxes. In high-income OECD countries, direct taxes account for around 70 percent of total tax revenue, whereas in LICs, LMICs, and UMICs, they account for only 43–47 percent. The VAT contributes the largest single share of total tax revenues in LICs, LMICs, and UMICs, while indirect taxes contribute a larger share of total tax revenues than direct taxes (refer to figure 2.1).

Most PIT systems are progressive and create little impoverishment. PIT is income targeted in two respects: PIT systems typically exempt incomes below a predetermined threshold, and they use a progressive marginal rate structure for those who are liable. Figure 2.10, panel a, demonstrates that these characteristics generate progressivity in PIT systems regardless of income level. The predetermined threshold typical of progressive PIT systems also explains the minimal contributions to impoverishment from taxes: In HICs and LICs, the PIT's share in total impoverishment due to taxes is between 3 and 4 percent (refer to figure 2.11).

Yet, limited PIT collection blunts its potential for redistribution. EMDEs produce limited revenues from progressive PIT in part because (1) high thresholds exempt a large portion of the (potential) taxpayer base (refer to figure 2.6, panel b), (2) average PIT rates are lower (refer to figure 2.4), and (3) the size of the informal sector creates tax administration and enforcement constraints in all parts of the distribution.[15] The equity outcome of low PIT collections can be seen in figure 2.10, panel b, where the contribution of PIT to vertical equity in EMDEs is reduced despite significant progressivity.

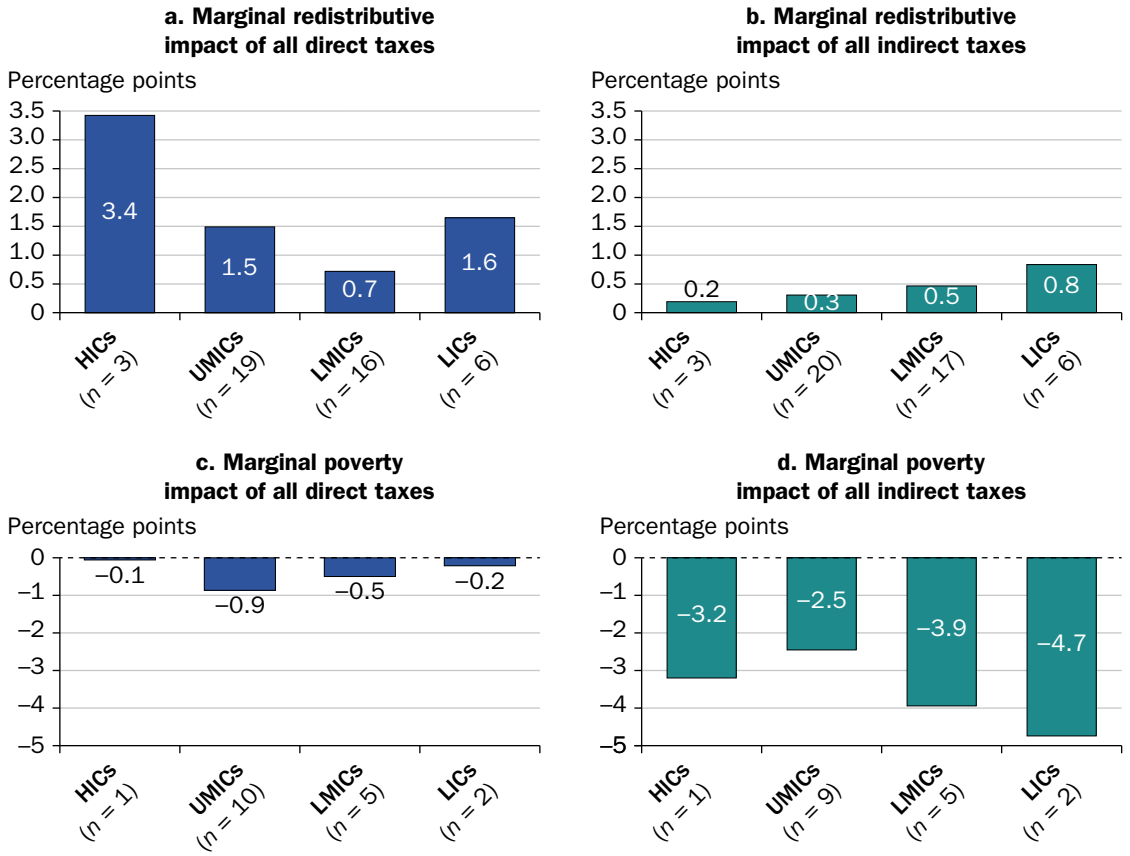
Figure 2.10 Progressivity and redistribution of PIT, 2024



Source: Mylonas and Thomas (forthcoming).

Note: HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

Figure 2.11 Welfare impacts of direct and indirect taxes

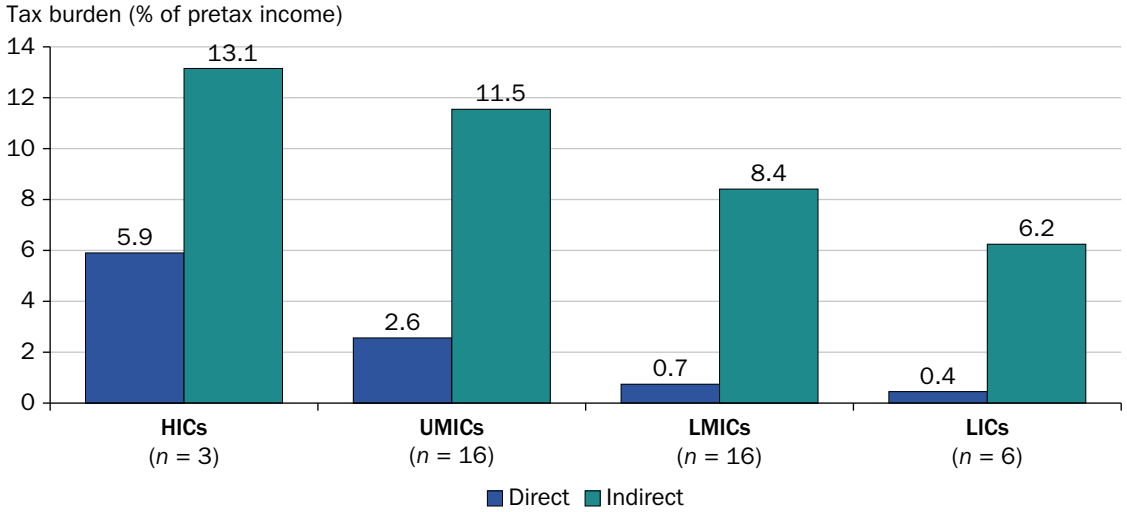


Source: Original figure for this publication based on Commitment to Equity Master Workbooks.

Note: A positive marginal redistributive impact indicates that the group of instruments accounts for a reduction in the Gini coefficient, all else being equal. A positive (negative) poverty impact indicates that the instrument or group of instruments accounts for a reduction (increase) in the poverty rate. Countries were classified by income group at the time the Commitment to Equity data were collected. HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

The reliance on indirect taxes creates a tension between revenue and equity. Nearly everyone—rich or poor, retired or active in the labor market—pays VAT roughly in proportion to how much they consume. For example, in Mexico in 2014 and Zambia in 2015, 99.9 percent and 100 percent, respectively, of the population paid VAT; the poorest 50 percent of individuals in LICs, LMICs, and UMICs pay, on average, between 6 percent and 12 percent of pretax income in indirect taxes (refer to figure 2.12). These characteristics imply that, in expectation, VAT is neither strongly regressive nor strongly progressive, and it generates insignificant redistribution but significant impoverishment (refer to figure 2.11). Across LICs, LMICs, and UMICs, indirect taxes' share in total impoverishment from taxes ranges from 71 percent to 92 percent.[16]

Figure 2.12 Taxes paid as a share of pretax income, average among poorest 50 percent



Source: Original figure for this publication based on Commitment to Equity Master Workbooks.

Note: The total tax burden in the poorest five deciles is calculated as a percentage of total pretax income in the same decile and then averaged over the poorest five deciles. For example, the burden of direct taxes across deciles 1–5 averages 6 percent in HICs and 2.6 percent in UMICs. Estimates for direct taxes paid are missing for two LMICs (Bolivia and Indonesia). Countries were classified by income group at the time the Commitment to Equity data were collected. HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries: UMICs = upper-middle-income countries.

Other progressive direct tax instruments like capital income and property taxation play an insignificant role in EMDEs (Grote and Wen 2024). Property taxes are almost irrelevant in LICs, LMICs, and UMICs (refer to figure 2.1). In the sample of LICs, LMICs, and UMICs with Commitment to Equity Assessments (refer to figures 2.9, 2.11, and 2.12), only one UMIC has significant revenues from property taxes. In many countries, concessions and preferential income tax rates on capital income are popular (Bergolo et al. 2023), even though such concessions are highly regressive (Clark et al. forthcoming; Palomo et al. 2025).

Design-related equity concerns are amplified by tax avoidance and evasion, particularly in lower-capacity EMDEs, weakening the redistributive role of taxes. For example, figure B2.2.1 shows that tax systems create incentives to classify corporate profits as personal income, allowing firms and their beneficiaries to reduce their tax liability. Because corporate earnings are a significant income source for the richest individuals, the ability to avoid the full income tax burdens generates regressivity in the income tax structure (Scot et al. 2025). In addition, when countries are unable to effectively implement Automatic Exchange of Information standards on financial income, the reduced threat of detection makes it less costly to move income to offshore locations and tax havens.

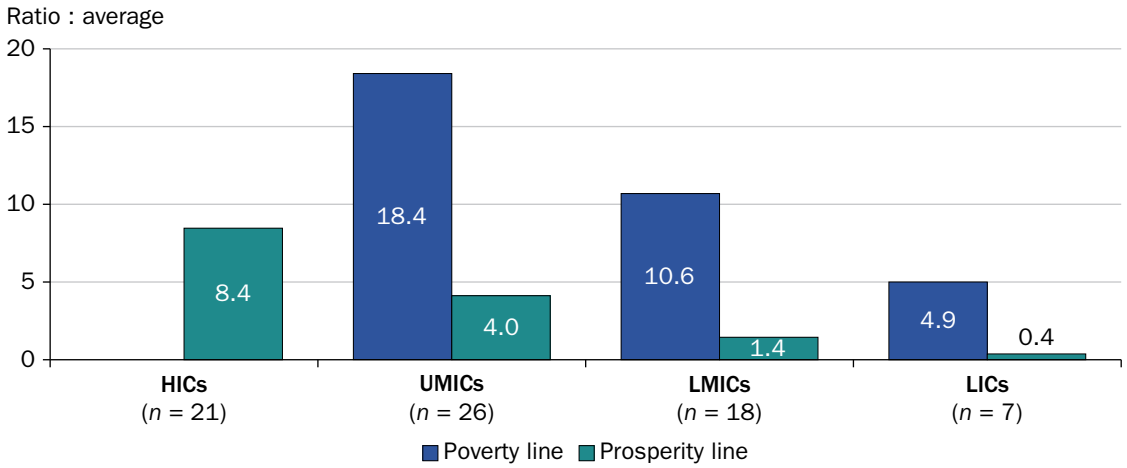
Efficiency meets equity: Priorities for reform

Countries at any income level can create more tax equity and greater efficiency simultaneously. Chapter 1 defines the fiscal frontier, for a given revenue target and structural fundamentals, as the best-attainable balance between *efficiency* and *equity* when policy is optimally designed and administrative capacity is fully utilized. Countries operating inside that frontier can improve both dimensions simultaneously before confronting the fundamental tradeoff between them. The preceding diagnosis suggests that many EMDEs have considerable scope to do so by broadening fragmented tax bases, improving alignment across taxes, strengthening enforcement, and replacing poorly targeted concessions with better redistributive instruments.

If paired with targeted transfers, eliminating indirect tax concessions can improve both efficiency and equity. The optimal indirect tax literature (Atkinson and Stiglitz 1976; Kaplow 2006; Laroque 2005) suggests that direct targeting is generally a better tool for redistribution than reduced VAT rates or exemptions. A large empirical literature supports this view. For example, closing VAT exemptions and preferential rates and recycling the additional revenue through direct cash transfers can reduce both poverty and inequality (Warwick et al. 2022).[17] New technologies also expand targeting options beyond traditional cash transfers. For example, Rio Grande do Sul in Brazil and Uzbekistan have developed "personalized VAT" systems that use transaction-level data to provide means-tested VAT rebates (Bachas et al. 2025; Barreix et al. 2022). Where such targeting is not feasible due to weaker capacity, VAT may still play a role in redistribution by incorporating differential consumption patterns among poor and nonpoor households. But these should be limited to expenditure categories that are unambiguously progressive, most notably basic food products (for example, refer to Benzarti et al. 2024) or even fuel purchases (Tortarolo 2026).

Expansion of the direct tax base enhances efficiency and equity. Strengthening tax administration and enforcement among top earners can reduce aggressive avoidance and evasion, reinforcing the equity of the tax system. When better tax performance at the top end of the income distribution is complemented with a potential expansion of the taxpayer base closer to the existing threshold, efficiency and equity of the tax system overall may be enhanced. For example, in UMICs, current tax thresholds are, on average, 18 times as large as the US$5.50 per day international poverty line, or 4 times as large as the US$25 per day prosperity standard, suggesting that some countries could potentially lower direct income tax thresholds without creating additional impoverishment (refer to figure 2.13). Chapter 4 expands on these topics in the context of globalization and high-income earners.

Figure 2.13 Average PIT threshold to poverty and prosperity standards



Sources: Original figure for this publication based on *EY Personal Tax and Immigration Guide 2023–24,* among other sources (PricewaterhouseCoopers, tax expenditure reports, general tax codes, and so on) for the calculation of PIT thresholds and the United Nations Department of Economic and Social Affairs, the Global Monitoring Database, and the Luxembourg Income Study for the calculation of average household size.

Note: The ratios of country-specific PIT thresholds to poverty and prosperity standards are averaged across income groups. The poverty standard for each country is defined as the US dollar PPP (2011) international poverty line multiplied by the country-specific average household size. The *prosperity standard* (refer to blogs.worldbank.org/en/opendata/updated-estimates-prosperity-gap) is defined as US$25 PPP per person per day multiplied by the country-specific average household member size. The average household sizes are 4.9 (LICs), 4.4 (LMICs), 3.7 (UMICs), and 3.3 (HICs) members. Data on PIT thresholds are from 2020. Countries were classified according to their 2020 income classification. HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; PIT = personal income tax; PPP = purchasing power parity; UMICs = upper-middle-income countries.

Removing ineffective and regressive tax incentives can improve efficiency and equity. For example, home mortgage interest deductions in PIT statutes and concessional VAT rates for restaurant food service, entertainment, and cultural activities are popular but regressive (Glaeser and Shapiro 2003; OECD and KIPF 2014). Because these benefit individuals with significant savings or disposable income, closing these incentives should lead to enhanced vertical and horizontal equity in the tax system overall. Concessions and preferential rates for capital income are also popular (Bergolo et al. 2023). Increasing neutrality across different forms of capital income and moving toward equivalent taxation of capital and labor income (that is, under a comprehensive income tax) would increase efficiency (by reducing distortions to portfolio allocation) while also removing tax incentives predominantly available to the richest (refer to chapter 4). For firms, replacing income-based CIT concessions with expenditure-based incentives can encourage investment and job creation while increasing the share of revenue raised through direct taxes (Benitez et al. 2023). Eliminating ineffective incentives altogether can further improve both revenue performance and equity.

Recurrent property taxes offer another underused opportunity. They account for very small revenue shares in LICs, LMICs, and UMICs (Grote and Wen 2024), but low property tax rates are not associated with larger real estate markets (Kronfol and Steenbergen 2020; Stotsky 2024). Instead, the size of local real estate markets is more consistently associated with the coverage and quality of municipal services, which are often financed through property tax revenue. Strengthening recurrent property taxation can, therefore, raise local revenue and improve equity without necessarily impeding real estate development. Its distinct administrative and political economy challenges are discussed more fully in chapter 5.

Corrective taxes can also be revenue- and equity-enhancing in most countries. Tobacco taxes, for example, generate net-positive welfare benefits for lower-income households through reduced medical expenses and increased labor productivity (Fuchs et al. 2019). Chapter 6 similarly discusses evidence that broadly defined environmental taxes can be progressive in LICs or broadly neutral across consumption groups in MICs. Tax progressivity could be enhanced through targeted expenditures that promote the continued affordability of essential social and economic services that are intensive in environmentally harmful inputs. The net long-term benefits of environmental taxes may be especially large for low-income households, which are often more exposed to pollution and bear larger associated health and productivity losses.

Table 2.1 translates this chapter's diagnosis into policy priorities. The rows capture the strength of structural fundamentals—the slower moving economic, administrative, and institutional features that shape what is feasible—while the columns capture distance to the current frontier or the scope to improve policy design and implementation with existing fundamentals. Weak fundamentals call for simpler instruments and selective capacity building, whereas greater distance from the frontier calls for more immediate base broadening, simplification, and enforcement reforms.

These recommendations indicate reform directions rather than guaranteed magnitudes. Much of the evidence on labor supply, investment, incidence, and compliance still comes from HICs, while the growing evidence from EMDEs remains context specific. Reform should, therefore, be sequenced carefully and, where possible, informed by pilots, administrative data, and ex post evaluation. Moreover, these priorities are necessary but not sufficient. Chapter 5 examines the political and institutional conditions that determine whether they can be adopted, implemented, and sustained. In the report's 3Ts architecture, technology can improve information and enforcement, transparency can expose concessions and hidden tax bases, and trust can make compliance and reform more durable. The appropriate combination depends on both a country's structural fundamentals and its distance from the fiscal frontier.

Table 2.1 Policy matrix to improve efficiency and equity in domestic tax systems

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming:*** **Fragmented systems with narrow capacity** **Current situation** • With ample concessions, multiple rates, ad hoc taxes, and high evasion, the system sits far from the "broad-base, low-rate" benchmark. • Thresholds are off, targeting is poor, and progressivity is limited. • Administration is weak, data are scarce, and policy evaluations are uncommon. **Actions** • Broaden the base and simplify rate structures by phasing out distortionary and regressive concessions. • Strengthen enforcement through third-party data cross-checks, e-filing, and routine tax expenditure reporting. • Improve PIT–CIT alignment to reduce arbitrage and reinforce fairness.	***Constrained but functional:*** **Simple systems with narrow capacity** **Current situation** • Core taxes follow sound principles—simple, moderate, and broad. But the net is thin: few PIT filers and high VAT and CIT thresholds due to widespread informality. • Compliance tools are limited, and distributional and evaluation capacities are just developing. • Capacity, more than design, is the bottleneck. **Actions** • Strengthen practical enforcement—expanding e-filing, third-party data use, and risk scoring. • Use data and evaluation to guide gradual base broadening. • Improve PIT–CIT alignment to curb income shifting and lay the groundwork for expanding direct income taxation relative to indirect taxes.
Strong fundamentals	***Capable but underperforming:*** **Capable but cluttered** **Current situation** • Administrative and IT capacity are solid but underused. • The system remains cluttered with multiple rates, exemptions, special regimes, and distortive taxes; PIT and CIT are poorly aligned; and tax burdens vary widely across sectors and regions. Capital income is non-neutral and undertaxed. • Narrow bases require high statutory rates, while tax expenditures are large and seldom reviewed. **Actions** • Reduce tax rate dispersion: Review and prune regressive or ineffective tax expenditures, enabling lower statutory rates. • Narrow PIT–CIT gaps to curb arbitrage and integrate capital income sources to reinforce progressivity. • Deploy capacity: Use data to quantify behavioral responses and distortions, steering reforms toward the fiscal frontier.	***Capable and high-performing:*** **Functional and capable tax systems** **Current situation** • Enforcement is strong, bases are broad, and rates are moderate and consistent. Special regimes are rare. • Capital income, CIT, and PIT rules are increasingly integrated, yielding low wedge dispersion. • Advanced tools—e-invoicing, third-party reporting, and information exchange—are routinely used both for compliance and policy design. **Actions** • Smooth remaining wedges by fine-tuning rates and thresholds. • Broaden bases—rolling back concessions—while using targeted transfers to protect vulnerable groups. • Invest in deeper data analytics to stay at the frontier.

Source: Original table for this publication.

Note: CIT = corporate income tax; e-filing = electronic filing; e-invoicing = electronic invoicing; PIT = personal income tax; VAT = value-added tax.

Annex 2A Efficiency of the main tax instruments

VAT and efficiency

The value-added tax (VAT) is the cornerstone of revenue systems in most countries, especially in emerging market and developing economies (EMDEs) (refer to figure 2.1). In principle, a well-designed VAT is among the most-efficient taxes.[18] Its *staged collection mechanism*—where firms charge VAT on sales and deduct VAT on inputs—helps ensure that the tax falls on final consumption rather than intermediate production, satisfying production efficiency (Diamond and Mirrlees 1971). With a uniform rate, it also minimizes distortions to consumption choices[19] and is among the least-harmful taxes for growth (Acosta-Ormaechea et al. 2019; Arnold et al. 2011). The same invoice credit structure also supports compliance: Interfirm transactions are reported by both buyer and seller, generating third-party information for enforcement, while firms have an incentive to request receipts to claim input credits. Collecting tax at each stage also helps protect revenue where downstream informality is widespread (Keen 2008; Pomeranz 2015; Waseem 2022).

In practice, however, the VAT's efficiency properties are often eroded by design and enforcement shortcomings (Bird and Gendron 2007). Most VAT systems apply multiple exemptions and rates. Exemptions break the VAT chain by preventing input crediting, embedding tax in prices, and creating production distortions, including self-supply incentives and reduced export competitiveness (Chandler et al. 2025).[20] Multiple rates can also distort consumption choices and erode revenue.

High registration thresholds (refer to figure 2.6, panel a) and widespread informality similarly fragment the VAT chain by narrowing the base and segmenting markets (de Paula and Scheinkman 2010). Gadenne et al. (forthcoming), for example, show that, in India, the VAT distorts sourcing decisions by separating firms in and outside the VAT regime, limiting trade and reducing aggregate efficiency.

Implementation gaps further weaken neutrality, particularly for smaller firms in EMDEs (Brockmeyer et al. 2024). Smaller firms are less likely to benefit from exemptions or reduced rates, may underclaim legitimate input credits, and often face long refund delays. Credits are often carried forward for months or years, creating cash flow pressures and weakening competitiveness. The real effects of unrefunded VAT, however, remain insufficiently understood and deserve more research (Brusco et al. 2024; Pinto et al. 2024).

These weaknesses are reflected in low VAT performance. C-efficiency results (refer to figure 2.8) show that EMDEs raise far less revenue than would be expected under a broad-based VAT. In

many developing countries, compliance gaps dominate, whereas in advanced economies, policy gaps—driven by exemptions and reduced rates—account for most revenue losses (Keen 2013; Morrow et al. 2022).

CIT and efficiency

Although the corporate income tax (CIT) is a major source of government revenue, it is often considered distortionary,[21] because it can affect how firms organize, finance, and report their activities. It may discourage investment and innovation by raising the cost of capital, weaken competitiveness, and encourage multinationals to shift profits or relocate investment across jurisdictions (de Mooij and Ederveen 2008).

Real activity. High CIT rates can discourage investment and employment by raising the after-tax cost of capital (Hall and Jorgenson 1967; Harberger 1962). This logic underpins the widespread use of tax holidays, credits, exemptions, and accelerated depreciation (refer to chapter 6). Evidence from advanced economies suggests that investment responds to effective tax rates (Chodorow-Reich et al. 2024; Kennedy et al. 2026; Zwick and Mahon 2017), but evidence from EMDEs is more limited and mixed (refer to Agostini et al. 2026). Studies from Chile, China, Tunisia, and Viet Nam find widely differing effects, suggesting that the impact of incentives depends on the frictions they relax (Bustos et al. 2004; Cali et al. 2025; Cerda and Larrain 2010; Chen et al. 2021, 2022; Li et al. 2021; Liu and Mao 2019; Pham 2020).[22] In many settings, broader factors such as macroeconomic stability, infrastructure, access to finance, and market size matter more for investment than tax policy alone (Adarov 2025; World Bank 2018).

Reported activity. The CIT also affects how firms report their activities. A growing body of evidence from EMDEs shows that reported profits are highly responsive to tax rates, through cost overreporting, income shifting, and other forms of base erosion. Studies from Costa Rica, Honduras, Indonesia, Pakistan, and South Africa document strong domestic responses to corporate taxation (Bachas and Soto 2021; Basri et al. 2021; Best et al. 2015; Lediga et al. 2019; Lobel et al. 2024). International evidence also suggests that cross-border profit shifting is especially pronounced in less developed countries and that Base Erosion and Profit Shifting (BEPS) and tax competition weigh heavily on EMDEs (Crivelli et al. 2016; Johannesen et al. 2019).

Revenue stakes. Although EMDEs often apply higher statutory CIT rates, they raise less revenue than advanced economies, reflecting tax bases that are both more porous and more elastic (Bachas and Soto 2021). Cross-country estimates suggest that revenue losses from BEPS are substantial, averaging 2.5 percent of gross domestic product in low-income countries and 1.5 percent in lower-middle-income countries (Cobham and Janský 2018)—a pattern consistent with the lower

CIT productivity shown in figure 2.8. These vulnerabilities have spurred calls for a "broad-base, low-rate" approach to mobilize revenue while limiting distortions.

Research gaps. While the theory of CIT distortions is well established, evidence from EMDEs remains limited. Key priorities include estimating elasticities along different margins, assessing the cost-effectiveness of incentives, and understanding how tax policy interacts with broader business conditions (Kronfol and Steenbergen 2020). Administrative tax data and modern causal methods offer an opportunity to build a more evidence-based corporate tax policy.

PIT and efficiency

As shown in figure 2.1, EMDEs rely relatively little on the personal income tax (PIT) for revenue or redistribution. High exemption thresholds exclude most workers from the tax net (refer to figure 2.6), which narrows the base and mutes efficiency concerns. Where PIT rates are higher, however, they can discourage labor supply, entrepreneurship, and human capital investment while also encouraging avoidance and evasion. Cross-country evidence also suggests that the PIT is among the taxes most associated with lower growth (Acosta-Ormaechea et al. 2019; Arnold et al. 2011).

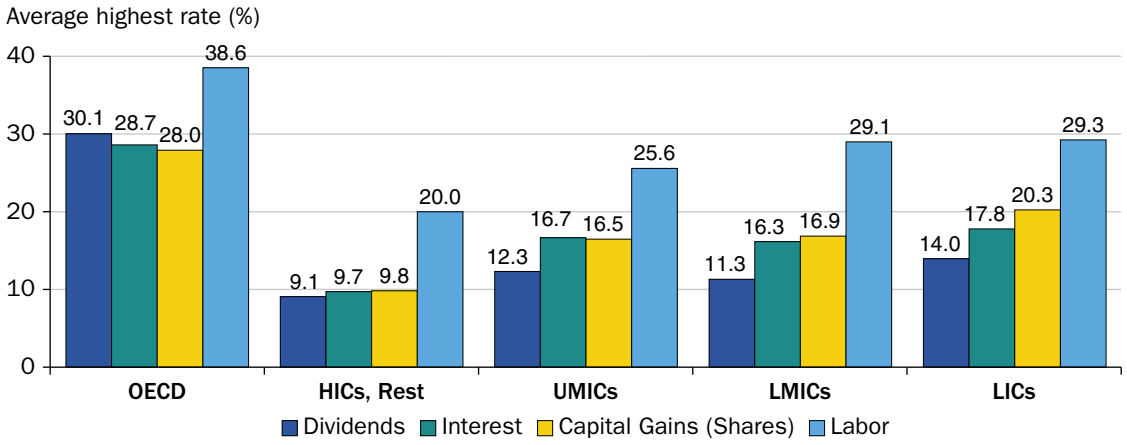
Labor income. Top PIT rates are a visible marker of the equity–efficiency tradeoff, but they often raise limited revenue because they apply to few taxpayers, who may be especially responsive to tax legislation. While labor supply responses at the top may be modest, estimates of the elasticity of taxable income are often larger, although evidence from EMDEs remains sparse.[23] In some middle-income countries and in most high-income countries, these effects are amplified by social security contributions (SSCs) levied mainly on wages (OECD 2025; World Bank 2025b).

At lower income levels, PIT and SSCs can also discourage formal employment, especially where informality is high and enforcement is weak. But the evidence paints a more nuanced picture: Payroll tax wedges are substantially lower in EMDEs than in high-income economies (refer to figure 2.5), and global evidence generally finds modest employment effects from payroll taxes, often at high fiscal cost (Kim et al. 2022; Kugler and Kugler 2009; McKay et al. 2024). Relatedly, the cash transfer literature tends to find limited effects on adult labor supply, even though transfer phase-outs can operate like implicit taxes on earnings (Baird et al. 2018; Banerjee et al. 2017). More broadly, reducing informality appears to depend more on improving enforcement and state capacity than on lowering the cost of formality alone (Ulyssea 2020).

A handful of countries, mostly in Eastern Europe and Central Asia, have adopted flat-rate PIT systems. While often justified on efficiency grounds, the gains may be overstated. These systems frequently rely on high SSCs to recover revenue, yielding relatively low tax wedges at the top but comparatively high effective tax rates on low-income workers. Any efficiency gains at the top must, therefore, be weighed against efficiency and equity losses at the bottom.

Capital income. Most EMDEs tax capital income under schedular systems that apply flat, and often lower, rates than those on labor income (Clark et al., forthcoming).[24] Many HICs also use schedular systems or combine labor and capital income under progressive schedules. Figure 2A.1 illustrates this variation across interest, dividends, and capital gains. Even at low rates, exemptions, concessions, and timing rules can create non-neutralities across assets and distort portfolio choices. While full neutrality is not realistic, distortions can be reduced by aligning rates across assets and broadening coverage. Recent advances in international transparency also ease concerns over capital flight, especially in higher-capacity settings (refer to chapter 4).

Figure 2A.1 Top statutory income tax rates, by income group and type



Source: Clark et al. (forthcoming).

Note: This figure shows the simple average of the highest marginal statutory tax rate applicable to labor and capital income across 196 countries by income group. Data were collected from the International Bureau of Fiscal Documentation country income tax summaries, where available. To the extent this was unavailable, information was collected through a review of national tax legislation, PricewaterhouseCoopers tax summaries, or the *Ernst & Young Worldwide Personal Income Tax Guide 2023–24*. Values represent the highest marginal statutory tax rate applicable to dividends, bank account interest, labor income, and capital gains on shares in 2024 (except for Aruba, Ethiopia, and Iraq, where only 2023 information was available). HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; OECD = Organisation for Economic Co-operation and Development; UMICs = upper-middle-income countries.

Notes

1. Other important instruments—including excise taxes, trade taxes, and recurrent property taxes—lie beyond the chapter's scope. Because property taxation raises distinct issues of local administration and political economy, its underuse and reform are discussed in chapter 5.
2. VAT C-efficiency compares actual collections with a uniform, fully compliant VAT benchmark; CIT and PIT productivity scale collections by statutory rates; cross-industry CIT rate dispersion proxies economic neutrality; and two enterprise survey indicators capture firms' perceived rate and administrative burdens. All indicators are defined so that higher values represent better performance, standardized, and combined using principal components analysis.
3. This pattern is robust to measuring inequality using the income share of the top 10 percent. The resulting redistribution measure is highly correlated (0.90) with its Gini-based counterpart. The World Inequality Database initiative defines pretax income as factor income adjusted for the operation of pension and unemployment systems, adding related benefits and deducting corresponding contributions (Chancel et al. 2022). This adjustment is important because, as Blanchet et al. (2022) show, pensions represent a large share of redistribution in HICs (over 16 percent of national income in Europe). Retirees typically have little or no market income (Chancel et al. 2022; Hartley and Abels 2025), so including pensions in pretax income mechanically lowers measured inequality in richer, aging countries. As a result, WID's pretax Gini declines with GDP per capita, whereas other pretax Gini measures based purely on factor income (for example, the Standardized World Income Inequality Database) show a flatter or even positive gradient. This reflects how factor income inequality is highly sensitive to population age structure (Jesuit and Mahler 2010; Solt 2020).
4. Benchmarks, methodologies, and coverage vary widely across countries. Inconsistent reporting, estimates of forgone revenue, benchmark definitions, and a lack of information on subnational tax expenditures further hinder comparability. Although such limitations are common across income groups, capacity constraints make them more acute in EMDEs, where reports often cover only a partial set of tax expenditures or provide limited detail (Redonda et al. 2021).
5. *Wedges* are mechanisms that create gaps between how resources would be allocated in an efficient setting and how they are allocated in practice, generating dispersion in the marginal returns to factors across economic agents (Bergquist et al. 2026). In taxation, wedges reflect heterogeneous impacts of taxes arising from differences in statutory rules or uneven enforcement and compliance.
6. Income shifting may occur through various channels (Gordon and Slemrod 1998): debt financing (interest deductions for corporations and interest income for people), legal structure (incorporated versus unincorporated), or compensation types (mix of wages, dividends, and stock options). High-income taxpayers typically have greater access to the legal and financial tools needed to use these strategies (Bustos et al. 2022; Guyton et al. 2021).
7. Waseem (2018) shows that this margin can be important in EMDEs: Following a tax rate hike, Pakistani partnerships engaged in more tax evasion, became informal, and changed legal form, leading to large revenue losses.
8. For example, Zarate (2022) finds that eliminating wedges between formal and informal firms in Mexico City (arising from labor and output taxes) could increase welfare by about 20 percent.

9. Informality disrupts the VAT chain much like exemptions or registration thresholds: Informal firms do not charge VAT and, consequently, cannot credit VAT paid on their inputs (de Paula and Scheinkman 2010; Ulyssea 2020). Refer to Adom (2026) and Gwaindepi (2025) for a recent discussion of taxation in the context of high informality.
10. Although imperfect, these revenue performance indicators are used widely to benchmark tax systems. C-efficiency provides a meaningful benchmark for VAT by comparing actual revenue to the revenue that would be collected if the standard VAT rate were applied to all consumption (Ebrill et al. 2001). For CIT and PIT, *productivity* is defined as the ratio of tax revenue (as a percent of GDP) to the tax's statutory rate (Gallagher 2005). In the absence of data on the potential tax base, GDP serves as a common benchmark. Without loss of generality, higher values indicate more efficient systems, although PIT and CIT productivity measures should be interpreted with caution. CIT productivity is informative, but PIT productivity is less reliable: It benchmarks revenue against the top marginal rate, penalizing progressive rate structures and sometimes suggesting lower "productivity" even when reforms are revenue neutral or equity-enhancing. These dimensions are summarized in the composite efficiency index presented in the section "Tax Mix across Development Levels," which provides a basis for comparing tax systems across countries. For details, refer to World Bank (2025a).
11. A rising average tax rate with income is sufficient, but not necessary, for the ability-to-pay principle.
12. In general, equitable tax systems should seek as much as possible to "do no harm," which means avoid exacerbating poverty (Ebrill et al. 2001). In addition to broad income redistribution and poverty alleviation goals, fiscal systems enable the government to produce public goods and administer services and stabilize the macro economy by dampening economic shocks and stimulating economic growth (Horton and El-Ganainy 2020).
13. In certain circumstances, progressive taxation can impoverish taxpayers or fail to achieve significant redistribution. A tax's total equity impact depends on its magnitude (the amount of revenue raised), its horizontal *and* vertical equity contributions, and the composition of the taxpayer base. This report considers taxes and revenue policy in isolation from expenditure policy; however, redistribution through the tax system can be offset or reinforced by spending, while poverty alleviation due to public expenditures can be offset or remain unchanged by taxes. Refer to Lustig (2022) for more details.
14. Although CEQ coverage is smaller, its pre-tax-and-transfer Gini coefficients are strongly correlated (0.78) with the World Inequality Database estimates used in figure 2.3. CEQ is used here because it permits a more detailed decomposition of the effects of taxes and transfers on inequality and poverty.
15. While the proliferation of income tax withholding on non-income transactions like sales orders, export and import contracts, financial transactions, utility bill payments, and others may increase tax revenues overall, these are in application *indirect* taxes and have analogous poverty and redistributive impacts (Amjad et al. 2025). The past decade has produced compelling research on how tax policy needs to adapt to limited tax capacity and structural differences in formalization in many LICs, LMICs, and UMICs (refer to, for example, Benitez et al. 2023; Dom et al. 2022; IMF 2025; Jensen et al. 2024).
16. Tax structures that emphasize indirect taxes imply that expenditure policy will have to "work harder" to eliminate remaining post-tax inequality and increased post-tax poverty.
17. The intuition is straightforward: Indirect tax concessions benefit all consumers, but richer households capture a larger share because they consume more. Redirecting the forgone revenue through targeted

transfers can, therefore, generate net gains for poorer households. In settings with high consumption informality or own production, these gains may be even larger (Bachas, Gadenne, and Jensen 2024).

18. The VAT is still distortionary insofar as it reduces the purchasing power of net wages and may discourage labor supply, although some degree of money illusion can dampen this effect.
19. Differentiated rates could in theory improve efficiency—for example, if goods differ in their complementarity with leisure or home production. In practice, these conditions are difficult to verify, and rate differentiation is often poorly targeted (Atkinson and Stiglitz 1976; Crawford et al. 2010; Piggott and Whalley 2001). Refer to Thomas (2024) for a summary.
20. Some exemptions—notably for margin-based financial services, which are technically difficult to tax under a VAT—are pragmatic. Others are often justified on distributional, merit-good, or employment grounds but tend to be poorly targeted. Refer to Thomas (2024) and the section "Equity Shortcomings in Domestic Revenue Mobilization."
21. In theory, the CIT can be neutral if it taxes only pure profits (for example, under full loss carryforward and investment expensing). In practice, depreciation rules, interest deductibility, and interactions with the PIT make neutrality unlikely (Atkinson and Stiglitz 2015).
22. For example, in China, input VAT deductions on new equipment appear more effective than headline rate cuts (Chen et al. 2022).
23. For instance, the meta-study by Neisser (2021) includes only China and South Africa among 61 studies. Although EMDE evidence has grown in recent years, it remains limited relative to that for advanced economies.
24. While early tax theory argued for low or even zero taxation of capital income (Atkinson and Stiglitz 1976; Chamley 1986; Judd 1985), more recent work shows that these assumptions are often empirically unrealistic and that equity arguments for taxing capital income remain strong (Aiyagari 1995; Piketty et al. 2023; Straub and Werning 2020).

References

Acosta-Ormaechea, Santiago, Sergio Sola, and Jiae Yoo. 2019. "Tax Composition and Growth: A Broad Cross-Country Perspective." *German Economic Review* 20 (4): e70–e106.

Adarov, Amat. 2025. *Accelerating Investment: Challenges and Policies*. World Bank.

Adom, Idossou Marius. 2026. "A Structural Analysis of Firms' Transition from Informality to Formality in Nigeria." *Journal of Development Economics* 179: 103684.

Agostini, Claudio, Zareh Asatryan, Laurent Bach, et al. 2026. "The Elasticity of Corporate Taxable Income across Countries." NBER Working Paper 34945. National Bureau of Economic Research.

Aiyagari, S. Rao. 1995. "Optimal Capital Income Taxation with Incomplete Markets, Borrowing Constraints, and Constant Discounting." *Journal of Political Economy* 103 (6): 1158–175.

Alvaredo, Facundo, Anthony B. Atkinson, Thomas Piketty, and Emmanuel Saez. 2024. World Inequality Database. https://wid.world.

Amjad, Beenish, Haydeeliz Carrasco, and Moritz Meyer. 2025. *The Effects of Taxes and Transfers on Inequality and Poverty in Pakistan*. Economic and Sector Work Studies. World Bank.

Ando, Sakai. 2021. "Size-Dependent Policies and Risky Firm Creation." *Journal of Public Economics* 197: 104404.

Arnold, Jens Matthias, Bert Brys, Christopher Heady, Åsa Johansson, Cyrille Schwellnus, and Laura Vartia. 2011. "Tax Policy for Economic Recovery and Growth." *Economic Journal* 121 (550): F59–F80.

Atkinson, Anthony B., and Joseph E. Stiglitz. 1976. "The Design of Tax Structure: Direct versus Indirect Taxation." *Journal of Public Economics* 6 (1): 55–75.

Atkinson, Anthony B., and Joseph E. Stiglitz. 2015. *Lectures on Public Economics,* 2nd ed. Princeton University Press.

Auerbach, Alan J. 2018. "Measuring the Effects of Corporate Tax Cuts." *Journal of Economic Perspectives* 32 (4): 97–120.

Bachas, Pierre, Tatiana Flores, Gabriel Lara Ibarra, et al. 2025. "VAT Cashback Programs in Practice: The Case of Devolve–ICMS in Rio Grande do Sul, Brazil." Prosperity Insight Series. World Bank.

Bachas, Pierre, Lucie Gadenne, and Anders Jensen. 2024. "Informality, Consumption Taxes, and Redistribution." *Review of Economic Studies* 91 (5): 2604–634.

Bachas, Pierre, Roberto N. Fattal Jaef, and Anders Jensen. 2019. "Size-Dependent Tax Enforcement and Compliance: Global Evidence and Aggregate Implications." *Journal of Development Economics* 140: 203–22.

Bachas, Pierre, Anders Jensen, and Lucie Gadenne. 2024. "Tax Equity in Low- and Middle-Income Countries." *Journal of Economic Perspectives* 38 (1): 55–80.

Bachas, Pierre, and Mauricio Soto. 2021. "Corporate Taxation under Weak Enforcement." *American Economic Journal: Economic Policy* 13 (4): 36–71.

Baird, Sarah, David McKenzie, and Berk Özler. 2018. "The Effects of Cash Transfers on Adult Labor Market Outcomes." *IZA Journal of Development and Migration* 8 (1): 22.

Banerjee, Abhijit V., Rema Hanna, Gabriel E. Kreindler, and Benjamin A. Olken. 2017. "Debunking the Stereotype of the Lazy Welfare Recipient: Evidence from Cash Transfer Programs." *World Bank Research Observer* 32 (2): 155–84.

Barreix, Alberto Daniel, Martín Bes, Oscar Fonseca, María Fonteñez, Dalmiro Morán, Emilio Pineda, and Jerónimo Roca. 2022. *Revisiting Personalized VAT: A Tool for Fiscal Consolidation with Equity*. Inter-American Development Bank.

Bashir, Muhammad, Zehra Farooq, Usama Jamal, and Mazhar Waseem. 2024. "Size-Based Policies and Firm Growth: Evidence from Pakistan." Working paper. https://mazharwaseem.com/static/uploads/PAK_VAT_Threshold_October_2024.pdf.

Basri, M. Chatib, Mayara Felix, Rema Hanna, and Benjamin A. Olken. 2021. "Tax Administration versus Tax Rates: Evidence from Corporate Taxation in Indonesia." *American Economic Review* 111 (12): 3827–871.

Benhassine, Najy, David McKenzie, Victor Pouliquen, and Massimiliano Santini. 2018. "Does Inducing Informal Firms to Formalize Make Sense? Experimental Evidence from Benin." *Journal of Public Economics* 157: 1–14.

Benitez, Juan Carlos, Mario Mansour, Miguel Pecho, and Charles Vellutini. 2023. "Building Tax Capacity in Developing Countries." IMF Staff Discussion Note 6. International Monetary Fund.

Benzarti, Youssef, Santiago Garriga, and Dario Tortarolo. 2024. "Can VAT Cuts and Anti-Profiteering Measures Dampen the Effects of Food Price Inflation?" NBER Working Paper 32241. National Bureau of Economic Research.

Bergolo, Marcelo, Juliana Londoño-Vélez, and Darío Tortarolo. 2023. "Tax Progressivity and Taxing the Rich in Developing Countries: Lessons from Latin America." *Oxford Review of Economic Policy* 39 (3): 530–49.

Bergquist, Lauren F., Danial Lashkari, and Eric Verhoogen. 2026. "Wedges: A Microeconomic Perspective on Misallocation." NBER Working Paper 34756. National Bureau of Economic Research.

Besley, Timothy, and Torsten Persson. 2013. "Taxation and Development." In *Handbook of Public Economics,* vol. 5, edited by Alan J. Auerbach, Raj Chetty, Martin Feldstein, and Emmanuel Saez, 51–110. Elsevier.

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

Best, Michael Carlos, Anne Brockmeyer, Henrik Jacobsen Kleven, Johannes Spinnewijn, and Mazhar Waseem. 2015. "Production Versus Revenue Efficiency with Limited Tax Capacity: Theory and Evidence from Pakistan." *Journal of Political Economy* 123 (6): 1311–355.

Bird, Richard M., and Pierre-Pascal Gendron. 2007. *The VAT in Developing and Transitional Countries*. Cambridge University Press.

Blanchet, Thomas, Lucas Chancel, Ignacio Flores, and Marc Morgan. 2024. "Distributional National Accounts Guidelines: Methods and Concepts Used in the World Inequality Database." WIL Working Paper. World Inequality Lab.

Blanchet, Thomas, Lucas Chancel, and Amory Gethin. 2022. "Why Is Europe More Equal than the United States?" *American Economic Journal: Applied Economics* 14 (4): 480–518.

Brockmeyer, Anne, Giulia Mascagni, Vedanth Nair, Mazhar Waseem, and Miguel Almunia. 2024. "Does the Value-Added Tax Add Value? Lessons Using Administrative Data from a Diverse Set of Countries." *Journal of Economic Perspectives* 38 (1): 107–32.

Bruhn, Miriam, and David McKenzie. 2014. "Entry Regulation and the Formalization of Microenterprises in Developing Countries." *World Bank Research Observer* 29 (2): 186–201.

Brusco, Giacomo, Marlies Piek, and Tejaswi Velayudhan. 2024. "Wait No More: How the Administration of VAT Refunds Impacts Firm Behaviour." WIDER Working Paper 58. United Nations University–World Institute for Development Economics Research.

Burgess, Robin, and Nicholas Stern. 1993. "Taxation and Development." *Journal of Economic Literature* 31 (2): 762–830.

Bustos, Álvaro, Eduardo M. R. A. Engel, and Alexander Galetovic. 2004. "Could Higher Taxes Increase the Long-Run Demand for Capital? Theory and Evidence for Chile." *Journal of Development Economics* 73 (2): 675–97.

Bustos, Sebastián, Dina Pomeranz, Juan Carlos Suárez Serrato, José Vila-Belda, and Gabriel Zucman. 2022. "The Race between Tax Enforcement and Tax Planning: Evidence from a Natural Experiment in Chile." NBER Working Paper 30114. National Bureau of Economic Research.

Cali, Massimiliano, Giorgio Presidente, and Thiago Scot. 2025. "The Elusive Impact of Corporate Tax Incentives." Policy Research Working Paper 11061. World Bank.

Carrillo, Paul, Dave Donaldson, Dina Pomeranz, and Monica Singhal. 2023. "Misallocation in Firm Production: A Nonparametric Analysis Using Procurement Lotteries." NBER Working Paper 31311. National Bureau of Economic Research.

Cerda, Rodrigo A., and Felipe Larrain. 2010. "Corporate Taxes and the Demand for Labor and Capital in Developing Countries." *Small Business Economics* 34 (2): 187–201.

Chamley, Christophe. 1986. "Optimal Taxation of Capital Income in General Equilibrium with Infinite Lives." *Econometrica* 54 (3): 607–22.

Chancel, Lucas, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman. 2022. *World Inequality Report 2022*. Harvard University Press.

Chandler, William, Alastair Thomas, and Frederic Tremblay. 2025. "VAT Exemptions, Embedded Tax, and Unintended Consequences." Policy Research Working Paper 11120. World Bank.

Chen, Zhao, Xian Jiang, Zhikuo Liu, Juan Carlos Suárez Serrato, and Daniel Yi Xu. 2022. "Tax Policy and Lumpy Investment Behaviour: Evidence from China's VAT Reform." *Review of Economic Studies* 90 (2): 634–74.

Chen, Zhao, Zhikuo Liu, Juan Carlos Suárez Serrato, and Daniel Yi Xu. 2021. "Notching R&D Investment with Corporate Income Tax Cuts in China." *American Economic Review* 111 (7): 2065–100.

Chodorow-Reich, Gabriel, Owen Zidar, and Eric Zwick. 2024. "Lessons from the Biggest Business Tax Cut in US History." *Journal of Economic Perspectives* 38 (3): 61–88.

Choudhary, Keshav, and Bhanu Gupta. 2024. "Dynamics of Firm Growth around Tax Thresholds: Evidence from India." Working Paper of the Max Planck Institute for Tax Law and Public Finance 2024-05.

Clark, Steven, Joseph Eloi, and Alastair Thomas. Forthcoming. "Taxation of Capital Income in Low- and Middle-Income Countries." World Bank.

Cobham, Alex, and Petr Janský. 2018. "Global Distribution of Revenue Loss from Corporate Tax Avoidance: Re-Estimation and Country Results." *Journal of International Development* 30 (2): 206–32.

Crawford, Ian, Michael Keen, and Stephen Smith. 2010. "Value Added Tax and Excises." In *Dimensions of Tax Design: The Mirrlees Review,* vol. 1, 275–362. Oxford University Press.

Crivelli, Ernesto, Ruud de Mooij, and Michael Keen. 2016. "Base Erosion, Profit Shifting and Developing Countries." *FinanzArchiv: Public Finance Analysis* 72 (3): 268–301.

de Mooij, Ruud A., and Sjef Ederveen. 2008. "Corporate Tax Elasticities: A Reader's Guide to Empirical Findings." *Oxford Review of Economic Policy* 24 (4): 680–97.

de Paula, Aureo, and Jose A. Scheinkman. 2010. "Value-Added Taxes, Chain Effects, and Informality." *American Economic Journal: Macroeconomics* 2 (4): 195–221.

Devereux, Michael P., and Rachel Griffith. 1998. "Taxes and the Location of Production: Evidence from a Panel of US Multinationals." *Journal of Public Economics* 68 (3): 335–67.

Diamond, Peter A., and James A. Mirrlees. 1971. "Optimal Taxation and Public Production I: Production Efficiency." *American Economic Review* 61 (1): 8–27.

Dom, Roel, Anna Custers, Stephen R. Davenport, and Wilson Prichard. 2022. *Innovations in Tax Compliance: Building Trust, Navigating Politics, and Tailoring Reform*. World Bank.

Ebrill, Liam P., Michael Keen, and Victoria P. Perry. 2001. *The Modern VAT*. International Monetary Fund.

Fajgelbaum, Pablo D., Eduardo Morales, Juan Carlos Suárez Serrato, and Owen Zidar. 2019. "State Taxes and Spatial Misallocation." *Review of Economic Studies* 86 (1): 333–76.

Farias, Alison, and Roberto Hsu Rocha. 2026. "Formalizing Microentrepreneurs through Targeted Tax Systems: Evidence from Brazil." *Journal of Public Economics* 259: 105677.

Fuchs, Alan, Patricio V. Marquez, Sheila Dutta, and Fernanda Gonzalez Icaza. 2019. "Is Tobacco Taxation Regressive? Evidence on Public Health, Domestic Resource Mobilization, and Equity Improvements." Economic and Sector Work Studies. World Bank.

Fuest, Clemens, Andreas Peichl, and Sebastian Siegloch. 2018. "Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany." *American Economic Review* 108 (2): 393–418.

Gadenne, Lucie, Tushar K. Nandi, and Roland Rathelot. Forthcoming. "Taxation and Supplier Networks: Evidence from India." *American Economic Journal: Applied Economics*.

Gallagher, Mark. 2005. "Benchmarking Tax Systems." *Public Administration and Development* 25 (2): 125–44.

Garicano, Luis, Claire Lelarge, and John Van Reenen. 2016. "Firm Size Distortions and the Productivity Distribution: Evidence from France." *American Economic Review* 106 (11): 3439–479.

Glaeser, Edward L., and Jesse M. Shapiro. 2003. "The Benefits of the Home Mortgage Interest Deduction." *Tax Policy and the Economy* 17 (1): 37–82.

Gordon, Roger, and Wei Li. 2009. "Tax Structures in Developing Countries: Many Puzzles and a Possible Explanation." *Journal of Public Economics* 93 (7): 855–66.

Gordon, Roger H., and Joel Slemrod. 1998. "Are 'Real' Responses to Taxes Simply Income Shifting between Corporate and Personal Tax Bases?" NBER Working Paper 6576. National Bureau of Economic Research.

Grote, Martin, and Jean-François Wen. 2024. "How to Design and Implement Property Tax Reforms." IMF How-To Note 6. International Monetary Fund.

Guner, Nezih, Gustavo Ventura, and Yi Xu. 2008. "Macroeconomic Implications of Size-Dependent Policies." *Review of Economic Dynamics* 11 (4): 721–44.

Guyton, John, Patrick Langetieg, Daniel Reck, Max Risch, and Gabriel Zucman. 2021. "Tax Evasion at the Top of the Income Distribution: Theory and Evidence." NBER Working Paper 28542. National Bureau of Economic Research.

Gwaindepi, Abel. 2025. "Taxation in the Context of High Informality: Conceptual Challenges and Evidence from Sub-Saharan Africa." *Review of Development Economics* 29 (2): 1228–249.

Hall, Robert E., and Dale W. Jorgenson. 1967. "Tax Policy and Investment Behavior." *American Economic Review* 57 (3): 391–414.

Harberger, Arnold C. 1962. "The Incidence of the Corporation Income Tax." *Journal of Political Economy* 70 (3): 215–40.

Hartley, Gonzalo Reyes, and Miglena Abels. 2025. "Riding the Demographic Wave: Pensions and Retirement Income in an Aging World." The State of Social Protection Report 2025 Background Paper 5. Social Protection Discussion Paper 2512. World Bank.

Higgins, Sean, and Nora Lustig. 2016. "Can a Poverty-Reducing and Progressive Tax and Transfer System Hurt the Poor?" *Journal of Development Economics* 122: 63–75.

Horton, Mark, and Asmaa El-Ganainy. 2020. "Fiscal Policy: Taking and Giving Away." Finance and Development. International Monetary Fund.

Hsieh, Chang-Tai, and Peter J. Klenow. 2009. "Misallocation and Manufacturing TFP in China and India." *Quarterly Journal of Economics* 124 (4): 1403–448.

IMF (International Monetary Fund). 2025. "G20 Background Note on Enhancing Domestic Revenue Mobilization through Strengthening Revenue Administration." G20 Background Note, September 2025. IMF.

Jensen, Anders. 2022. "Employment Structure and the Rise of the Modern Tax System." *American Economic Review* 112 (1): 213–34.

Jensen, Anders, Anne Brockmeyer, and Lucie Gadenne. 2024. "Taxation and Development." *VoxDevLit* 12 (1).

Jesuit, David K., and Vincent A. Mahler. 2010. "Comparing Government Redistribution across Countries: The Problem of Second-Order Effects." *Social Science Quarterly* 91 (5): 1390–404.

Johannesen, Niels, Thomas Tørsløv, and Ludvig Wier. 2019. "Are Less Developed Countries More Exposed to Multinational Tax Avoidance? Method and Evidence from Micro-Data." *World Bank Economic Review* 34 (3): 790–809.

Judd, Kenneth L. 1985. "Redistributive Taxation in a Simple Perfect Foresight Model." *Journal of Public Economics* 28 (1): 59–83.

Kaplow, Louis. 2006. "On the Undesirability of Commodity Taxation Even When Income Taxation Is Not Optimal." *Journal of Public Economics* 90 (6): 1235–250.

Keen, Michael. 2008. "VAT, Tariffs, and Withholding: Border Taxes and Informality in Developing Countries." *Journal of Public Economics* 92 (10–11): 1892–906.

Keen, Michael. 2013. "The Anatomy of the VAT." *National Tax Journal* 66 (2): 423–46.

Keen, Michael, and Jack Mintz. 2004. "The Optimal Threshold for a Value-Added Tax." *Journal of Public Economics* 88 (3): 559–76.

Kennedy, Patrick J., Christine L. Dobridge, Paul Landefeld, and Jacob Mortenson. 2026. "Corporate Tax Cuts, Firm Growth, and Workers' Earnings." *American Economic Review* 116 (9): 3380–422.

Kim, Jinyoung, Seonghoon Kim, and Kanghyock Koh. 2022. "Labor Market Institutions and the Incidence of Payroll Taxation." *Journal of Public Economics* 209: 104646.

Kleven, Henrik Jacobsen. 2016. "Bunching." *Annual Review of Economics* 8 (1): 435–64.

Kleven, Henrik, Adnan Khan, and Upaasna Kaul. 2016. "Taxing to Develop: When 'Third-Best' Is Best." IGC Growth Brief Series 005. International Growth Centre.

Kopczuk, Wojciech, and Eric Zwick. 2020. "Business Incomes at the Top." *Journal of Economic Perspectives* 34 (4): 27–51.

Kronfol, Hania, and Victor Steenbergen. 2020. *Evaluating the Costs and Benefits of Corporate Tax Incentives: Methodological Approaches and Policy Considerations.* Finance, Competitiveness and Innovation in Focus. World Bank.

Kugler, Adriana, and Maurice Kugler. 2009. "Labor Market Effects of Payroll Taxes in Developing Countries: Evidence from Colombia." *Economic Development and Cultural Change* 57 (2): 335–58.

Laroque, Guy. 2005. "Income Maintenance and Labor Force Participation." *Econometrica* 73 (2): 341–76.

Lediga, Collen, Nadine Riedel, and Kristina Strohmaier. 2019. "The Elasticity of Corporate Taxable Income: Evidence from South Africa." *Economics Letters* 175: 43–46.

Lee, Young, and Roger H. Gordon. 2005. "Tax Structure and Economic Growth." *Journal of Public Economics* 89 (5–6): 1027–43.

Li, Bing, Chang Liu, and Stephen Teng Sun. 2021. "Do Corporate Income Tax Cuts Decrease Labor Share? Regression Discontinuity Evidence from China." *Journal of Development Economics* 150: 102624.

Liu, Li, Ben Lockwood, and Eddy H. F. Tam. 2024. "Small Firm Growth and the VAT Threshold: Evidence for the UK." IMF Working Papers 33. International Monetary Fund.

Liu, Yongzheng, and Jie Mao. 2019. "How Do Tax Incentives Affect Investment and Productivity? Firm-Level Evidence from China." *American Economic Journal: Economic Policy* 11 (3): 261–91.

Lobel, Felipe, Thiago Scot, and Pedro Zúniga. 2024. "Corporate Taxation and Evasion Responses: Evidence from a Minimum Tax in Honduras." *American Economic Journal: Economic Policy* 16 (1): 482–517.

Lustig, Nora, ed. 2022. *The Commitment to Equity Handbook: Estimating the Impact of Fiscal Policy on Inequality and Poverty,* 2nd ed. Brookings Institution Press and CEQ Institute–Tulane University.

McAuliffe, Sean, Georg U. Thunecke, and Georg Wamser. 2023. "The Tax-Elasticity of Tangible Fixed Assets: Evidence from Novel Corporate Tax Data." CESifo Working Paper 10628. CESifo.

McKay, Andy, Jukka Pirttilä, and Caroline Schimanski. 2024. "The Tax Elasticity of Formal Work in Sub-Saharan African Countries." *Journal of Development Studies* 60 (2): 217–44.

Morrow, Peter, Michael Smart, and Artur Swistak. 2022. "VAT Compliance, Trade, and Institutions." *Journal of Public Economics* 208: 104634.

Muthitacharoen, Athiphat, Wonma Wanichthaworn, and Trongwut Burong. 2021. "VAT Threshold and Small Business Behavior: Evidence from Thai Tax Returns." *International Tax and Public Finance* 28 (5): 1242–275.

Mylonas, Victor, and Alastair Thomas. Forthcoming. "Personal Income Tax Progressivity around the World: A Simplified Modeling Approach." Policy Research Working Paper. World Bank.

Neisser, Carina. 2021. "The Elasticity of Taxable Income: A Meta-Regression Analysis." *Economic Journal* 131 (640): 3365–391.

OECD (Organisation for Economic Co-operation and Development). 2013. *Action Plan on Base Erosion and Profit Shifting*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2025. *Taxing Wages 2025: Decomposition of Personal Income Taxes and the Role of Tax Reliefs*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development) and KIPF (Korea Institute of Public Finance). 2014. *The Distributional Effects of Consumption Taxes in OECD Countries*. OECD Tax Policy Studies 22. OECD Publishing.

Palomo, Theo, Davi Bhering, Thiago Scot, Pierre Bachas, Luciana Barcarolo, Celso Campos, Javier Feinmann, Leonardo Moreira, and Gabriel Zucman. 2025. *Tax Progressivity and Inequality in Brazil: Evidence from Integrated Administrative Data*. Report 9. EU Tax Observatory.

Pham, Anh. 2020. "Effects of Temporary Corporate Income Tax Cuts: Evidence from Vietnam." *Journal of Development Economics* 146: 102476.

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

Piketty, Thomas, Emmanuel Saez, and Gabriel Zucman. 2023. "Rethinking Capital and Wealth Taxation." *Oxford Review of Economic Policy* 39 (3): 575–91.

Pinto, David Pineda, Jose Carlo Bermúdez, and Thiago De Gouvea Scot de Arruda. 2024. "VAT Refunds and Firms' Performance: Evidence from a Withholding Reform in Honduras." Policy Research Working Paper 10996. World Bank.

Pomeranz, Dina. 2015. "No Taxation without Information: Deterrence and Self-Enforcement in the Value Added Tax." *American Economic Review* 105 (8): 2539–569.

Redonda, Agustín, Christian von Haldenwang, and Flurim Aliu. 2021. "The Global Tax Expenditures Database (GTED): Companion Paper." Global Tax Expenditure Database.

Restuccia, Diego, and Richard Rogerson. 2017. "The Causes and Costs of Misallocation." *Journal of Economic Perspectives* 31 (3): 151–74.

Risch, Max. 2023. "Does Taxing Business Owners Affect Employees? Evidence from a Change in the Top Marginal Tax Rate." *Quarterly Journal of Economics* 139 (1): 637–92.

Scot, Thiago, Pierre Bachas, Santiago Cesteros, et al. 2025. "Income Taxation of Top Earners in Honduras: Linking Personal and Corporate Taxes." Prosperity Insight Series. World Bank.

Solt, Frederick. 2020. "Measuring Income Inequality across Countries and Over Time: The Standardized World Income Inequality Database." *Social Science Quarterly* 101 (3): 1183–199.

Stotsky, Janet. 2024. "Tax Incentives and Investment." ADB Governance Brief, Issue 54/2024. Asian Development Bank.

Straub, Ludwig, and Iván Werning. 2020. "Positive Long-Run Capital Taxation: Chamley-Judd Revisited." *American Economic Review* 110 (1): 86–119.

Tanzi, Vito, and Howell H. Zee. 2001. "Tax Policy for Developing Countries." IMF Economic Issues 2001/001. International Monetary Fund.

Thomas, Alastair. 2022. "Reassessing the Regressivity of the VAT." *Fiscal Studies* 43: 23–38.

Thomas, Alastair. 2024. "VAT Rate Structures in Theory and Practice." Policy Research Working Paper 10677. World Bank.

Tortarolo, Dario. 2026. "Tax Cuts and the 2026 Oil Shock: Can They Deliver?" Policy Note. World Bank. https://thedocs.worldbank.org/en/doc/2c06882094ed97f3d0bfb4f685036a3f-0050062026/original/Fuel-tax-measures-2026.pdf.

Ulyssea, Gabriel. 2020. "Informality: Causes and Consequences for Development." *Annual Review of Economics* 12 (1): 525–46.

Wai-Poi, Matthew, Mariano Sosa, and Pierre Bachas. 2025. "Taxes, Spending, and Equity: International Patterns and Lessons for Developing Countries." Prosperity Insight Series. World Bank.

Wamser, Georg, Valeria Merlo, Martin Ruf, et al. 2025. "The ITI Database: New Data on International Tax Institutions." *International Tax and Public Finance* 33: 734–62.

Warwick, Ross, Tom Harris, David Phillips, Maya Goldman, Jon Jellema, Gabriela Inchauste, and Karolina Goraus-Tańska. 2022. "The Redistributive Power of Cash Transfers vs VAT Exemptions: A Multi-Country Study." *World Development* 151: 105742.

Waseem, Mazhar. 2018. "Taxes, Informality and Income Shifting: Evidence from a Recent Pakistani Tax Reform." *Journal of Public Economics* 157: 41–77.

Waseem, Mazhar. 2022. "The Role of Withholding in the Self-Enforcement of a Value-Added Tax: Evidence from Pakistan." *Review of Economics and Statistics* 104 (2): 336–54.

World Bank. 2018. *Global Investment Competitiveness Report 2017/2018: Foreign Investor Perspectives and Policy Implications*. World Bank.

World Bank. 2025a. *PFR Fundamentals: Tax Productivity*. World Bank.

World Bank. 2025b. *Western Balkans—Labor Market Brief 2023: Special Topic—Disincentives to Formal Work: Modeling Social Benefits and Labor Taxation for Low-Income Households.* World Bank.

World Values Survey. 2025. "Findings and Insights." World Values Survey Association.

Zarate, Roman David. 2022. "Spatial Misallocation, Informality, and Transit Improvements: Evidence from Mexico City." Policy Research Working Paper 9990. World Bank.

Zwick, Eric, and James Mahon. 2017. "Tax Policy and Heterogeneous Investment Behavior." *American Economic Review* 107 (1): 217–48.

Part II
A New Path to the Fiscal Frontier: Technology, Transparency, and Trust

CHAPTER 3

Technology in Tax Administration

Prepared by Oyebola Okunogbe and Fabrizio Santoro

Introduction

A pivotal development in tax administration is the dramatic increase in the availability and adoption of powerful technology tools including, most recently, artificial intelligence (AI) solutions. Almost all countries have adopted elements of digitalization in their tax administration, and governments continue to make significant investments in them. Between 2010 and 2022, in 78 percent of countries with approved World Bank tax projects, there was at least one tax digitization component (Okunogbe and Santoro 2023). These projects span a wide spectrum—from integrated tax administration systems and customs modernization to digital taxpayer registration; electronic-filing (e-filing) and electronic-payment (e-payment) systems; electronic fiscal devices (EFDs); risk-based, automated audit frameworks; natural language processing for document analysis; and personalized customer service.

Technological advances provide new means for tax authorities to perform their three core functions: identification of taxpayers and the tax base, verification of true tax liabilities, and the collection of known liabilities (Okunogbe 2021). By enabling governments to understand their tax bases better and target their collection and enforcement efforts accordingly, these tools offer the promise of allowing governments to increase tax revenues by improving the efficiency of the tax system while also promoting equity by improving the transparency, coverage, and accessibility of the system.

However, these anticipated benefits are not always realized due to limitations in the tax system: For example, taxpayers are registered en masse, but in the absence of monitoring and

enforcement, tax revenues do not budge; digital transactions generate vast amounts of data but without appropriate data infrastructure and advanced analytical skills, these data do not yield policy insights. Novel technology tools also introduce new ethical and privacy risks as data governance guardrails often lag behind.

This chapter examines the evidence on the extent to which emerging markets and developing economies (EMDEs) are realizing this promise of an expanded tax collection frontier and investigates the constraints to doing so. The chapter begins with an overview of the use of technology for taxation over time and across country groups. It then investigates the evidence on the use of technology for each of the core tax functions, highlighting the revenue and efficiency gains and equity impacts. The chapter then critically examines the limitations countries face in maximizing the promise of technology and concludes with policy preconditions for successful digitalization reforms.

Growing use of technology for taxation

The growth of technology in taxation mirrors technological transformation in society and government, such as the rapid increase in access to mobile phones and the internet, digital finance, and e-commerce.[1] It occurs as part of a whole-of-government pivot toward digital governance across different sectors—from treasury systems to pension and procurement services—and reflects a global shift toward digital public infrastructure (refer to box 3.1).

The rapid proliferation of digital management information systems (MIS) for taxes occurred in lockstep with broader digital government efforts (refer to figure 3.1). The World Bank's GovTech Maturity Index (GTMI) data show that, by 2025, most countries had core government information systems in place, with higher income countries having higher levels of digital transformation compared to lower-income countries.

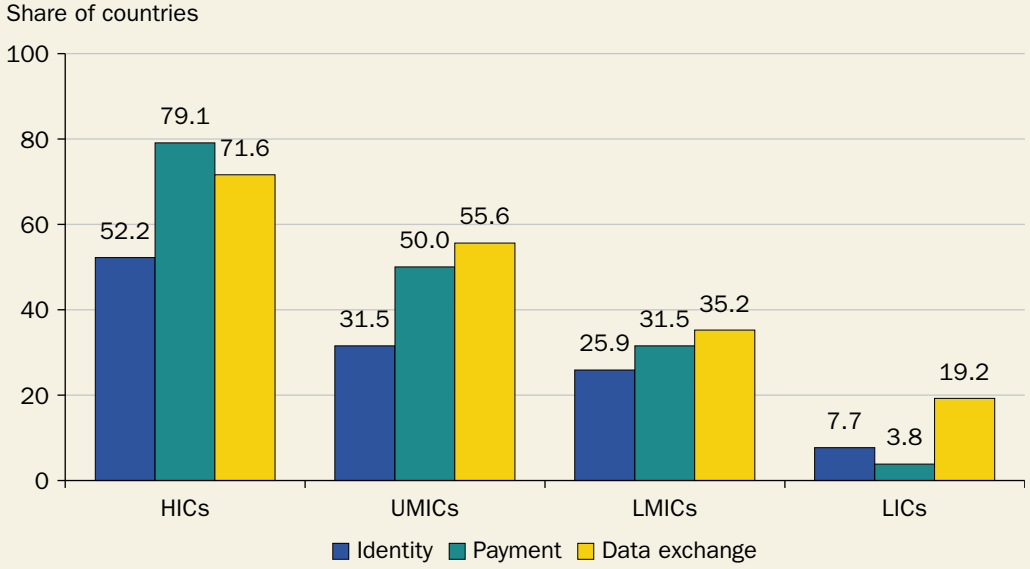
The adoption patterns of tax digitalization reforms differ by country income level. Using International Survey on Revenue Administration (ISORA)[2] data, we document the adoption of some of the most-common uses of technology across tax administrations: e-filing and e-payment of taxes and e-invoicing solutions (refer to figure 3.2). At least two interesting patterns emerge. First, the rising trend in adoption in low-income countries (LICs), and to a lesser extent, lower-middle-income countries (LMICs), is starker than the flatter trend in upper-middle-income countries (UMICs) and high-income countries (HICs), indicating recent implementation of digital tax solutions. Second, while HICs are ahead in the extent of e-filing and e-payment,

UMICs, LMICs, and LICs are significantly ahead of them in the adoption of e-invoicing. This might reflect the ability of LICs to leapfrog into novel e-invoicing solutions or a strong interest in curbing value-added tax (VAT) evasion. It remains unclear whether complementary technologies to fully leverage e-invoicing data—such as integrated, automated systems and advanced data analytics—are in place (Okunogbe and Santoro 2023).

Box 3.1 DPI and tax systems

What is DPI? *Digital public infrastructure* (DPI) refers to interoperable, reusable digital systems, such as digital ID, digital payments, and data exchange frameworks. They serve as building blocks for delivering essential services and enabling innovation at scale, prioritizing inclusion and transparency while lowering transaction costs and supporting data-driven governance (Alper et al. 2025). Global deployment has accelerated: About 70 countries have DPI-like digital ID systems, supported by the World Bank's Identification for Development (ID4D) initiative, almost 100 have interoperable digital payments, and more than 100 have developed data exchange frameworks (refer to figure B3.1.1; DPI Map 2026).

Figure B3.1.1 DPI, by income group



Sources: Original figure for this publication using data from the DPI Map (2026) Dataset, the UCL Institute for Innovation and Public Purpose, and Long and Lacroix (2024).

(Continued)

Box 3.1 DPI and tax systems *(continued)*

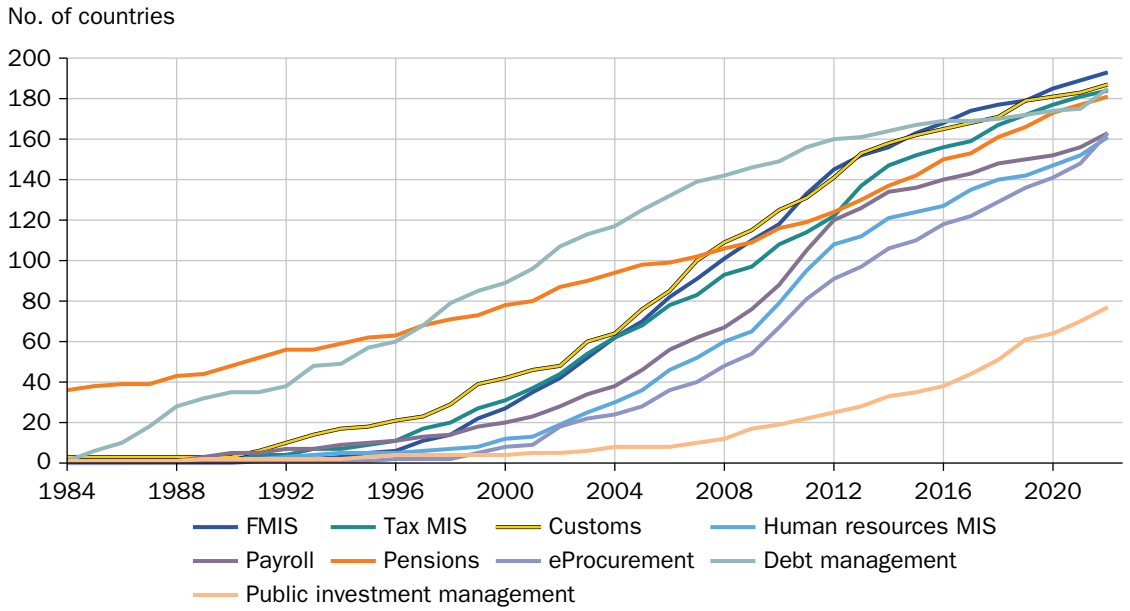
How does DPI support taxation? Tax systems depend on accurate identification, traceable transactions, and efficient compliance mechanisms—all areas where DPI can deliver:

- **Accurate identification.** Linking digital IDs to tax systems prevents duplication and enables unambiguous taxpayer records, improving coverage and identification of the tax base (Okunogbe and Santoro 2023).
- **Seamless payments.** Interoperable, real-time payment systems reduce costs and facilitate instant confirmation of tax payments, supporting both taxpayers and administrations (Santoro et al. 2025).
- **Data exchange for compliance.** Secure, interoperable data-sharing frameworks allow tax authorities to access verified third-party data—from banks, land registries, or business systems—enhancing verification of liabilities, pre-filling of tax returns, and evidence-based policy making (Rossel and Santoro 2024).
- **Transparency, fairness, and inclusion.** DPI can reduce discretion and corruption by making compliance more visible and predictable (Tinta et al. 2024). DPI-based tax e-services, designed to be intuitive, multilingual, and mobile-friendly, lower barriers for small firms and informal workers, fostering inclusion (Santoro, Amine, and Magongo 2024).
- **Business formalization.** DPI-linked services—such as e-registration, interoperable bank accounts, and digital certificates—can make it easier for firms to enter the formal economy and comply with tax obligations (Chandra et al. 2024).

Efficiency versus trust. Tax administration epitomizes the central tension of DPI: The same digital systems that promise efficiency can, if poorly governed, erode public trust (Totolo 2025). Adoption of digital IDs and payments can stall when citizens fear data misuse, surveillance, or punitive enforcement (Luciano and Fleck 2025; Totolo 2025). In many lower-middle-income countries, where trust in government and data protection are fragile, these concerns are acute (Parsheera 2024; *The Economist* 2025; Zollmann et al. 2024). Building legitimacy, therefore, requires embedding *trust and rights* at the core of DPI–tax integration. Key safeguards include

- **Privacy-by-design,** with strict purpose limitation and data minimization rules.
- **Open standards and application programming interfaces** to ensure interoperability and avoid vendor lock-in.
- **Independent oversight** and citizen-led audit mechanisms to monitor data use.
- **Inclusive access,** maintaining assisted and offline options for those without digital connectivity.
- **Transparency and participation,** through clear communication on data use and civil society involvement in system design.

Figure 3.1 Diffusion of core government systems across countries over time



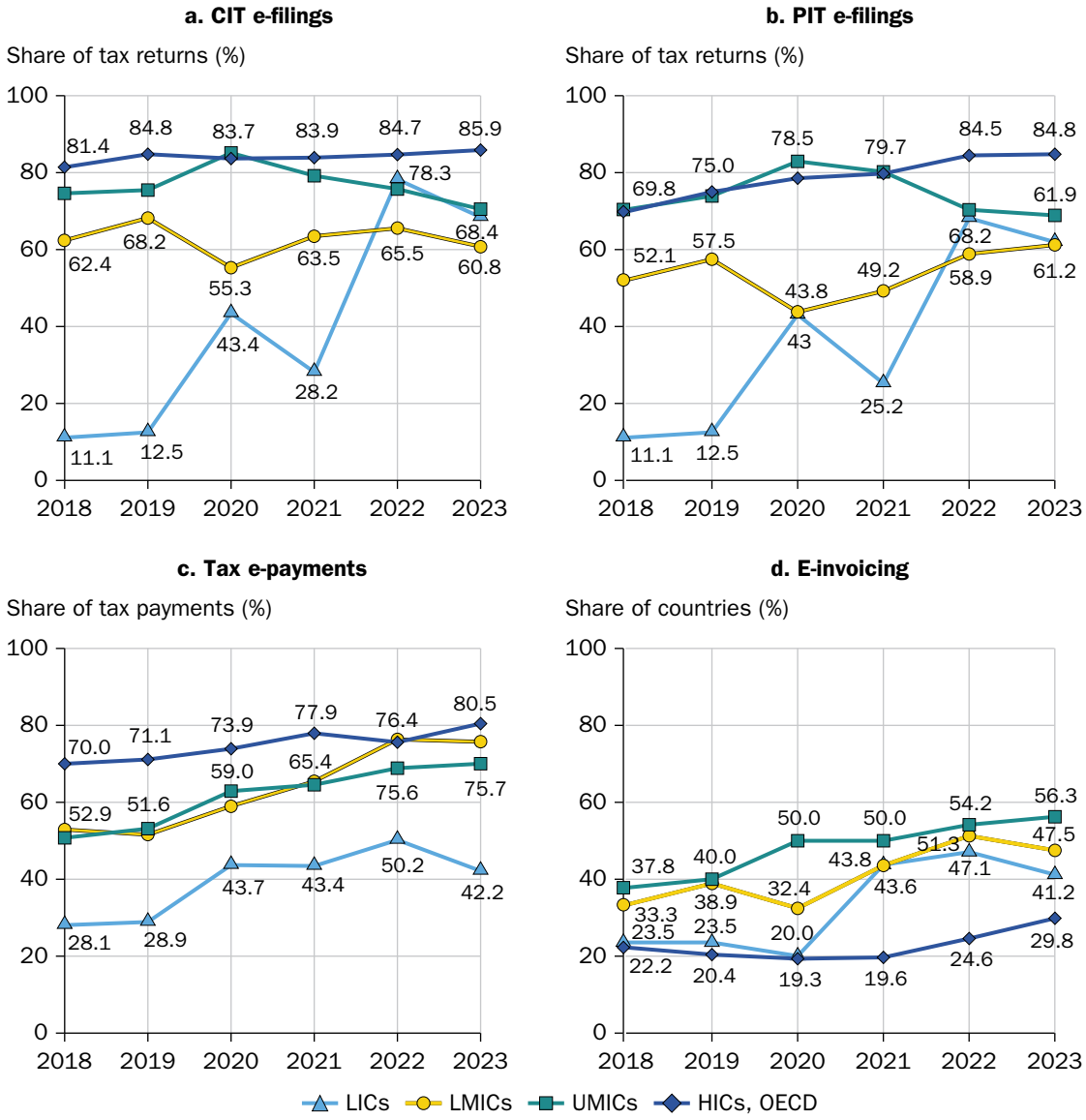
Source: Original figure for this publication using data from the World Bank Group GovTech Dataset.

Note: The sample includes 198 countries. FMIS = financial management information system; MIS = management information system.

Cutting-edge solutions, such as biometric authentication, AI and machine learning (ML) systems, cloud computing, and mobile applications for taxpayer services, remain largely inaccessible to most LICs and LMICs (refer to figure 3.3). HICs lead in adopting such innovations: 58 percent report using cloud-based tax platforms, and a similar 58 percent are experimenting with AI or ML for fraud detection and taxpayer segmentation. In stark contrast, around 6 and 12 percent of LICs report using cloud-based solutions or AI or ML, respectively. Even among UMICs, uptake remains modest—37 percent for cloud and 25 percent for AI. These differences underscore both capacity and infrastructure gaps and highlight the risk of LICs being left behind while higher-income countries accelerate rapidly.

Data-sharing protocols, another cornerstone of effective digital reform, are more extensive within tax administrations and across other government entities than with private entities. Data from the OECD Inventory of Tax Technology Initiatives (2023) Global Survey on Digitalisation[3] illustrate this point, albeit with a relatively modest sample of 64 countries. Figure 3.4 shows that all income regions exhibit high levels of having some degree of data sharing both within the tax administration and with other government institutions. However,

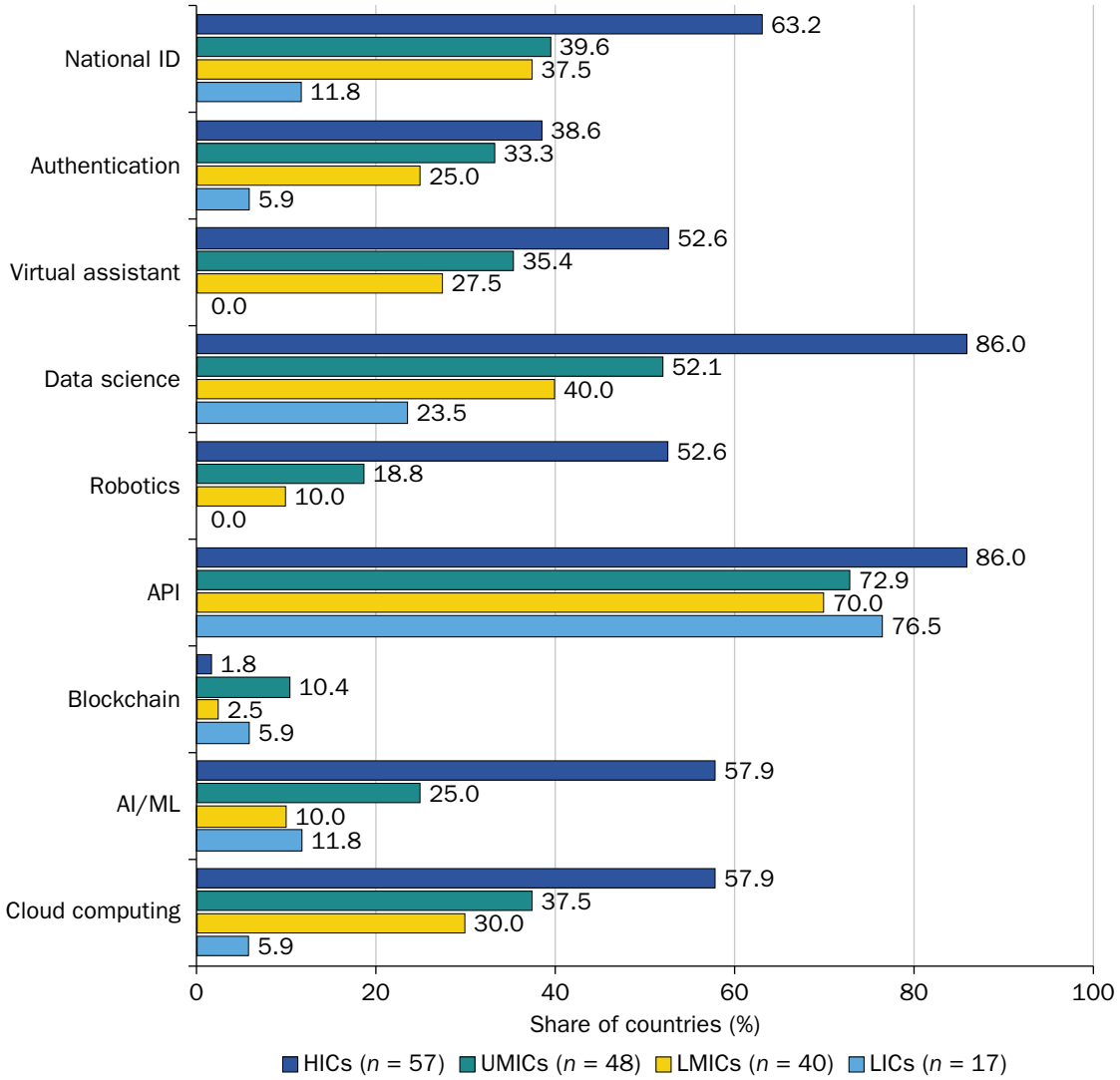
Figure 3.2 Technology adoption in tax administration, ISORA data, 2018–23



Sources: Original figure for this publication using data from the International Survey on Revenue Administration (ADB, CIAT, IMF, IOTA, and OECD 2023).

Note: ADB = Asian Development Bank; CIAT = Inter-American Center of Tax Administrations; CIT = corporate income tax; HICs = high-income countries; IMF = International Monetary Fund; IOTA = Intra-European Organisation of Tax Administrations; ISORA = International Survey on Revenue Administration; LICs = low-income countries; LMICs = lower-middle-income countries; OECD = Organisation for Economic Co-operation and Development; PIT = personal income tax; UMICs = upper-middle-income countries.

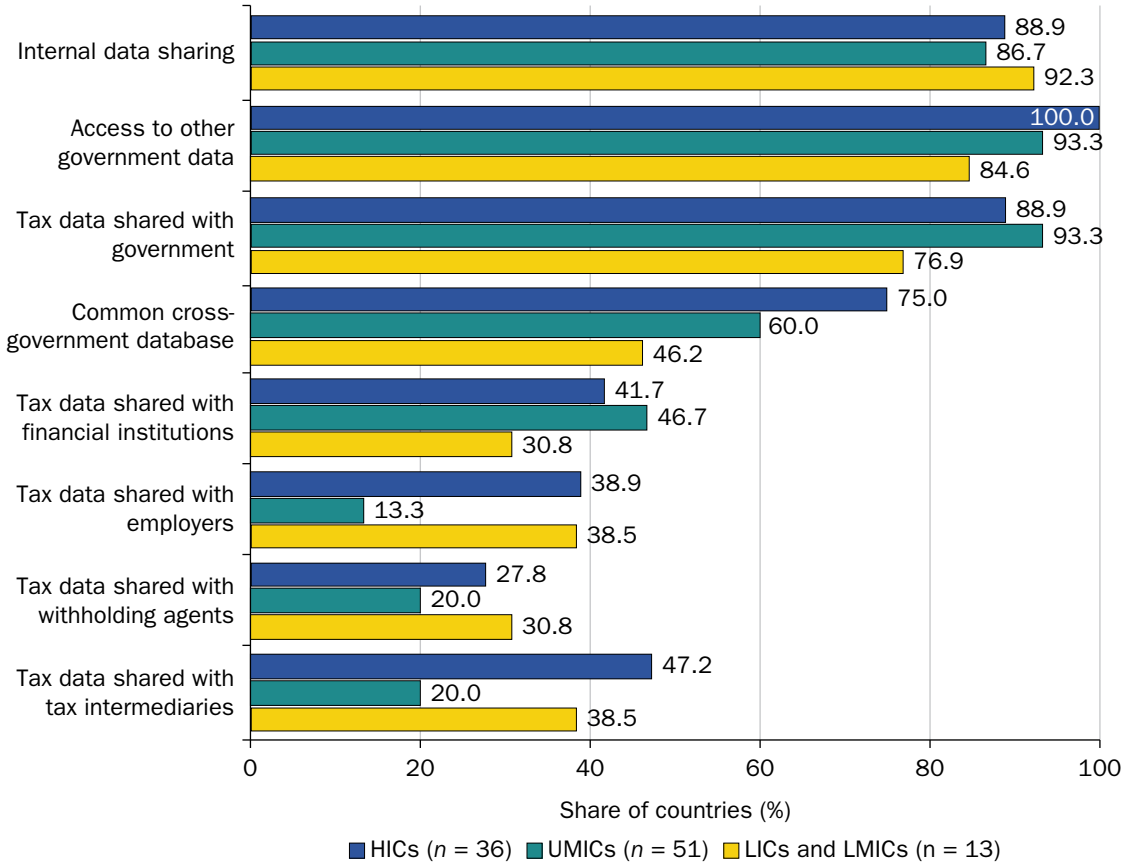
Figure 3.3 Innovative solutions adoption in tax administration, ISORA data, 2023



Source: Original figure for this publication using data from the International Survey on Revenue Administration (ADB, CIAT, IMF, IOTA, and OECD 2023).

Note: ADB = Asian Development Bank; AI/ML = artificial intelligence/machine learning; API = application programming interface; CIAT = Inter-American Center of Tax Administrations; HICs = high-income countries; IMF = International Monetary Fund; IOTA = Intra-European Organisation of Tax Administrations; ISORA = International Survey on Revenue Administration; LICs = low-income countries; LMICs = lower-middle-income countries; OECD = Organisation for Economic Co-operation and Development; UMICs = upper-middle-income countries.

Figure 3.4 Data sharing in tax administration, OECD data, 2023



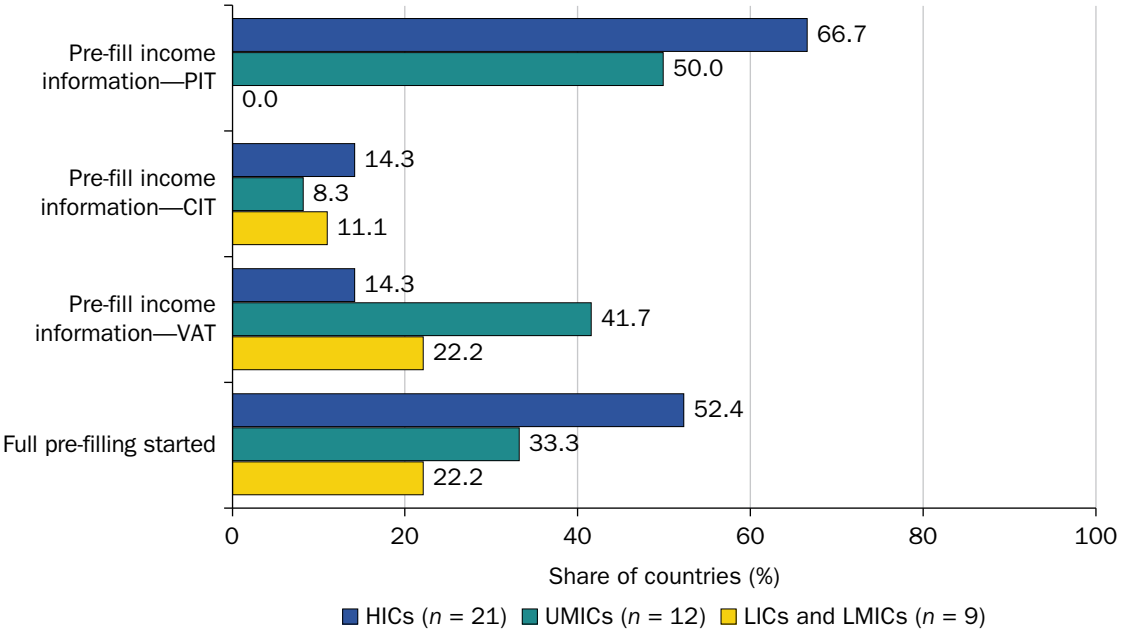
Source: Original figure for this publication using data from the Organisation for Economic Co-operation and Development Inventory of Tax Technology Initiatives (2023).

Note: HICs = high-income countries; LICs and LMICs = low-income countries and lower-middle-income countries; OECD = Organisation for Economic Co-operation and Development; UMICs = upper-middle-income countries.

less than half of LICs and LMICs have a common cross-governmental database, while 75 percent of HICs do, suggesting that comprehensive data integration remains limited in LICs and LMICs, weakening the potential of digitized data to boost tax administration's core functions. Data sharing with the private sector is less common with only 30–40 percent of LICs, LMICs, and HICs sharing data with financial institutions, employers, withholding agents, and tax intermediaries.

Led by HICs, countries are adopting another innovative use of shared tax data: the pre-filling of tax returns, which reduces taxpayer burdens and increases filing accuracy. Inventory of Tax Technology Initiatives data from 42 countries show that, among the HIC tax administrations surveyed, 66 percent pre-fill some or all fields in personal income tax (PIT) declarations using third-party data but perform much worse with corporate income tax (CIT) and value-added tax (VAT) (refer to figure 3.5). Around half of HICs have started a process of full pre-filling. While LICs and LMICs perform poorly with pre-filling of income taxes, they score better than HICs when it comes to VAT. This pattern is consistent with the faster implementation of e-invoicing in LICs and LMICs (refer to figure 3.2) and suggests that e-invoicing transaction data can be used for pre-filling (refer to the case of Rwanda in Hakizimana and Santoro 2023). The figure highlights a significant missed opportunity for simplification in LICs and LMICs, where capacity and data-sharing bottlenecks inhibit the broader deployment of user-friendly, data-driven filing systems.

Figure 3.5 Pre-filling in tax administration, OECD data, 2023



Source: Original figure for this publication based on data from the Organisation for Economic Co-operation and Development's Inventory of Tax Technology Initiatives (2023).

Note: CIT = corporate income tax; HICs = high-income countries; LICs and LMICs = low-income countries and lower-middle-income countries; OECD = Organisation for Economic Co-operation and Development; PIT = personal income tax; UMICs = upper-middle-income countries; VAT = value-added tax.

Use of technology for core tax functions

This section reviews the empirical evidence on how technology tools enable tax authorities to perform their three core functions of identifying taxpayers and the tax base, verifying true tax liabilities, and collecting known liabilities. Box 3.2 highlights the three broad groups of technologies that emerge based on their revenue-readiness, and figure 3.6 provides a more detailed summary of the literature.

Identification of taxpayers and the tax base

Identifying taxpayers is a foundational task of tax administration. However, many EMDE governments have limited knowledge of their citizens and their assets, which hinders effective taxation. Globally, over 850 million people have no form of official government identification, 56 percent of whom are in Sub-Saharan Africa and 24 percent of whom are in South Asia (Casher et al. 2021). Technology tools allow governments to identify and register individuals and property at a much larger scale and much lower cost compared to manual systems.

Box 3.2 Technology solutions: From most revenue impactful to more tentative

Group 1: Most likely to deliver near-term revenue with the highest confidence

- Electronic invoicing and electronic fiscal devices that capture transactions and report them directly to the tax authority
- Data analytics that detect discrepancies between tax filings and third-party data, particularly when these discrepancies can be credibly communicated to taxpayers.

Group 2: Promising but context dependent; typically require complementary investments in enforcement

- Electronic filing and related e-services that reduce compliance costs and replace interactions with tax officials
- Digitization of land records and property identification
- Low-cost digital nudges via text message and email.

Group 3: Tentative one-off solutions, with lower likelihood of large revenue impact without adequate follow-up and incentives

- Mass taxpayer registration drives
- Identifying taxpayers by matching different databases.

Individuals

Digital identification is an important component of DPI systems that tax authorities can leverage. As more countries roll out biometric identification systems (or other foundational digital identification) that help uniquely identify taxpayers, tax authorities may adopt this identity for tax registration purposes, instead of using the more common stand-alone tax identification number (TIN). Countries like Ethiopia, Ghana, India, Nigeria, and Uganda have experience with linking their tax identification credentials with the national identity database, resulting in significant expansions in their taxpayer registries. In 2022, this strategy accounted for 35 percent of registrations in Uganda (Scarpini et al. 2025) and over 65 percent of registrations in Ghana (Santoro, Scarpini, and Okiya 2024).

Besides increasing the coverage of the tax registry, this approach also improves accuracy by eliminating duplicates and incorrect information, both of which are common features of traditional stand-alone tax IDs. For example, in Uganda, 3 percent of registered taxpayers had multiple TINs and 44 percent had phone numbers or email addresses identical to those of at least one other taxpayer, typically as a result of tax preparers using their contact information on behalf of their clients (Mayega et al. 2021).

A taxpayer registry that is linked to a foundational, biometric ID can enhance the efficiency of tax administration. It provides the tax authority with the denominator for assessing the taxpayers still not registered for taxes. Further, when connected to other data sources, for example, land records, vehicle registers, financial accounts and payment systems, customs databases, and social security registers, it can help identify tax-eligible individuals who are not registered for taxes, especially high-net-worth individuals (HNWIs). As an example of identifying noncompliant taxpayers by linking different government databases, in South Africa, a large-scale synchronization of the business tax and commercial registries in 2008 and 2014 added over 300,000 firms to the tax system (Lediga et al. 2025). The tax revenue impact was less impressive: Only 2 percent of forcibly registered firms paid in 2008 and 0.4 percent in 2014. Nevertheless, given the scale of the intervention, and its ability to draw in some high-value firms, the revenue gains were high enough to make the intervention fiscally cost-effective.

The ability to identify taxpayers also supports equity, as it allows countries to expand income taxation, which is more progressive compared to taxing consumption. Identifying taxpayers also enables the government to preserve the efficiency of tax instruments while addressing equity concerns. For example, VAT is, in theory, an efficient tax. However, it is often perceived as regressive because poorer households spend a larger share of their income on consumption.[4] To address these equity concerns, many tax systems include exemptions or reduced rates on some essential goods like food.

Instead of these tax expenditures, which typically introduce distortions and are not well targeted (for example, Benzarti et al. 2024), a recent policy innovation in some countries (for example, Argentina, Brazil, Colombia, Ecuador, Thailand, and Uruguay) is a personalized and targeted cash-back program where the government directly refunds VAT to low-income households (de la Feria and Swistak 2024). Bachas, Flores, et al. (2025) studied the case of Rio Grande do Sul, Brazil, highlighting that a precondition for implementing this policy is for governments to be able to identify eligible households, which becomes feasible when there is a robust identification system in place.[5]

In addition, expanding the tax net using technology tools may improve horizontal and vertical equity. Properly identifying taxpayers may also improve horizontal equity by expanding the tax registry to include those who would otherwise have been left out, possibly due to registration hurdles. For example, in Ghana and Uganda, the tax register expansion brought in taxpayers who were more likely to be female, younger, and previously informal entities (Santoro, Scarpini, and Okiya 2024; Scarpini et al. 2025). Technology-supported identification may also improve vertical equity by ensuring that high-income individuals and firms who were previously evading are identified and brought into the tax net. For example, in Pakistan, data mining allowed the national identity agency (National Database and Registration Authority) to identify some 2.4 million wealthy individuals who did not yet have national tax numbers, as well as 1.2 million who had tax numbers but were not filing (Clark 2018).

Real estate

Technology also provides important tools to identify taxable assets such as real estate.[6] In LICs, given weak cadastral systems, coverage of the property tax registry can be as low as 5 percent (Olabisi 2013).[7] Geospatial data allow tax authorities to verify the location of properties, and digital records provide updated ownership information. An increasing number of countries are leveraging these tools: From 2010 to 2019, 52 economies computerized their land registries in both developing and developed countries (World Bank 2020).

Côte d'Ivoire and Rwanda provide illustrative examples. In Côte d'Ivoire, the government is digitizing all existing paper maps and enabling online applications for land titles—reducing administrative delays and improving access to formal ownership. The Directorate General of Taxes, with support from the African Development Bank, started using tools such as 3D mapping and geo-localization to update cadastral maps and strengthen property registries (Mukazayire and Barras 2025). In Rwanda, the government launched a comprehensive land tenure reform program that initiated the systematic demarcation, digitization, and registration of land parcels. Through a combination of aerial photography and on-the-ground verification *(ground-truthing),* 10.3 million parcels were successfully registered (Shipley 2020).

An important lesson from the literature is that identification of taxpayers or property is often insufficient to significantly increase tax revenues; an essential factor is the enforcement environment. A randomized experiment from Liberia illustrates this point (Okunogbe forthcoming). The tax authority created a new digital property database by training local youth to collect property data (location, photographs, and ownership details) using tablets and open-source software. The data were then leveraged in a randomized experiment to test the impact of including identification information (name of owner and photo of property), penalty information (warning about legal penalties), or both on tax notices. Property owners receiving a tax notice with both the identification and penalty information were four times more likely to pay their property taxes (increasing from 2 percent to over 8 percent) relative to those receiving a plain notice. The identification-only and penalty-only notices did not have statistically significant effects, underscoring the importance of combining property visibility with enforcement credibility.

Verifying tax liabilities

Technology tools help tax authorities carry out the next core task after identifying taxpayers—verifying tax liabilities. Tax authorities rely on third-party information, such as wages reported by employers, capital income reported by financial institutions, or data from EFDs, to corroborate any self-declaration provided by taxpayers. In the absence of third-party information, tax evasion rates are much higher even in high-capacity countries like Denmark (Kleven et al. 2011). Technology advances have provided tools for collecting third-party information, as well as for analyzing this information for tax monitoring purposes.

Technologies that collect third-party information

One of the most-prominent technological innovations in tax administration is the deployment of EFDs and e-invoicing. *EFDs* are hardware- or software-based solutions designed to transmit sales transaction data directly to the tax authority for tax purposes. They typically include an e-invoicing system that issues invoices with unique information about the transaction and creates a verifiable record of the transaction, thus making it difficult to forge receipts for VAT input claims. This is particularly valuable for VAT, where the buyer and seller report the transaction to the tax authority. They also include modules to simplify book-keeping and support accurate recording, which is important for tax preparation. Mandating firms to use EFDs and e-invoicing has led to increases in reported revenues and tax payments in a variety of countries such as China (Fan et al. 2018), Ethiopia (Ali et al. 2017; Mascagni et al. 2021), Peru (Bellon et al. 2022), Rwanda (Eissa and Zeitlin 2014; Hakizimana and Santoro 2023), and Uganda (Lees et al. 2025).

Cashless payments such as bank transfers, mobile money (MM), and credit and debit cards are another important source of information for governments about financial transactions of firms. In some countries, like the United States, the government requires payment processors to report the cashless payments received by businesses to the tax authorities. Adhikari et al. (2021) find that this results in some increase in tax compliance. In many other countries, even when cashless payments are not directly reported to the tax authority, they provide a paper trail of transactions that could be used in the event of an audit and, therefore, may promote tax compliance. In Rwanda, Bernad et al. (2023) document a large increase in the use of MM during the pandemic in response to a temporary removal of MM transaction fees. Firms increase their declared sales when they adopt MM, but this effect lasts only a few months. Das et al. (2023) studied the 2016 demonetization shock in India, finding that it led to a large increase in cashless payments, as well as an increase in reported sales and tax payments.

Given the expected tax benefits of cashless payments, some governments actively incentivize citizens to move from cash to cashless payments, but this is not always successful. For example, Brockmeyer and Somarriba (2025) find that consumer VAT rebates for credit and debit card transactions produce an immediate 50 percent increase in the number of card transactions; however, this occurs mostly among firms that already had card machines and ultimately did not affect total tax revenues. In other cases, governments directly target electronic transactions as a tax base to be exploited (refer to box 3.3 for a discussion of taxes on MM).

Box 3.3 MM taxes: A double-edged sword

Prepared by Oyebola Okunogbe, Fabrizio Santoro, and Dario Tortarolo

Beyond improving the administration of existing taxes, digital technologies can also enable the introduction of new ones. A prominent example in lower-middle-income countries is the taxation of mobile money (MM) and digital financial services. In many African countries, MM has been a key driver of financial inclusion, connecting millions of individuals—especially in underserved areas—to formal financial services via mobile phones (Klapper et al. 2025; Suri and Jack 2016). Since 2013, at least 14 African countries have introduced MM-related taxes (Hearson et al. 2024). These taxes raise revenue quickly but embody a stark "third-best" tradeoff among administrative ease, efficiency losses, and equity concerns.

(Continued)

Box 3.3 MM taxes: A double-edged sword *(continued)*

Why governments adopt MM taxes. From a tax administration perspective, MM platforms can ease three core functions. *Identification* improves because transactions are linked to verified accounts. *Verification* becomes more feasible because platforms generate high-frequency digital trails. *Collection* is simplified because taxes can be withheld at the source, using mobile operators and fintech firms as intermediaries. In settings with widespread informality and limited enforcement capacity, these features make MM taxes an appealing way to raise revenue quickly and reach economic activity that conventional income tax and value-added tax systems may miss. Some countries explicitly target informal activity by exempting bank transfers or transfers made by registered businesses.

Revenue gains might not justify the efficiency and equity costs. Revenue yields have been small in most cases—typically 1–2 percent of total tax revenue in Ghana, Kenya, Nigeria, and Uganda. These modest gains, however, come with substantial costs:

- **Efficiency losses** are substantial. MM taxes function as turnover taxes, taxing each transfer and discouraging digital payments. Evidence from five countries shows immediate declines of 20–30 percent in transaction values after introduction (refer to figure B3.3.1). Users cut transaction frequency, reduce amounts, or revert to cash—undermining financial inclusion (refer also to Barczay et al. 2025). In addition, they disrupt a strong upward adoption trend, implying sizable long-run efficiency costs.
- **Equity concerns** compound the problem. MM represents a larger income share for lower-income and unbanked users, who have few alternatives. Survey evidence from Ghana suggests the tax exceeds 8 percent of earnings for poor informal workers, versus less than 1 percent for richer users (Anyidoho et al. 2022). Some countries mitigate burdens through exemptions and thresholds (for example, in Ghana, the first GHC 100 in daily transfers were tax-free).

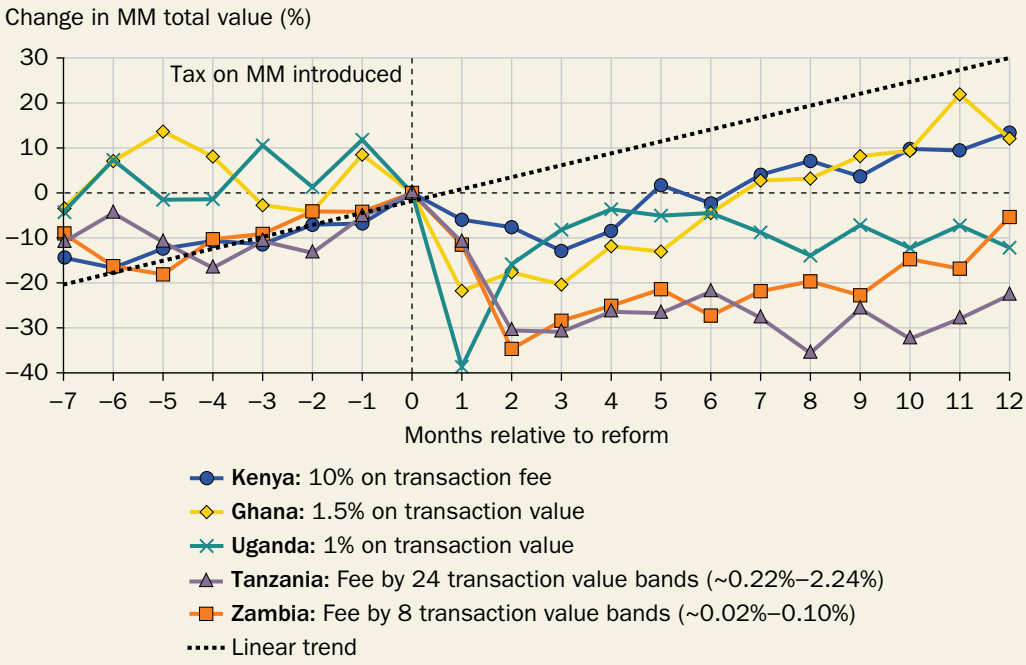
The predictable rise and retrenchment of MM taxes. MM taxes follow a recurring pattern: introduction, a sharp drop in usage, and public backlash, followed by rate cuts, exemptions, or repeal (Niesten and Wales 2024). For example, Uganda's 1 percent levy (2018) was swiftly narrowed to a 0.5 percent withdrawal tax; Tanzania's 2021 transfer and withdrawal charges were reduced, with the transfer component scrapped within two years. Ghana's 1.5 percent electronic levy (2022) was scaled back and abolished by 2025. The pattern reflects a basic tension: Transaction taxes raise revenue quickly, but they provoke large behavioral responses and can be difficult to sustain politically.

(Continued)

Box 3.3 MM taxes: A double-edged sword *(continued)*

By undermining MM systems, governments erode the foundations of a less distortionary tax future. Rather than taxing transactions directly, governments can leverage MM as *tax infrastructure*—using digital payments to simplify compliance and support broader revenue mobilization (Apeti and Edoh 2023; Dom et al. 2022). While causal evidence remains limited, the broader lesson is that MM is likely more valuable as *infrastructure* for existing taxes than as a tax base itself.

Figure B3.3.1 Impact of MM taxes on transaction values in Ghana, Kenya, Tanzania, Uganda, and Zambia



Sources: Original figure for this publication based on official aggregate data from central banks.

Note: For each country, transaction values are expressed as percentage changes relative to the month immediately preceding the tax's introduction ($t = 0$), which is normalized to zero. The tax implementation month ($t = 1$) is January 2013 in Kenya, July 2018 in Uganda, July 2021 in Tanzania, May 2022 in Ghana, and January 2024 in Zambia. MM = mobile money.

In addition to EFDs and cashless payments, governments may obtain information on taxpayers' economic activity, income, and assets from different public and private agencies in the country (such as employers, financial institutions, utility companies, and customs), as well as international sources to detect offshore income, which is an important source of revenue losses to EMDE governments (refer to chapter 4).

Technology that processes third-party information

For the vast amounts of information tax authorities collect to be useful, they must have the capacity to effectively process this information. This analysis could range from simple cross-matching of a few data sources to advanced data analytics like ML. Brockmeyer et al. (2019) in Costa Rica and Carrillo et al. (2017) in Ecuador report increases in tax payments from randomized experiments in which tax authorities contact firms to flag discrepancies between the tax filing of a firm and third-party reports. Other countries develop automated systems that synchronize and verify tax-related data with information from public and private entities like banks, customs, and social insurance, such as China's Golden Tax Project III (Li et al. 2020). An important application of sophisticated data analytics is to create risk profiles for firms to be able to target audits appropriately (refer to box 3.4 on AI and ML). In some cases, such as Pakistan's Computerized Risk Evaluation System for Taxation, the automated system can deny unsubstantiated input tax claims in real time, precluding the need for an audit after evasion is suspected (Shah 2026).

Box 3.4 AI and ML for tax systems in LMICs

What are AI and ML, and how can they support tax systems? *Artificial intelligence* (AI) and *machine learning* (ML) refer to software systems capable of performing tasks that typically require human intelligence—such as processing language, recognizing patterns, and making predictions (Farooq and Solowiej 2021). Junquera et al. (2025) document a wide range of AI and ML applications in tax administration, from low-complexity tasks such as automatically classifying documents during an audit or estimating the costs and probability of success of recovering tax arrears, to medium complexity tasks like automatic profiling of taxpayers by their risk of evasion or selecting the composition of the audit team to match the taxpayer profile, to high complexity tasks like detecting fraud patterns in e-commerce transactions or detecting violations of transfer pricing rules. AI and ML can also support officials and taxpayers alike—drafting letters, interpreting complex rules, and providing personalized taxpayer services (Cantens and Tourpe 2025).

(Continued)

Box 3.4 AI and ML for tax systems in LMICs *(continued)*

Evidence on the use of AI and ML. Rigorous empirical evidence on AI and ML applications in tax administration remains scarce in emerging market and developing economies (EMDEs), and most research is still ongoing. Below is some evidence of how AI and ML tools have been deployed in identification of taxpayers, verification of liabilities, and collection of taxes.

- **Identification:** In India, Mahajan et al. (2024) developed an ML model to detect bogus firms using administrative data, finding that over half of the flagged entities did not exist at their registered addresses. This model outperformed traditional rule-based methods but also underscored the need for strong institutional coordination to effectively remove fraudulent firms.
- **Verification of liabilities:** Two increasingly common applications of AI and ML in taxation are for detecting fraud and evasion to better target audits, and for valuing property. The section "Artificial Intelligence, Machine Learning, and High-Frequency Data" in chapter 8 provides detailed examples. By analyzing numerous variables from large and diverse datasets such as historical tax returns, e-invoicing data, and business registration data, AI models are able to identify intricate risk patterns that are missed when using only static rules. Battaglini et al. (2025) demonstrate that ML can substantially improve audit efficiency—boosting detected tax evasion by up to 39 percent and actual recovery by 29 percent. AI and ML models also inform mass valuation of property by training models on data on property characteristics from administrative data, street photographs, and satellite imagery, often at a fraction of the cost of traditional property valuation methods (Asad et al. 2025; Bergeron et al. 2023). In a World Bank–supported cadastral updating pilot in Sutamarchán, Colombia, for urban land use classification, the team processed 4,000 Google Street View images at a total cost of just US$28, using GPT-4o to classify building type and number of floors. The model achieved 92 percent precision for land use classification and 86 percent precision for floor count (Krsul et al. 2026).
- **Collection:** Case studies from different countries provide descriptive evidence on the use of AI and ML for improving customer service. A World Bank–supported project in Uzbekistan has developed an intelligent knowledge manager and assistant that supports taxpayers and tax officials by understanding queries in context and drawing on thousands of laws, procedures, and taxpayer guides to provide clear, accurate responses (Junquera et al. 2025). Granular access controls safeguard sensitive information by ensuring that users can only access data they are authorized to see. In other contexts, Singapore's multilingual AI tax assistant halved call center volumes, while France and the Republic of Korea use AI to help citizens file taxes and process taxpayer emails (Cantens and Tourpe 2025).

(Continued)

Box 3.4 AI and ML for tax systems in LMICs *(continued)*

Predictive, generative, and agentic AI. To date, most AI systems deployed in tax administrations were either predictive (for example, audit risk selection) or generative (for example, customer service bots). Tax authorities have much less experience with agentic AI systems that autonomously complete workflows to execute complex tasks. For example, agentic AI systems could retrieve taxpayer records from different third-party sources, assess for inconsistencies, initiate an investigation and request documentation, assess the additional documentation, and determine any additional liabilities. Given the financial, legal, and privacy implications, in the near future, tax authorities are unlikely to adopt fully autonomous agentic AI systems that lack human supervision.

Equity and fairness implications. AI may be perceived as fairer than human officials who may be biased, as shown in Belgium (Decuypere and Van de Vijver 2025) and Senegal (Knebelmann et al. 2026). Indeed, algorithmic valuations based on property characteristics significantly improved both accuracy and equity. However, equity concerns may warrant caution. AI algorithms may perpetuate bias embedded in historical data. In Australia and the Netherlands, automated welfare fraud detection systems faced backlash due to algorithmic bias and lack of transparency, disproportionately affecting vulnerable populations (Braithwaite 2020; Hadwick and Lan 2021).

Challenges, preconditions, and policy recommendations. AI's and ML's promise in tax administration is tempered by significant challenges. Data quality, privacy, ethical risks, and potential inaccuracies can undermine trust if not carefully managed. Explainability of AI and ML outputs and transparent processes are critical to maintain public confidence (Aoki et al. 2024; Decuypere and Van de Vijver 2025). To harness AI and ML effectively, EMDEs require strong legal frameworks that guarantee human oversight, protect taxpayer rights to explanation and appeal, and mandate ongoing monitoring for errors and bias. Finally, digital maturity is a major prerequisite. EMDEs contend with outdated information technology infrastructure; limited digitization; and scarce, biased data (Okunogbe and Santoro 2023) that hamper advanced AI and ML use. Getting the basics right in a digitalization process and building technical capacity are crucial to tapping into advanced solutions like AI and ML.

Revenue, efficiency, and equity impacts of verification of tax liabilities

Obtaining information on firms' true liabilities supports the tax authority in collecting more revenues, but the impact is often muted by strategic taxpayer behavior. A recurring theme in studies from different contexts is that the revenue impact from this type of intervention is dampened because, once the tax authority obtains information on one input of tax liability, for example, revenues, taxpayers respond by adjusting other margins, such as costs (Adhikari et al. 2021; Carrillo et al. 2017; Lees et al. 2025; Mascagni et al. 2021).

These interventions also improve efficiency and equity. Increasing automation of data collection and cross-matching improves administrative efficiency. In addition, by increasing the coverage of information on the size of different tax bases available to the tax authority, the interventions reduce the scope for evasion, hence promoting efficiency. However, these improvements in administration may result in higher effective tax rates and trigger some disincentive effects. These interventions are also likely to improve equity as people with hidden assets or multiple sources of income that are discovered through matching are more likely to be wealthy.

Collecting tax liabilities

After identifying taxpayers and verifying their liabilities, the remaining task of the tax authority is to collect these taxes; technology tools play an important role here as well. The integration of digital technologies into tax administration has the potential to simplify and streamline tax collection, improving equity in access and reducing compliance costs. These tools, such as withholding and automatic payments, e-filing and e-payments, and online communication, can help establish a tax process that is transparent, is straightforward, and requires minimal direct interaction with tax officials, thereby fostering voluntary compliance and trust in tax administration.

E-filing and e-payment

Digital solutions that allow taxpayers to file and pay taxes online—instead of in person or by mail—can improve tax administration in multiple ways. The most-documented channel is that they improve efficiency by reducing transaction costs for taxpayers and the number of interactions between taxpayers and tax officials, which could provide opportunities for bribes and corruption (Kochanova et al. 2020; Okunogbe and Pouliquen 2022). They are also associated with improved filing and accuracy, two indicators often overlooked in the literature (Santoro, Amine, and Magongo 2024). An additional channel for increased efficiency for the tax authority is that they produce digitized data that can be used for analysis, without the need for data entry from manual transactions.

In addition, while there is some evidence that e-filing and e-payment are associated with higher revenues (Jouste et al. 2021; Tinta et al. 2024), causal evidence suggests that this depends on the preexisting pattern of interactions between taxpayers and tax officials. If tax officials serve a monitoring role at the point of submission, moving to e-filing may reduce tax payments. However, if tax officials are colluding with taxpayers, e-filing can lead to substantial increases in tax payment (Okunogbe and Pouliquen 2022). By having taxpayers interact with an online system to file and pay, instead of tax officials, electronic systems, therefore, also contribute to horizontal equity.

Withholding and automation

Withholding systems delegate remittance responsibility to a payer (for example, financial institutions or public agencies), which deducts tax before payment is completed. This setup reduces the administrative burden on tax authorities by front-loading tax collection and relying on third-party intermediaries, usually facilitated by appropriate technology systems. While withholding has traditionally been viewed as administratively efficient but neutral in terms of taxpayer incentives, new evidence suggests that digital withholding can significantly improve compliance outcomes. In Costa Rica, a doubling of the withholding rate led to a 33 percent increase in sales tax payments among affected firms and an 8 percent increase in total sales tax revenue—due to reduced misreporting and incomplete refund claims (Brockmeyer and Hernandez 2016). Argentina had a similar success with the appointment of large firms as withholding agents (Garriga and Tortarolo 2024). Other types of automation allow tax collection to be embedded in financial transactions, such as VAT inclusion in the final price of goods, or property taxes bundled with mortgage payments.

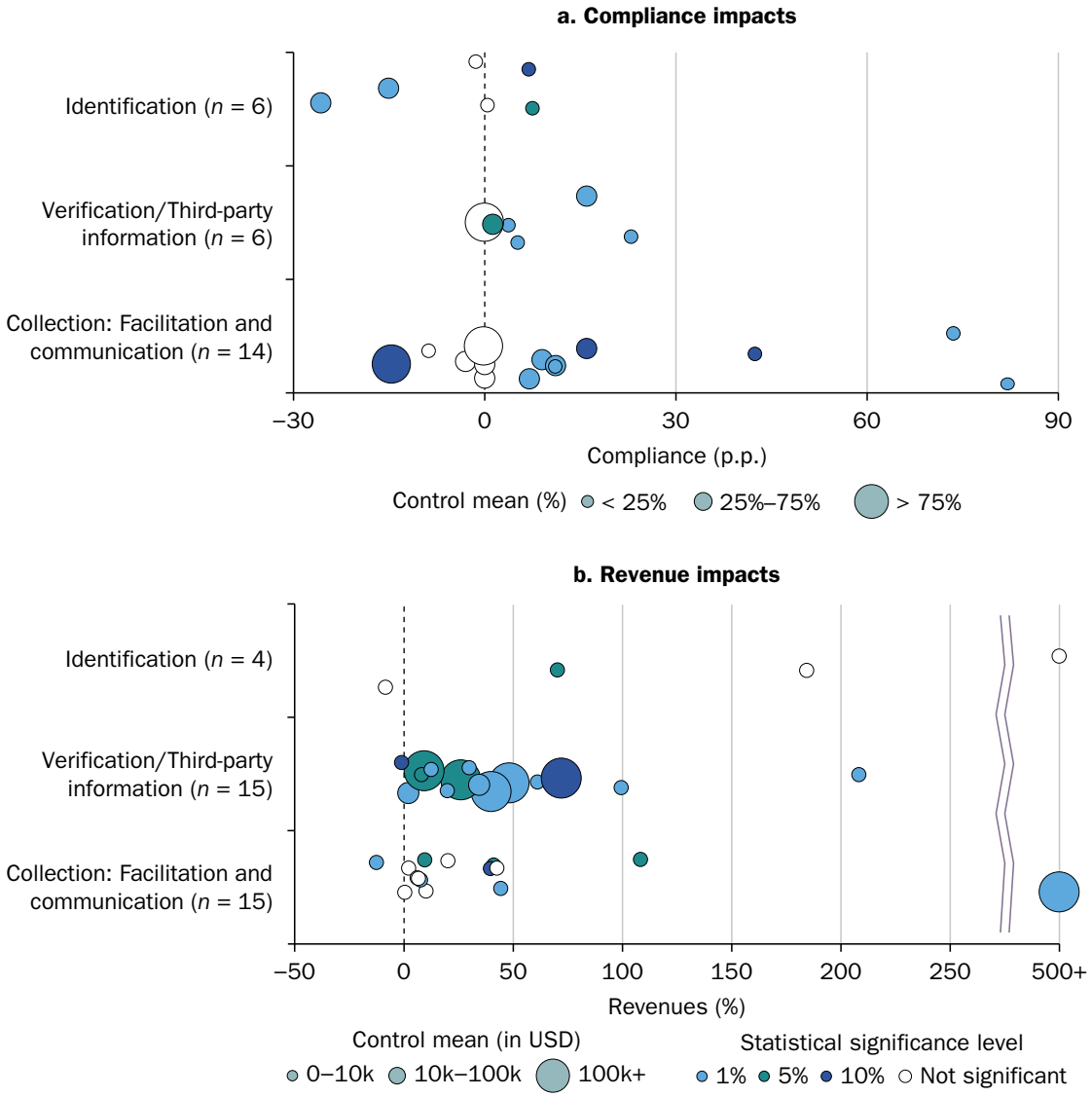
Online communication and customer service

Technology tools allow tax administrations to provide both general and personalized communication to taxpayers. For example, virtual tax offices and one-stop shops provide a single space or platform to share clear and accessible information on tax rules, procedures, and deadlines, reducing uncertainty for taxpayers, thereby improving administrative efficiency. Smart communication methods, such as text message and email, have also proven to be cost-effective tools for sending reminders and personalized compliance nudges to taxpayers, leading to increases in revenue (for example, Brockmeyer et al. 2019; Cohen 2024; Mascagni and Nell 2022). Another innovative way tax administrations can leverage technology to facilitate compliance is through visual nudges or edutainment, using cost-effective, easily scalable, digital tools (for example, short videos) to raise awareness about the tax system. Santoro and Mascagni (2023) find in a randomized experiment that a deterrent-themed video in Rwanda leads to improved tax filing. AI tools may also be used for pre-filling of tax returns based on third-party reporting available to the tax authority, further reducing compliance costs (refer to box 3.4).

Overview of literature on identification, verification, and collection

Figure 3.6 summarizes the evidence from academic literature on the impact of technology on these three areas of tax administration. It focuses on causally identified recent empirical findings published since 2011 in EMDEs.

Figure 3.6 Impacts of digital reforms on tax performance: Evidence from the literature since 2011



Source: Original figure for this publication.

Note: Panel a illustrates the impact of these interventions on the extensive margin of compliance—that is, the proportion of taxpayers who comply. This panel aggregates 26 interventions from 11 studies. In panel b, the x-axis displays changes in revenues in percentages with respect to the control group average, based on 34 interventions drawn from 20 studies. The color of dots is relative to the extent of statistical significance or insignificance; the size of dots is relative to the control mean. This figure builds on figure 5, "Impacts of Tax Interventions," from Okunogbe and Tourek (2024), updating the list of papers included and expanding the range of reported estimates to include nonsignificant results. Refer to annex 3A for a list of the studies included in this figure. p.p. = percentage points; USD = US dollars.

Panel a illustrates the impact of these interventions on the extensive margin of compliance—that is, the proportion of taxpayers who comply—measured in percentage points. This panel aggregates 26 interventions from 11 studies. Panel b reports revenue gains as a percentage of the mean of the comparison group, based on 34 interventions drawn from 20 studies.

To better understand the range and robustness of outcomes, we classify the effect estimates by their level of statistical significance, explicitly noting instances of nonsignificant results. This approach highlights both successful and less effective interventions.

The empirical literature and case studies examined in this chapter reveal a diverse set of digital reform strategies available to EMDEs. In Figure 3.6, panel a, digital interventions focused on facilitating tax compliance and taxpayer communication demonstrate the most-substantial and statistically significant effects on compliance rates. Interventions based on third-party data to strengthen enforcement also show consistently positive outcomes. In contrast, digital initiatives aimed at improving taxpayer identification yield more heterogeneous results, with some studies even reporting negative effects on compliance.

In Figure 3.6, panel b, the largest revenue gains are associated with verification-focused interventions utilizing third-party data. In exceptional cases, these measures have led to revenue increases as high as threefold. While facilitation and communication interventions also show promising impacts on revenue, their effects are generally more modest and less variable. Evidence on identification interventions remains limited, with most studies yielding nonsignificant results.

These findings point to a preliminary conclusion: Third-party data are particularly effective in raising tax revenues, whereas facilitation and communication measures are more impactful in broadening taxpayer compliance at the extensive margin. The evidence based on identification-focused digital reforms remains sparse and mixed, highlighting an area for future research. One possible explanation is that identification is only the beginning of the compliance journey. Without the additional steps of collecting information on tax liabilities and ensuring collection, it is unlikely to yield strong revenue impacts.

Essential ingredients for successful technology reforms

Not all digital tax reforms are successful, indicating the importance of preconditions. Figure 3.6 shows a wide range of negative, null, and positive results from different interventions. While the various studies come from different contexts and cover different tax instruments, several broad themes emerge that support the success of technology reforms in taxation. This section discusses

three of them: having an institution-wide strategic vision, developing essential legal and regulatory frameworks, and ensuring complementarity between technology and tax officials. An additional factor is to carefully consider taxpayer responses and design reforms that will be politically feasible—chapter 5 discusses this in more detail.

Institution-wide strategic vision and reform sequencing

Digital reforms must be anchored in long-term institutional strategies—not donor pressure or peer imitation (Okunogbe and Santoro 2023). In many cases, driven by external pressure, technology is introduced in a target-driven manner, with an emphasis on visible outputs—such as the number of new registrations or digital tools deployed—rather than sustained improvements in compliance, enforcement, and revenue outcomes. When technologies are introduced without sufficient alignment to core administrative goals or institutional capacity, they risk becoming siloed solutions that add complexity without delivering meaningful gains.

A compelling illustration of this challenge emerges in recent research on the integration of ID data into tax registries, a reform pursued by several LMICs with support from donor-backed DPI agendas. Evidence from Ghana, South Africa, and Uganda, as discussed earlier, indicates minimal revenue gains. In Ghana, only preexisting taxpayers who migrated from taxpayer identification numbers to personal identification numbers (PINs) improved their filing and payment behavior. In contrast, new registrants with PINs showed no compliance improvement, and in some cases, compliance worsened (Santoro, Scarpini, and Okiya 2024). In South Africa, Lediga et al. (2025) show that most newly registered businesses did not submit returns, and only 2.8 percent reported any positive tax liability during the six-year period following the reform. Many of these firms were micro or low-turnover businesses unlikely to contribute significantly to revenues.

These case studies reinforce a critical lesson: Technology is not a substitute for strategy. While immediate outcomes, such as higher registration numbers or availability of third-party data, can be achieved, tax authorities often lack the capacity to effectively onboard, contact, and monitor the large influx of newly registered individuals or to analyze the new data. When registration or data access expands but enforcement and service capacity do not, tax administrations risk building oversized registries filled with inactive taxpayers—an outcome that strains resources without increasing revenue.

Moreover, authorities must carefully consider opportunity costs. Resources allocated to mass registration drives or other digitally enabled strategies may yield limited returns if they divert

attention from more pressing enforcement priorities, such as taxing hard-to-reach professionals or HNWIs. Policy makers should consider adjusting annual tax performance targets to emphasize high-impact enforcement rather than headline-grabbing registration figures (Santoro, Prichard, and Mascagni 2024). In sum, smart digitalization requires a clear strategic vision: Technology must be embedded within a broader reform agenda that links innovation to improved taxpayer services and onboarding, targeted enforcement and risk-based auditing, and stronger revenue collection.

Once a long-term vision is in place, the sequencing of reforms is critical. Reforms typically start with customs digitalization (for example, Automated System for Customs Data) followed by digitalizing different functions, such as taxpayer registration, VAT, and income tax, eventually fully integrating and automating the tax administration system. In this sense, integrated tax administration systems play a pivotal role in integrating and digitalizing all functions and serve as a foundational element for the successful deployment of the technologies outlined earlier. Other institutional challenges matter. Staff re-skilling should precede technology rollouts and be sustained; different government agencies must coordinate with one another. Tying tax reforms to national digital transformation and whole-of-government efforts is more likely to yield results (Scarpini et al. 2025; Schreiber 2018).

Legal and regulatory frameworks

Technology evolves faster than legal systems. As such, successful reforms must ensure that the legal and regulatory frameworks to support them are in place. For example, when introducing new technology that enhances enforcement capacities—such as by improving liability assessments and tracking defaulters—it is important for the legal system to support timely prosecution and sanctioning. Otherwise, long delays in court proceedings can undermine the effectiveness of the reform. Similarly, for digitalization interventions that encourage mass registration and formalization to improve compliance, the tax code must clearly outline the obligations of new taxpayers (Mascagni et al. 2021).

A particularly important area that requires robust legal and regulatory frameworks is data governance. Tax authorities handle highly sensitive personal and financial data, making data protection and privacy central concerns. Many jurisdictions have strict laws governing where tax data can be stored or processed, which can constrain the adoption of modern technologies if legal frameworks are not updated to accommodate them. At the same time, the use of algorithmic tools in enforcement raises questions of fairness, accountability, and taxpayer rights that existing legal structures may not be equipped to address.

Effective technology reform, therefore, requires more than technical implementation—it demands that data governance, privacy safeguards, and institutional accountability structures be codesigned with the technology from the outset, rather than retrofitted after deployment (Junquera et al. 2025). This means establishing clear policies on data ownership, access, and use; putting in place mechanisms for human oversight of automated decisions; and aligning national data protection laws with the operational realities of modern tax systems.

Still, legislation alone is not enough: Public perception matters. To avoid backlash against digital reforms, tax authorities should be transparent about what data they collect and highlight the benefits to taxpayers, such as helping simplify compliance. Importantly, authorities must build confidence in the level of security they provide for tax data, such as encryption, access controls, and audit trails. Any breach would erode public trust and derail digital reform initiatives. The section "Ethical Governance of Tax Data" in chapter 8 provides further discussion of privacy concerns and how to manage associated risks.

High-level political support is often crucial for data exchange between agencies and the success of digital tax reforms. For example, without clear directives from the executive, agencies may resist collaboration due to turf protection or legal ambiguity. In many African countries, public institutions are "siloed and saddled with complex internal politics" (Santoro, Prichard, and Mascagni 2024). The success of Uganda's UGHub platform reflects high-level political commitment and inclusive governance, even as full adoption remains incomplete (Scarpini et al. 2025).

Ensuring complementarities with tax officials

A crucial component for implementing digital tax reforms is managing how new digital tools are incorporated into existing bureaucratic structures. Authorities must provide tax officials with the appropriate training to use the new digital tools and to analyze the vast amounts of data generated by electronic systems. Unlike HICs that maintain large teams of dedicated data scientists and analysts, many LICs have much fewer employees (Okunogbe and Tourek 2024), and these employees are less skilled on average. As such, LIC revenue authorities are ill-equipped to extract actionable insight from their own data for the purposes of verification and collection. Beyond training, tax authorities also need to anticipate and proactively address the possibility of resistance or manipulation from tax officials. The section "Hold Bureaucrats Accountable" in chapter 5 discusses the importance of high-level oversight and sanctioning capacity to enforce compliance with new technology.

Caution: In some cases, technology may disrupt the functioning of tax officials in ways that reduce revenues. Aman-Rana and Minaudier (2026) document a *fall* in agricultural income tax

revenues following the digitization of land records in one state in Pakistan. Prior to the reform, the same bureaucrats were responsible for tax collection and land records management, and helping property owners resolve issues related to land records was a major source of leverage to enforce tax collection. Once they were no longer responsible for land records, they lost this informal enforcement lever and tax collection declined. This highlights the importance of paying close attention to organizational dynamics and both formal and informal power structures in the rollout of such reforms.

Another key factor is to understand the relative strengths of humans and technology systems in each context to appropriately leverage them. While digital tools can enhance routine tax functions, they are not always effective substitutes for skilled tax officials—particularly in tasks that require nuanced judgment and a deep understanding of local economic contexts. In Senegal, Bachas, Brockmeyer, et al. (2025) used a randomized experiment to evaluate whether an algorithm-based audit selection system could outperform tax inspectors in identifying high-evasion firms. The algorithm relied on self-declared tax data and third-party information to flag firms with anomalies such as inconsistencies between reported and observed sales or unusually low profit margins. Due to data limitations and a need for simplicity and transparency, the algorithm was not ML-based and could not rely on historical audit outcomes.

Inspector-selected audits generated 23 percent more revenue than algorithm-selected audits. While this may partly reflect discretion in completing selected cases, the composition of audits also differed: Inspectors disproportionately targeted larger, more profitable firms, likely drawing on local knowledge and their extensive professional experience to prioritize high-yield cases. These results indicate that when tasks are complex and data are weak, the state's most-valuable resource may not be digital infrastructure but its well-trained, well-embedded civil servants.

Policy lessons

- **Anchor digital tax reforms in a clear strategy and diagnostic.** Countries should begin by assessing how core tax functions currently work, where the main constraints lie, and what taxpayers actually need. A realistic, sequenced road map—starting with basic but high-impact reforms such as data cleaning, e-filing, and e-payments—will generally deliver more than fragmented or technology-driven initiatives. Table 3.1 provides priority actions for countries at different levels of digital maturity. Refer also to OECD (2020) for a discussion of pathways to a digitalized tax administration.

Table 3.1 Technology maturity in tax systems

	Far from Digital Frontier	Close to Digital Frontier
Weak tax digital fundamentals	***Constrained and underperforming:*** **Limited state and tax digital readiness** **Current situation** • Fragmented taxpayer registries. • Basic IT in parallel with paper-based processes. • Simple web portal for few taxes and limited functions. • Little or no analytics. • Extensive in-person interactions between tax officials and taxpayers with high discretion. **Actions** • Clean and deduplicate registries; roll out unique taxpayer IDs. • Establish basic portal and e-payment with central data storage and backups. • Establish basic cybersecurity and legal basis for e-services and data sharing.	***Constrained but functional:*** **Emerging tax digitalization aligned to strong national agenda** **Current situation** • Simple tools like e-filing and e-payment in place. • Some basic data analytics (for example, data-driven risk-based audits, automated reminders). **Actions** • Expand data sources and integration. • Connect the flows: Prioritize interoperability, routine data sharing, and automation of simple cross-checks to improve coverage and reduce burdens. • Invest to align with national strategy for digital reforms.
Strong tax digital fundamentals	***Capable but underperforming:*** **Tax system pioneering and advancing state digital reforms** **Current situation** • Tax technology in place but not maximized (for example, tax data from e-invoicing not routinely used for enforcement). • Limited integration of different data sources. **Actions** • Make digital the operating model: Shift investment from pilots and portals to data platforms, skills, governance, and organizational change. • Inform the digital reform of other government ministries, departments, agencies, and entities.	***Capable and high-performing:*** **Tax system key part of state digital vision** **Current situation** • Almost no manual processes or interactions except for appeals. • Tax data routinely used not only for tax administration but also for broader economic policy. • Emerging use of AI. **Actions** • Use advanced tech strategically: Aim for proactive, user-centered, and preventive administration. • Adopt AI and real-time models only where they solve clear problems and can be governed safely. • Lead a national digital reform agenda with experience from the tax digitalization journey.

Source: Original table for this publication.

Note: AI = artificial intelligence; e-filing = electronic filing; e-invoicing = electronic invoicing; e-services = electronic services; IT = information technology.

- **Strengthen data and legal foundations for digital tax administration.** Digital reforms require reliable taxpayer identification, interoperable data systems, and clear rules on data use, sharing, privacy, and security. Establishing these foundations, and backing them with political commitment, allows tax data to flow securely across government and reduces the risk that new systems become isolated "digital islands."
- **Put people, behavior, and trust at the center of reform.** Technology will deliver results only if taxpayers and tax officials understand it, trust it, and see value in using it. Systematic communication, training, and user support, combined with simple, accessible digital services, are essential. It is also crucial to recognize that technology can be gamed or resisted and must be complemented by traditional monitoring and enforcement.
- **Leverage third-party data through a shared vision and partnerships.** The largest short-term gains often come from integrating third-party data (such as e-invoices, e-payments, and information from other agencies and regulated firms) and using it for cross-checks, pre-filled returns, withholding, and risk-based audits. Realizing this potential requires a clear national vision for data; coherent policies and standards for data sharing; and structured collaboration among tax authorities, other public entities, and private actors.
- **Use tax digitalization as a platform for broader state digital transformation.** Tax administrations can both benefit from and help drive wider DPI. Linking tax systems to national ID, payment, and data exchange platforms and promoting routine data sharing across ministries can strengthen revenue mobilization while supporting broader economic management and social policy.

Annex 3A Sources for figure 3.6

Identification

Lediga, Collen, Nadine Riedel, and Kristina Strohmaier. 2025. "What You Do (Not) Get When Expanding the Net—Evidence from Forced Taxpayer Registrations in South Africa." *Journal of Development Economics* 172: 103388.

Okunogbe, Oyebola. 2021. *Becoming Legible to the State: The Role of Identification and Collection Capacity in Taxation.* Policy Research Working Paper 9852. World Bank.

Detection/Third-party information

Ali, Merima, Abdulaziz B. Shifa, Abebe Shimeles, and Firew Woldeyes. 2021. "Building Fiscal Capacity in Developing Countries: Evidence on the Role of Information Technology." *National Tax Journal* 74 (3): 591–620.

Bellon, Matthieu, Era Dabla-Norris, Salma Khalid, and Frederico Lima. 2022. "Digitalization to Improve Tax Compliance: Evidence from VAT e-Invoicing in Peru." *Journal of Public Economics* 210: 104661.

Brockmeyer, Anne, Spencer Smith, Marco Hernandez, and Stewart Kettle. 2019. "Casting a Wider Tax Net: Experimental Evidence from Costa Rica." *American Economic Journal: Economic Policy* 11 (3): 55–87.

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

Das, Satadru, Lucie Gadenne, Tushar Nandi, and Ross Warwick. 2023. "Does Going Cashless Make You Tax-Rich? Evidence from India's Demonetization Experiment." *Journal of Public Economics* 224: 104907.

Hakizimana, Naphtal, and Fabrizio Santoro. 2023. "Technology Evolution and Tax Compliance: Evidence from Rwanda." *African Multidisciplinary Tax Journal* 3 (1): 125–49.

Kotsogiannis, Christos, Luca Salvadori, John Karangwa, and Innocente Murasi. 2025. "E-invoicing, Tax Audits and VAT Compliance." *Journal of Development Economics* 172: 103403.

Laajaj, Rachid, Marcela Eslava, and Tidiane Kinda. 2023. "The Costs of Bureaucracy and Corruption at Customs: Evidence from the Computerization of Imports in Colombia." *Journal of Public Economics* 225: 104969.

Londoño-Vélez, Juliana, and Javier Ávila-Mahecha. 2021. "Enforcing Wealth Taxes in the Developing World: Quasi-experimental Evidence from Colombia." *American Economic Review: Insights* 3 (2): 131–48.

Mascagni, Giulia, Andualem T. Mengistu, and Firew B. Woldeyes. 2021. "Can ICTs Increase Tax Compliance? Evidence on Taxpayer Responses to Technological Innovation in Ethiopia." *Journal of Economic Behavior and Organization* 189: 172–93.

Naritomi, Joana. 2019. "Consumers as Tax Auditors." *American Economic Review* 109 (9): 3031–72.

Collection: Facilitation and communication

Apeti, Ablam Estel, and Eyah Denise Edoh. 2023. "Tax Revenue and Mobile Money in Developing Countries." *Journal of Development Economics* 161: 103014.

Cohen, Isabelle. 2024. "Technology and the State: Building Capacity to Tax via Text." *Journal of Public Economics* 236: 105154.

Das, Satadru, Lucie Gadenne, Tushar Nandi, and Ross Warwick. 2023. "Does Going Cashless Make You Tax-Rich? Evidence from India's Demonetization Experiment." *Journal of Public Economics* 224: 104907.

Hoy, Christopher, Luke McKenzie, and Mathias Sinning. 2024. "Improving Tax Compliance without Increasing Revenue: Evidence from Population-Wide Randomized Controlled Trials in Papua New Guinea." *Economic Development and Cultural Change* 72 (2): 691–723.

Mascagni, Giulia, and Christopher Nell. 2022. "Tax Compliance in Rwanda: Evidence from a Message Field Experiment." *Economic Development and Cultural Change* 70 (2): 587–623.

Okunogbe, Oyebola, and Victor Pouliquen. 2022. "Technology, Taxation, and Corruption: Evidence from the Introduction of Electronic Tax Filing." *American Economic Journal: Economic Policy* 14 (1): 341–72.

Ortega, Daniel, and Carlos Scartascini. 2020. "Don't Blame the Messenger. The Delivery Method of a Message Matters." *Journal of Economic Behavior and Organization* 170: 286–300.

Santoro, Fabrizio, Razan Amine, and Tanele Magongo. 2024. "Encouraging Digital Tax Tools as a Response to Covid: Evidence from Eswatini." *International Tax and Public Finance* 31 (1): 95–135.

Santoro, Fabrizio, and Giulia Mascagni. 2023. "Visual Nudges: How Deterrence and Equity Shape Tax Attitudes and Behaviour in Rwanda." *Journal of Behavioral and Experimental Economics* 107: 102118.

Notes

1. In 2023, internet penetration reached nearly 23 percent in LICs and 57 percent in LMICs—up from 4 percent and 12 percent, respectively, just 13 years earlier. Likewise, mobile subscriptions surged from around 31 to 70 per 100 people in LICs and from 60 to 99 in LMICs between 2010 and 2023 (International Telecommunication Union 2025).
2. The International Survey on Revenue Administration collects survey data from national and federal tax administrations and is administered jointly by the Asian Development Bank, Inter-American Center of Tax Administrations, Intra-European Organisation of Tax Administrations, the International Monetary Fund, and the Organisation for Economic Co-operation and Development (refer to the International Survey on Revenue Administration database, https://data.imf.org/en/datasets/ISORA:ISORA_LATEST_DATA_PUB).
3. More information about the tax technology measures can be found in the OECD Inventory of Tax Technology Initiatives (https://www.oecd.org/content/oecd/en/data/datasets/inventory-of-tax-technology-initiatives.html/).
4. Recent research questions this long-standing criticism of VAT, showing that in the presence of informal markets, VAT can be progressive (Bachas et al. 2024).
5. Additional requirements are to accurately estimate VAT paid (for example, through e-invoicing discussed in the next section) and securely transfer the rebates.
6. Technology tools also help with the valuation of property (discussed in the section "Verifying Tax Liabilities") and the collection of liabilities (discussed in the section "Collecting Tax Liabilities").
7. In Dakar, at most one-third of cadastral plots were listed on the valuation roll (Knebelmann et al. 2021). In Zambia, between 30 and 70 percent of properties are missing from valuation rolls, with significant variation between local councils (McCort et al. 2024).

References

ADB (Asian Development Bank), CIAT (Inter-American Center of Tax Administrations), IMF (International Monetary Fund), IOTA (Intra-European Organisation of Tax Administrations), and OECD (Organisation for Economic Co-operation and Development). 2023. "International Survey on Revenue Administration." ADB, CIAT, IMF, IOTA, and OECD.

Adhikari, Bibek, James Alm, and Timothy F. Harris. 2021. "Small Business Tax Compliance under Third-Party Reporting." *Journal of Public Economics* 203: 104514.

Ali, Merima, Abdulaziz B. Shifa, Abebe Shimeles, and Firew Woldeyes. 2017. "Building Fiscal Capacity: The Role of ICT." Working Paper Series 290. African Development Bank.

Ali, Merima, Abdulaziz B. Shifa, Abebe Shimeles, and Firew Woldeyes. 2021. "Building Fiscal Capacity in Developing Countries: Evidence on the Role of Information Technology." *National Tax Journal* 74 (3): 591–620.

Alper, Oya Pinar Ardic, Julia Clark, Guillermo Alfonso Galicia Rabadan, and Georgina Marin. 2025. "Digital Public Infrastructure and Development: A World Bank Group Approach." Digital Transformation White Paper, Volume 1. World Bank.

Aman-Rana, Shan and Clement Minaudier. 2026. "Spillovers in State Capacity Building: Evidence from the Digitization of Land Records in Pakistan." *American Economic Review* 116 (4): 1459–498.

Anyidoho, Nana Akua, Max Gallien, Michael Rogan, and Vanessa van den Boogaard. 2022. "Mobile Money Taxation and Informal Workers: Evidence from Ghana's E-Levy." ICTD Working Paper 146. Institute of Development Studies.

Aoki, Naomi, Tetsuya Tomohiko, Go Naruse, and Kentaro Maeda. 2024. "Explainable AI for Government: Does the Type of Explanation Matter to the Accuracy, Fairness, and Trustworthiness of an Algorithmic Decision as Perceived by Those Who Are Affected?" *Government Information Quarterly* 41 (4): 101965.

Apeti, Ablam Estel, and Eyah Denise Edoh. 2023. "Tax Revenue and Mobile Money in Developing Countries." *Journal of Development Economics* 161: 102999.

Asad, Sher Afghan, Adnan Khan, Ben Olken, Mahvish Shaukat, and Jie Zhou. 2025. "Increasing Revenue Collection with Computer Vision: Experiments in Pakistan." Abdul Latif Jameel Poverty Action Lab. https://www.povertyactionlab.org/initiative-project/increasing-revenue-collection-computer-vision-experiments-pakistan.

Bachas, Pierre, Anne Brockmeyer, Alipio Ferreira, and Bassirou Sarr. 2025. "Algorithms and Bureaucrats: Evidence from Tax Audit Selection in Senegal." Policy Research Working Paper 11205. World Bank.

Bachas, Pierre, Tatiana Flores, Gabriel Lara Ibarra, et al. 2025. "VAT Cashback Programs in Practice: The Case of Devolve–ICMS in Rio Grande do Sul, Brazil." Prosperity Insight Series. World Bank.

Bachas, Pierre, Lucie Gadenne, and Anders Jensen. 2024. "Informality, Consumption Taxes, and Redistribution." *Review of Economic Studies* 91 (5): 2604–634.

Barczay, Michael, Shafik Hebous, Fayçal Sawadogo, and Jean-François Wen. 2025. "Taxing Mobile Money: Theory and Evidence." IMF Working Papers 255. International Monetary Fund.

Battaglini, Marco, Luigi Guiso, Chiara Lacava, Douglas L. Miller, and Eleonora Patacchini. 2025. "Refining Public Policies with Machine Learning: The Case of Tax Auditing." *Journal of Econometrics* 249: 105847.

Bellon, Matthieu, Era Dabla-Norris, Salma Khalid, and Frederico Lima. 2022. "Digitalization to Improve Tax Compliance: Evidence from VAT E-Invoicing in Peru." *Journal of Public Economics* 210: 104661.

Benzarti, Youssef, Santiago Garriga, and Dario Tortarolo. 2024. "Can VAT Cuts and Anti-Profiteering Measures Dampen the Effects of Food Price Inflation?" NBER Working Paper 32241. National Bureau of Economic Research.

Bergeron, Augustin, Arthur Fournier, Jean Kaoma Kabeya, Gabriel Tourek, and Jonathan L. Weigel. 2023. "Using Machine Learning to Create a Property Tax Roll: Evidence from the City of Kananga, DR Congo." ICTD Working Paper 176. Institute of Development Studies.

Bernad, Ludovic, Yves Nsengiyumva, Benjamin Byinshi, Naphtal Hakizimana, and Fabrizio Santoro. 2023. "Digital Merchant Payments as a Medium of Tax Compliance." ICTD Working Paper 159. Institute of Development Studies.

Braithwaite, Valerie. 2020. "Beyond the Bubble That Is Robodebt: How Governments That Lose Integrity Threaten Democracy." *Australian Journal of Social Issues* 55 (3): 242–59.

Brockmeyer, Anne, and Marco Hernandez. 2016. "Taxation, Information, and Withholding: Evidence from Costa Rica." Policy Research Working Paper 7600. World Bank.

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

Brockmeyer, Anne, Spencer Smith, Marco Hernandez, and Stewart Kettle. 2019. "Casting a Wider Tax Net: Experimental Evidence from Costa Rica." *American Economic Journal: Economic Policy* 11 (3): 55–87.

Cantens, Thomas, and Herve Tourpe. 2025. "How AI Can Help Both Tax Collectors and Taxpayers." *IMF Blog,* February 25, 2025. https://www.imf.org/en/blogs/articles/2025/02/25/how-ai-can-help-both-the-taxman-and-the-taxpayer.

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

Casher, Claire Susan, Julia Clark, and Anna Zita Metz. 2021. *ID4D Global Dataset 2021, Volume 1: Global ID Coverage Estimates*. Technical Report. World Bank.

Chandra, Kamya, Tanushka Valid, and Pramod Varma. 2024. "Creating Value for Taxpayers." *IMF Finance and Development Magazine* 61 (3). https://www.imf.org/en/publications/fandd/issues/2024/09/creating-value-for-taxpayers-chandra-vaid-varma.

Clark, Julia M. 2018. *Public Sector Savings and Revenue from Identification Systems: Opportunities and Constraints*. World Bank.

Cohen, Isabelle. 2024. "Technology and the State: Building Capacity to Tax via Text." *Journal of Public Economics* 236: 105–54.

Das, Satadru, Lucie Gadenne, Tushar Nandi, and Ross Warwick. 2023. "Does Going Cashless Make You Tax-Rich? Evidence from India's Demonetization Experiment." *Journal of Public Economics* 224: 104907.

Decuypere, Anouk, and Anne Van de Vijver. 2025. "AI: Friend or Foe of Fairness Perceptions of the Tax Administration? A Survey Experiment on Citizens' Procedural Fairness Perceptions." *Government Information Quarterly* 42 (1): 102002.

de la Feria, Rita, and Artur Swistak. 2024. "Designing a Progressive VAT." IMF Working Paper 78. International Monetary Fund.

Dom, Roel, Anna Custers, Stephen R. Davenport, and Wilson Prichard. 2022. *Innovations in Tax Compliance: Building Trust, Navigating Politics, and Tailoring Reform*. World Bank.

Eissa, Nada, and Andrew Zeitlin. 2014. "Using Mobile Technologies to Increase VAT Compliance in Rwanda." McCourt School of Public Policy, Georgetown University. https://scholar.google.com/citations?view_op=view_citation&hl=en&user=HhI9MiEAAAAJ&cstart=20&pagesize=80&sortby=pubdate&citation_for_view=HhI9MiEAAAAJ:f2IySw72cVMC.

Fan, Haichao, Yu Liu, Nancy Qian, and Jaya Wen. 2018. "Computerizing VAT Invoices in China." NBER Working Paper 24414. National Bureau of Economic Research.

Farooq, Khrystyna, and Benjamin J. Solowiej. 2021. *Artificial Intelligence in the Public Sector: Maximizing Opportunities, Managing Risks*. Equitable Growth, Finance and Institutions Insight. World Bank.

Garriga, Pablo, and Dario Tortarolo. 2024. "Firms as Tax Collectors." *Journal of Public Economics* 233: 105092.

Hadwick, David, and Shimeng Lan. 2021. "Lessons to Be Learned from the Dutch Childcare Allowance Scandal: A Comparative Review of Algorithmic Governance by Tax Administrations in the Netherlands, France and Germany." *World Tax Journal* 609.

Hakizimana, Naphtal, and Fabrizio Santoro. 2023. "Technology Evolution and Tax Compliance: Evidence from Rwanda." *African Multidisciplinary Tax Journal* 30 (1).

Hearson, Martin, Philip Mader, Mary Abounabhan, Marco Carreras, Awa Diouf, Adrienne Lees, Hannelore Niesten, Fabrizio Santoro, and Christopher Wales. 2024. "Taxing Mobile Money in Africa: Risk and Reward." ICTD Policy Brief 10. Institute of Development Studies.

Hoy, Christopher, Luke McKenzie, and Mathias Sinning. 2024. "Improving Tax Compliance without Increasing Revenue: Evidence from Population-Wide Randomized Controlled Trials in Papua New Guinea." *Economic Development and Cultural Change* 72 (2): 691–723.

International Telecommunication Union. 2025. World Telecommunication/ICT Indicators Database. https://datahub.itu.int/query/.

Jouste, Maria, Milly Nalukwago, and Ronald Waiswa. 2021. "Do Tax Administrative Interventions Targeted at Small Businesses Improve Tax Compliance and Revenue Collection? Evidence from Ugandan Administrative Tax Data." WIDER Working Paper 2021/17. United Nations University–World Institute for Development Economics Research.

Junquera, Raúl, Ivan Krsul, Vladimir Calderón, Joey Ghaleb, and Cristian Lucas. 2025. "From Theory to Practice: A Strategic AI Integration Model for Revenue Administrations." Prosperity Insight Series. World Bank.

Klapper, Leora, Dorothe Singer, Laura Starita, and Alexandra Norris. 2025. *The Global Findex Database 2025: Connectivity and Financial Inclusion in the Digital Economy*. World Bank.

Kleven, Henrik Jacobsen, Martin B. Knudsen, Claus Thustrup Kreiner, Søren Pedersen, and Emmanuel Saez. 2011. "Unwilling or Unable to Cheat? Evidence from a Tax Audit Experiment in Denmark." *Econometrica* 79 (3): 651–92.

Knebelmann, Justine, Victor Pouliquen, and Bassirou Sarr. 2021. "Developing and Adopting New Digital Tools for Property Tax Reform in Dakar, Senegal." *ICTD Blog Series*, August 3, 2021. https://www.ictd.ac/blog/developing-adopting-digital-tools-property-tax-reform-dakar-senegal/.

Knebelmann, Justine, Victor Pouliquen, and Bassirou Sarr. 2026. "Discretion versus Algorithms: Bureaucrats, Tax Equity, and Acceptability." IFS Working Paper 26/34. Institute for Fiscal Studies.

Kochanova, Anna, Zahid Hasnain, and Bradley Larson. 2020. "Does E-Government Improve Government Capacity? Evidence from Tax Compliance Costs, Tax Revenue, and Public Procurement Competitiveness." *World Bank Economic Review* 34 (1): 101–20.

Kotsogiannis, Christos, Luca Salvadori, John Karangwa, and Innocente Murasi. 2025. "E-invoicing, Tax Audits and VAT Compliance." *Journal of Development Economics* 172: 103403.

Krsul, Ivan, Charles Blanco, and Viet Anh Nguyen. 2026. "Use Cases and Case Studies of AI in Revenue Administrations." Unpublished Document. World Bank.

Laajaj, Rachid, Marcela Eslava, and Tidiane Kinda. 2023. "The Costs of Bureaucracy and Corruption at Customs: Evidence from the Computerization of Imports in Colombia." *Journal of Public Economics* 225: 104969.

Lediga, Collen, Nadine Riedel, and Kristina Strohmaier. 2025. "What You Do (Not) Get When Expanding the Net: Evidence from Forced Taxpayer Registrations in South Africa." *Journal of Development Economics* 172: 103388.

Lees, Adrienne, Maria Jouste, Nicholas Musoke, and Joseph Okello Ayo. 2025. "The Panopticon Taxman: The Impact of E-Invoicing on VAT Compliance in Uganda." WIDER Working Paper 2025/112. United Nations University–World Institute for Development Economics Research.

Li, Jing, Xun Wang, and Yongxiang Wu. 2020. "Can Government Improve Tax Compliance by Adopting Advanced Information Technology? Evidence from the Golden Tax Project III in China." *Economic Modelling* 93: 384–97.

Londoño-Vélez, Juliana, and Javier Ávila-Mahecha. 2021. "Enforcing Wealth Taxes in the Developing World: Quasi-experimental Evidence from Colombia." *American Economic Review: Insights* 3 (2): 131–48.

Long, Cathal, and Antoine Lacroix. 2024. "What Do We Know about Digital Public Infrastructure (DPI) in Africa?" *ODI Global Expert Comment,* November 18, 2024. https://odi.org/en/insights/what-do-we-know-about-digital-public-infrastructure-dpi-in-africa/.

Luciano, Maria, and Giovana Fleck. 2025. "How Disinformation Is Undermining Trust in Brazil's Most Used Digital Public Infrastructure." *Tech Policy Press*. https://www.techpolicy.press/how-disinformation-is-undermining-trust-in-brazils-most-used-digital-public-infrastructure/.

Mahajan, Aprajit, Shekhar Mittal, Ofir Reich, and Taha Barwahwala. 2024. "Using Machine Learning to Catch Bogus Firms." ICTD Working Paper 196. Institute of Development Studies.

Mascagni, Giulia, Andualem T. Mengistu, and Firew B. Woldeyes. 2021. "Can ICTs Increase Tax Compliance? Evidence on Taxpayer Responses to Technological Innovation in Ethiopia." *Journal of Economic Behavior and Organization* 189: 172–93.

Mascagni, Giulia, and Christopher Nell. 2022. "Tax Compliance in Rwanda: Evidence from a Message Field Experiment." *Economic Development and Cultural Change* 70 (2).

Mayega, Jova, Ronald Waiswa, Jane Nabuyondo, and Milly Nalukwago. 2021. *How Clean Are Our Taxpayer Returns? Data Management in Uganda Revenue Authority*. African Tax Administration Working Paper 24. Institute of Development Studies.

McCort, Rachel, Graeme Stewart-Wilson, and Nicolas Orgeira Pillai. 2024. "Understanding the Potential for Property Tax Reform in Zambia." Policy Brief 2. Local Government Revenue Initiative.

Mukazayire, Marie, and Camille Barras. 2025. "Expanding the Property Tax Base: Innovations in Property Identification and Challenges in Côte d'Ivoire." *LOGRI Blogs,* February 13, 2025.

https://logri.org/2025/02/expanding-the-property-tax-base-innovations-in-property-identification-and-challenges-in-cote-divoire/.

Naritomi, Joana. 2019. "Consumers as Tax Auditors." *American Economic Review* 109 (9): 3031–72.

Niesten, Hannelore, and Christopher Wales. 2024. "Exploring the Development of Mobile Money Markets and Revenue Collection from Digital Financial Services Taxes in Africa." ICTD Policy Brief 12. Institute of Development Studies.

OECD (Organisation for Economic Co-operation and Development). 2020. "Tax Administration 3.0: The Digital Transformation of Tax Administration." OECD Publishing. https://doi.org/10.1787/ca274cc5-en.

OECD (Organisation for Economic Co-operation and Development). 2023. *OECD Tax Technology Tools and Digital Delivery Channels: Current and Planned Availability in OECD Member Countries.* OECD Inventory of Tax Technology Initiatives. OECD Publishing.

Okunogbe, Oyebola. 2013. "Optimising Real Estate Tax in Liberia: Implications for Revenue Performance and Economic Growth." Working Paper. International Growth Centre.

Okunogbe, Oyebola. 2021. *Becoming Legible to the State: The Role of Identification and Collection Capacity in Taxation.* Policy Research Working Paper 9852. World Bank.

Okunogbe, Oyebola. Forthcoming. "Becoming Legible to the State: The Necessary but Not Sufficient Role of Identification in Taxation." *American Economic Review*.

Okunogbe, Oyebola, and Victor Pouliquen. 2022. "Technology, Taxation, and Corruption: Evidence from the Introduction of Electronic Tax Filing." *American Economic Journal: Economic Policy* 14 (1): 341–72.

Okunogbe, Oyebola, and Fabrizio Santoro. 2023. "The Promise and Limitations of Information Technology for Tax Mobilization." *World Bank Research Observer* 38 (2): 295–324.

Okunogbe, Oyebola, and Gabriel 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.

Ortega, Daniel, and Carlos Scartascini. 2020. "Don't Blame the Messenger. The Delivery Method of a Message Matters." *Journal of Economic Behavior and Organization* 170: 286–300.

Parsheera, Smriti. 2024. "Stack Is the New Black? Evolution and Outcomes of the 'India-Stackification' Process." *Computer Law and Security Review* 52: 105947.

Rossel, Lucia, and Fabrizio Santoro. 2024. "Broadening the Tax Horizon through Information: The Power of Third-Party Data for African Tax Administrations." *ICTD Blog Series*, March 25, 2024. https://www.ictd.ac/blog/power-of-third-party-data-african-tax-administrations/.

Santoro, Fabrizio, Razan Amine, and Tanele Magongo. 2024. "Encouraging Digital Tax Tools as a Response to Covid: Evidence from Eswatini." *International Tax and Public Finance* 31 (1): 95–135.

Santoro, Fabrizio, and Giulia Mascagni. 2023. "Visual Nudges: How Deterrence and Equity Shape Tax Attitudes and Behaviour in Rwanda." *Journal of Behavioral and Experimental Economics* 107: 102118.

Santoro, Fabrizio, Phindile Masuku, and Tanele Magongo. 2025. "Cashless Tax Systems: Voluntary vs. Mandated Digital Payments in Eswatini." ICTD African Tax Administration Paper 43. Institute of Development Studies.

Santoro, Fabrizio, Wilson Prichard, and Giulia Mascagni. 2024. "Digital IDs and Digital Payments: Opportunities and Challenges for Tax Administration." ICTD Policy Brief 7. Institute of Development Studies.

Santoro, Fabrizio, Celeste Scarpini, and Stephen Okiya. 2024. "The Potential of Digital ID Systems for Tax Administration: The Case of Ghana." ICTD African Tax Administration Paper 39. Institute of Development Studies.

Scarpini, Celeste, Fabrizio Santoro, Ronald Waiswa, Moyosore Arewa, and Jane Nabuyondo. 2025. "Enhancing Taxpayer Registration with Inter-Institutional Data Sharing: Evidence from Uganda." *Data and Policy* 7: e81.

Schreiber, Leon. 2018. *A Foundation for Reconstruction: Building the Rwanda Revenue Authority, 2001–2017*. Technical Report 29. Princeton University.

Shah, Jawad. 2026. "Using Computerized Information to Enforce VAT: Evidence from Pakistan." *Journal of Development Economics* 178: 103595.

Suri, Tavneet, and William Jack. 2016. "The Long-Run Poverty and Gender Impacts of Mobile Money." *Science* 354 (6317): 1288–292.

The Economist. 2025. "India Is Obsessed with Giving Its People 'Unique IDs.'" *The Economist*, March 20.

Tinta, Jule Kaïni, Mouhamed Zerbo, Fabrizio Santoro, Awa Diouf, and Kèrabouro Pale. 2024. "Electronic Services and Tax Compliance: Evidence from Medium and Small Businesses in Burkina Faso." ICTD Working Paper 209. Institute of Development Studies.

Totolo, Edoardo. 2025. "DPI's Unspoken Trade-Offs: What Leaders Must Weigh to Make Digital Rails Work in Finance and Beyond." Brief. Center for Financial Inclusion. https://www.centerforfinancialinclusion.org/brief/dpis-unspoken-trade-offs-what-leaders-must-weigh-to-make-digital-rails-work-in-finance-and-beyond/.

World Bank. 2020. *Doing Business 2020*. World Bank.

Zollmann, J., N. Sambuli, and C. Wanjala. 2024. "Citizen Experiences with DPI: Kenya's Digital ID Transition." Brief. Center for Financial Inclusion. https://www.centerforfinancialinclusion.org/brief/citizen-experiences-with-dpi-kenyas-digital-id-transition/.

CHAPTER 4

Transparency and Taxation of Top Economic Actors

Prepared by Pierre Bachas, Yi Jie Gwee, and Dario Tortarolo

Introduction

The globalization of trade in goods and services, financial flows, and the movement of people has heightened the mobility of tax bases. At the same time, rising market power and wealth concentration have drawn renewed policy attention to the issue of taxing *top economic actors:* multinational enterprises (MNEs) and high-net-worth individuals (HNWIs). Taxing these entities presents two distinctive challenges: Their real and reported economic activity is highly mobile, and their organizational structures are complex. Taxing top economic actors is also a politically salient and polarizing issue, as some view them as key engines of innovation and growth, while others argue that they benefit disproportionately from existing rules and that their activities may not always translate into broad-based economic gains. Regardless of one's stance, the role of top economic actors in domestic revenue mobilization (DRM) is critical not only because they account for a disproportionately large share of total income but also because their tax contribution is central to perceptions of the tax system's fairness and legitimacy.

This chapter examines how the taxation of top economic actors in emerging markets and developing economies (EMDEs) has evolved and where it may be headed. To date, both the academic literature and policy debate have focused largely on advanced economies. As evidence from EMDEs has grown, however, many of these questions can now be revisited in their context. Over the past decade, international and domestic transparency reforms have transformed tax enforcement for top economic actors. *Tax transparency* refers to the growing quantity and quality of information available to tax administrations on HNWIs' and MNEs' ownership structures, cross-border activities, and financial wealth.

As discussed throughout this chapter, these innovations are expanding the public finance frontier by making income, profits, and ownership more observable. While *technology* improves reporting and formalization across the broader taxpayer population (refer to chapter 3), *transparency* extends the reach of taxation to top economic actors. By reducing opportunities for concealment, it strengthens the effectiveness of progressive income taxation and, as discussed in chapter 5, can also strengthen public *trust* by making the tax system more visibly fair.

This chapter is organized into three parts. The first highlights the economic weight of the largest firms and wealthiest individuals, their tax treatment, and the resulting efficiency challenges. Measuring their economic footprint is difficult, especially in EMDEs, as the activities of top economic actors remain only partially observed and globally comparable data are scarce. It then outlines the main challenges governments face in taxing them. For MNEs, globalization has increased both profit shifting and firms' ability to negotiate favorable tax treatment. A "race to the bottom," fueled by low and sometimes firm-specific tax rates, has left most countries worse off. At the same time, complex corporate tax systems and international rules impose high compliance costs, making tax design a difficult balancing act. Similar challenges arise for HNWIs, who can hold assets offshore and shift income and wealth across asset classes (for example, from labor to capital). Concerned about capital flight and discouraging entrepreneurship, governments have generally taken a cautious approach to taxing this influential group.

The second part of this chapter discusses the innovations in transparency and international coordination that are pushing the fiscal frontier and challenging the commonly held view that it is too difficult to observe top economic actors' activity comprehensively. These innovations can be captured by the acronym ABCD:

- **A**utomatic exchange of financial information,
- **B**eneficial ownership registries,
- **C**ountry-by-country reporting (CbCR) of multinational activity, and
- **D**igital sector taxation.

The emerging literature assessing the past decade's experience offers grounds for cautious optimism about the ABCD's effectiveness in raising transparency. We synthesize the core lessons and highlight the remaining challenges, with particular attention to EMDEs.

The third part of this chapter looks ahead to the future of income taxation in EMDEs. As chapter 2 shows, the current narrow income tax bases undermine equity and efficiency. Transparency and international coordination do more than expand information: They make ambitious income tax reforms feasible by lowering the administrative costs of taxing top

economic actors. In some countries, integrating the personal income tax (PIT) and corporate income tax (CIT) and, thereby, measuring income and tax liabilities comprehensively are within reach. For most EMDEs, however, an incremental path is more realistic: Strengthen each tax with careful attention to their interplay. For the PIT, this means narrowing labor–capital tax differentials; ensuring progressivity of rates, including at the very top; and broadening the base by rationalizing concessions, and, in some cases, lowering thresholds. For the CIT, this involves advancing a feasible domestic agenda for taxing MNEs; reforming tax incentives to widen the base; and maintaining a simple, broad, and moderately rated CIT. The chapter concludes by considering emerging risks in the ever-evolving "cat-and-mouse" dynamic between tax authorities and taxpayers seeking to minimize their tax burden.

Top economic actors

This section examines the economic footprint of MNEs and HNWIs in EMDEs and the tax challenges they pose, setting the stage for the discussion of transparency innovations.

MNEs and corporate taxation

MNEs are central to the global economy. Estimates suggest that MNEs account for one-third of the world's output and two-thirds of exports, and they employ one-fourth of the global workforce (De Backer et al. 2019; Delpeuch et al. 2025). MNEs drive investment, facilitate trade, and contribute to economic growth and development across borders. However, their ability to operate across multiple countries enables them to exploit differences in tax regimes and shift profits without relocating real economic activity. In this way, their mobility weakens the effectiveness of the CIT, which remains a significant source of revenue in most EMDEs (refer to chapter 2).

MNE activity in developing economies. Tracking MNE activity consistently over time remains challenging (refer to box 4.1). One of the few sources is the Analytical Activities of MNEs (AAMNE) database of the Organisation for Economic Co-operation and Development (OECD). As of 2020, this database shows that MNEs account for about one-third of total output, one-half of exports, and one-fifth of the gross value added. Consequently, MNEs have become increasingly important, especially in upper-middle-income countries (UMICs): Between 2010 and 2020, their share of value added and exports rose by 5.4 and 12.4 percentage points, respectively (refer to figure 4.1, panel a). However, the database does not include information on tax payments, limiting our ability to quantify MNEs' contribution to tax revenues.

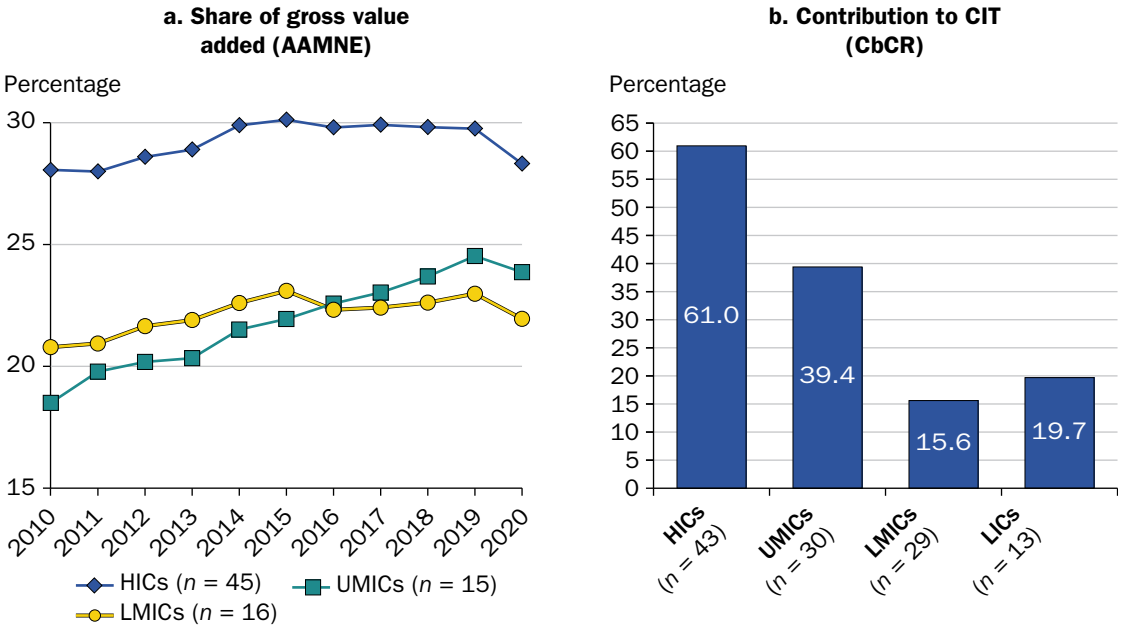
Box 4.1 Limited data on MNEs' activities

Comparable statistics on multinational enterprise (MNE) activity remain scarce, particularly for EMDEs. No single database offers comprehensive, consistent coverage across countries and time. Several existing sources listed below provide partial insights into MNE operations.

- **MNEs' country-by-country reporting (CbCR): The new gold standard?** Introduced in 2016, CbCR requires large MNEs with global revenues above €750 million to report income, profits, taxes, and activity for each country in which they operate. Once these reports are filed with the tax authority of the parent entity's country, they are anonymized and shared with the Organisation for Economic Co-operation and Development (OECD). Although until now only aggregate data covering a few years have been published, over time, CbCR should become an increasingly valuable source to analyze MNE activity across countries.
- **OECD Analytical Activities of MNEs (AAME) database.** This database records country-level data on revenue, value added, and trade by firm ownership type (foreign MNEs, domestic MNEs, and non-MNEs). It covers 41 sectors in 76 countries from 2008 to 2020, drawing on national statistics and Trade in Value-Added data. Coverage of emerging markets and developing economies (EMDEs) is limited.
- **Foreign Affiliate Statistics (FATS).** This country-level dataset includes firms with more than 50 percent foreign ownership, broken down by sector and ownership country. While analytically rich, FATS coverage is uneven: It excludes domestic MNEs and contains discrepancies between inward and outward reporting and holding-company structures that lead to double counting of profits. Sources include European MNEs (via Eurostat since 2008) and United States MNEs (via Activities of US Multinational Enterprises since 1982).
- **Orbis.** This subscription-based database contains firm-level information on financial activities and ownership structures for over 600 million entities. Its coverage is strong for advanced economies but weak for EMDEs. Its consolidated group data on MNEs are relatively complete, but its unconsolidated data are uneven. The opacity of Orbis' data sources and the difficulty of replicating queries complicate statistical use.

A country-by-country breakdown of MNEs' activity. The recent implementation of the country-by-country reporting (CbCR) provides an opportunity to advance our understanding of MNEs (refer to the section "*C* Is for CbCR of Multinational Activity"). It mandates reporting of the activity and taxes paid by MNEs with global revenue of at least €750 million (accounting for 90 percent of global MNE profits; OECD 2020). Of these large MNEs, 6,361 were headquartered in high-income countries (HICs), 1,142 in UMICs, and 125 in

Figure 4.1 Importance of MNEs to economic activity and corporate tax revenues



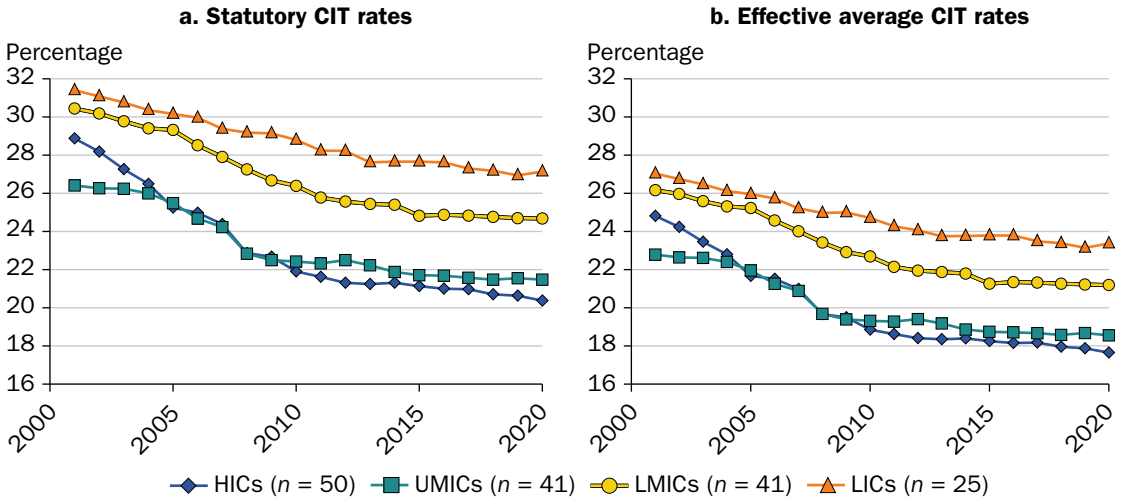
Sources: Original figure for this publication based on the Analytical Activities of Multinational Enterprises Database of the Organisation for Economic Co-operation and Development, anonymized and aggregated CbCR statistics, the Global Revenue Statistics Database, and the International Monetary Fund's World Economic Outlook database.

Note: Country observations are weighted by their share of the global GDP in 2010 (panel a) and 2021 (panel b). The percentages in panel b are calculated by dividing the amount of total tax accrued (reported in CbCR) by the total CIT revenues (as reported in the OECD's Global Revenue Statistics database). There might be timing differences in recording tax payments in the CbCR data (OECD 2024a).
AAMNE = Analytical Activities of Multinational Enterprises database; CbCR = country-by-country reporting; CIT = corporate income tax; GDP = gross domestic product; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; MNE = multinational enterprise; OECD = Organisation for Economic Co-operation and Development; UMICs = upper-middle-income countries.

lower-middle-income countries (LMICs). Figure 4.1, panel b, shows that, in EMDEs, as of 2021, MNEs accounted for 39 percent of total CIT revenues in UMICs and 16–20 percent in low-income countries (LICs) and LMICs.

A race to the bottom in corporate taxation? Despite their need for fiscal space, many countries appear increasingly constrained in their ability to raise CITs. Statutory corporate tax rates (refer to figure 4.2, panel a) have fallen over the past 20 years for countries at all income levels—a drop that has not been compensated by a broadening of the definition of the corporate tax base: Figure 4.2, panel b, shows that forward-looking effective tax rates (ETRs) have also declined. These measures forecast tax payments over the lifetime of a new investment, considering both the tax rate and key elements of the tax base (for example, tax deductions and incentives).

Figure 4.2 Racing to the bottom in CIT rates



Source: Original figure for this publication based on the Research School of International Taxation's International Tax Institutions database.

Note: Panel a shows the average statutory CIT rate by income group and year (unweighted). Panel b shows the average forward-looking effective CIT rate by income group and year (unweighted). Countries with less than 1 million in population (as of 2024) are excluded from the sample. Missing values are extrapolated, taking the most-recent (or earliest) available year. CIT = corporate income tax; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

Three main factors are often cited to explain the global "race to the bottom" in corporate taxation: the growing risk of profit shifting, the rising mobility of real economic activity, and the perceived increase in positive spillovers from attracting MNEs in the knowledge economy.

- **Risk of profit shifting.** MNEs respond to international tax rate differentials by reallocating profits from high- to low-tax countries. They achieve this through transfer pricing; intragroup financial arrangements; and the location of intangible assets, such as intellectual property (Beer et al. 2020; Wier 2024). In 2019, an estimated US$1 trillion in profits (37 percent of global multinational profits) was shifted to low-tax jurisdictions, resulting in a corporate tax revenue loss of approximately 10 percent globally (Wier and Zucman 2022). EMDEs are especially vulnerable to this risk (Johannesen et al. 2020). Profit shifting is concentrated among the largest MNEs: For example, in South Africa, the 10 largest foreign-owned firms accounted for half of the total profits shifted (Wier and Erasmus 2023).
- **Increased mobility of real economic activity.** Notwithstanding the mobility of "paper" profits, advances in technology and logistics infrastructure also make it easier for MNEs to relocate real economic activities such as production facilities across borders. Governments frequently respond with corporate tax cuts aimed at boosting jobs, production,

and growth. But these tax expenditures are rarely revisited, and their net benefits are often unevaluated. Some research finds that MNEs have positive effects for domestic workers and for economic activity in general (Ramondo 2014). These estimates include a 6 percent MNE wage premium in Brazil (Hijzen et al. 2013) and a 9 percent premium in Costa Rica (Alfaro-Urena et al. 2021).

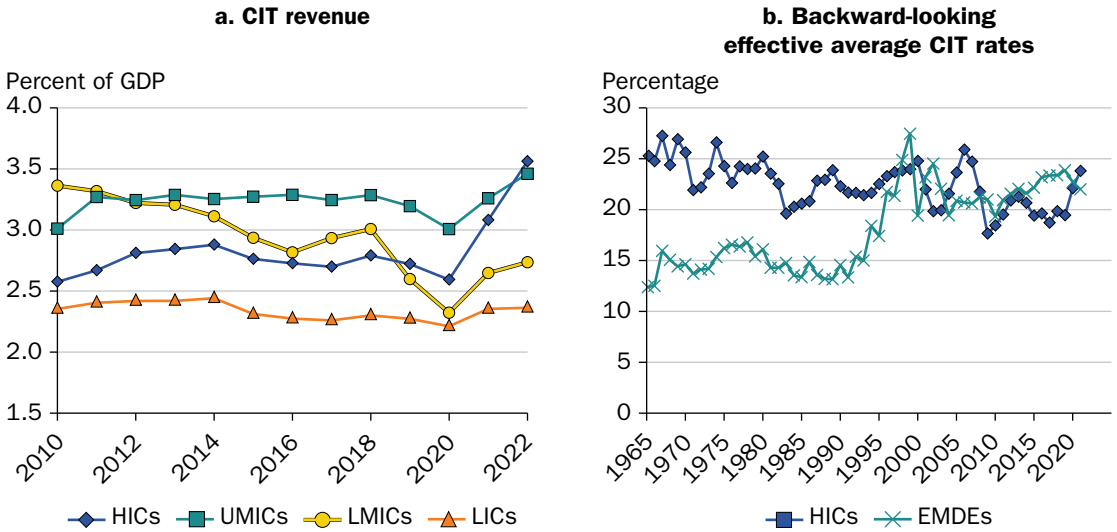
- **Spillovers in the knowledge economy.** In addition to the direct effects on employment and investments, MNEs can generate spillovers to host economies via their links to local firms, high-skilled migration, and technology adoption (Garetto et al. 2025). The evidence on how MNEs affect domestic firms in EMDEs is mixed and somewhat dated, with some studies finding weak or negative impacts on domestic competitors and buyers in China (Lu et al. 2017), Morocco (Haddad and Harrison 1993), and Venezuela (Aitken and Harrison 1999). By contrast, MNEs appear to have positive effects on domestic suppliers; in Costa Rica, for instance, firms that started supplying an MNE increased employment and productivity by 26 percent and 9 percent, respectively, within 4 years (Alfaro-Urena et al. 2022).

Different responses to each channel. Each channel calls for a tailored policy response. Profit shifting can be curbed through enhanced transparency and international information exchanges. If corporate economic activity has indeed become more mobile, then coordinated approaches to corporate taxation—such as those embodied in the OECD/G20 Pillars I and II—may preserve domestic tax bases. If the spillovers from attracting MNEs are very high, then countries might continue competing along other margins outside of the corporate tax system (for example, industrial policies). While estimates on the scale of profit shifting are robust, evidence on the growing mobility of real activity and on the magnitude of MNE spillovers remains limited, and few studies identify CITs as the decisive factor that influences location.

A nuanced take on tax competition. Going forward, the race to the bottom is not inevitable, as discussed in the rest of this chapter. But a retrospective analysis already paints a nuanced picture: Despite the steady decline in statutory CIT rates, corporate tax revenues have remained relatively stable as a share of GDP, a pattern observed for countries at all income levels (refer to figure 4.3, panel a). Since rates have fallen, this stability must reflect an expansion of the taxable corporate profit base. Yet, as shown earlier, the legal definition of the CIT base has not broadened. Therefore, the implication is that economic forces must have led to an expansion of profits reported by firms.

One mechanism is the rising share of profits in GDP: Without this force, CIT revenues might have declined markedly (Fuest and Neumeier 2023). Another is the growing formalization of production: A larger share of economic activity occurs within incorporated firms that are visible and easier to tax (Bachas et al. 2022). In EMDEs, the ratio of corporate tax payments to aggregate

Figure 4.3 A nuanced take on tax competition



Sources: Panel a: Original figure for this publication based on the International Monetary Fund's World Revenue Longitudinal Database and on the World Development Indicators. Panel b: Original figure for this publication based on Bachas et al. (2022) and the World Development Indicators.

Note: Panel a shows the evolution of average CIT revenues as a share of GDP for 2010–22. Country observations are weighted by their share of within-income-group GDP in 2010. The sample includes 136 countries with populations over 1 million as of 2024: 47 HICs, 37 UMICs, 31 LMICs, and 21 LICs. Panel b presents the evolution of average backward-looking CIT rates for 1965–2021. Country observations are weighted by their share of within-income-group GDP in 2010. The sample includes 144 countries with populations over 1 million as of 2024: 47 HICs and 97 EMDEs (all countries that are not classified as HICs). CIT = corporate income tax; EMDEs = emerging market and developing economies; GDP = gross domestic product; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

profits has increased over the long run, even though it tended to decline in HICs (refer to figure 4.3, panel b). In some large LMICs and UMICs, the formalization of production seems to have outweighed the race-to-the-bottom pressures from tax competition. This result highlights the importance of tax capacity and information for improved taxation. Moreover, the past decade has seen important innovations in transparency and international coordination, pushing the fiscal frontier of taxation and challenging the view that MNEs cannot be effectively taxed. Before reviewing these innovations (refer to the section "The ABCD of International Taxation") and their tax implications (refer to the section "Opportunities to Tax Top Economic Actors"), it is necessary to consider other economic actors: HNWIs.

HNWIs and income taxation

HNWIs command substantial shares of national income and wealth in EMDEs. Yet, they remain a poorly understood segment of the population. Globally, 62 million individuals might hold over US$1 million in net wealth. This group represents just 1.2 percent of the adult

population, yet it controls nearly half (46.5 percent) of global wealth (refer to table 4.1). While most millionaires live in high-income regions, the wealth concentration in EMDEs is more pronounced. In Latin America, 0.4 percent of adults hold 37 percent of the region's wealth; in Sub-Saharan Africa, 0.04 percent of adults control 17 percent; and in South and Southeast Asia, 0.1 percent concentrate 20 percent of wealth. Two concerning global trends amplify the policy relevance of this group: the surge in aggregate private wealth relative to national income and the growing concentration of wealth at the top (Chancel et al. 2022).

The entry bar to the top 1 percent richest in EMDEs is high. The annual income required to be included among the richest 1 percent in 2023 is similar between some EMDEs and advanced economies (refer to figure 4.4). Despite having a lower GDP per capita, many UMICs—especially in Latin America—exhibit top 1 percent thresholds comparable to HICs (panel a), underscoring the extent to which income is concentrated at the top. Similar to inhabitants of France, Italy, the Republic of Korea, and Spain, individuals in Chile, Costa Rica, Mexico, and Uruguay need to earn an annual pretax income between US$150,000 and US$200,000 to reach the top 1 percent. Slightly below, Argentina, Brazil, the Dominican Republic, Peru, and Türkiye have thresholds between US$100,000 and US$150,000, comparable to Czechia, Poland, and Portugal. While top 1 percent income thresholds are often lower in other EMDEs, the ratio of these thresholds to median income is two to three times higher than in high-income economies (panel b).

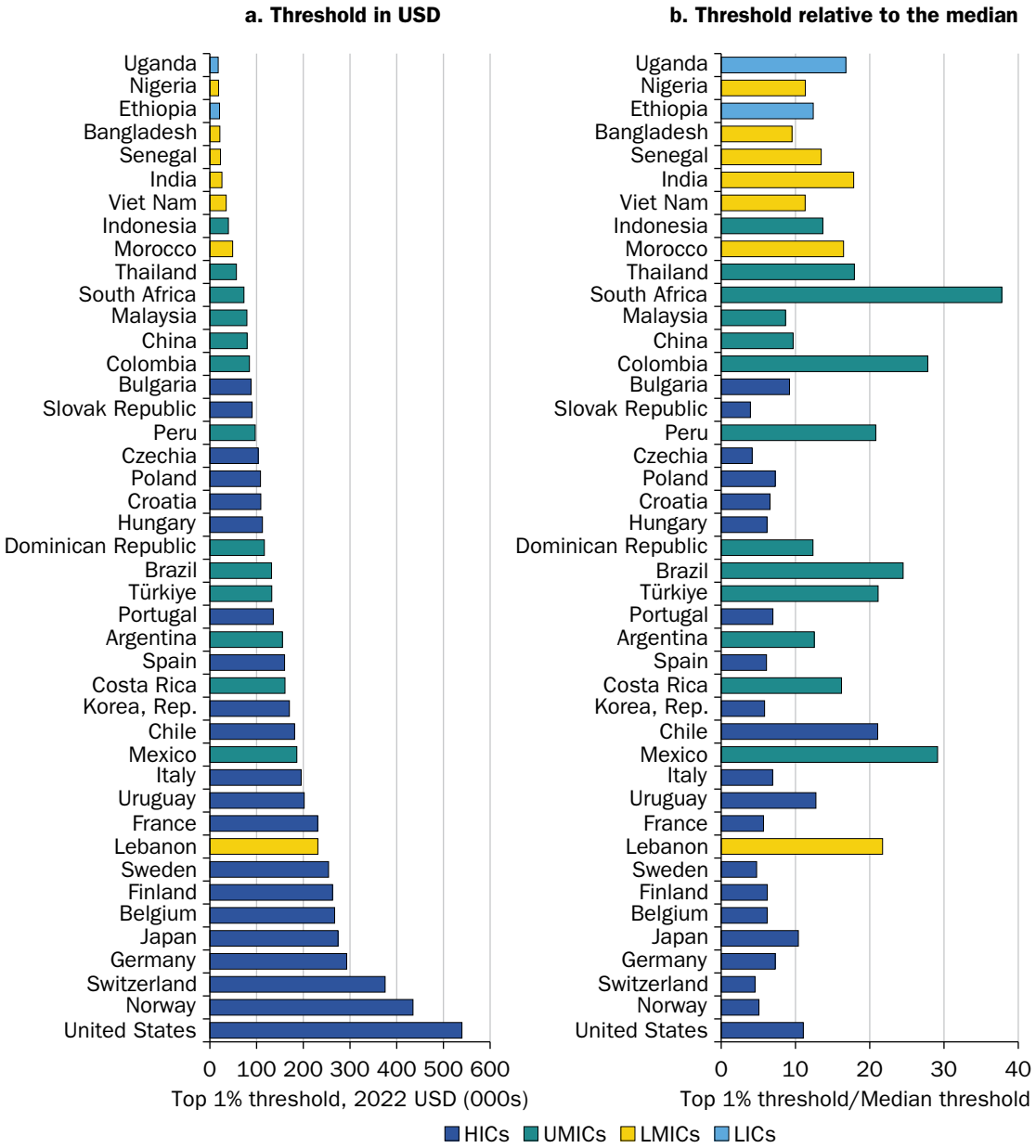
Table 4.1 Millionaires by region, 2021

	Millionaires			Net Wealth		
Region	No.	% of Global	% of Region	Total (USD, billions)	% of Global	% of Region
Global millionaires	62,165,158	100	1.2	174,216	100	46.5
North America	29,249,988	47	10.4	85,370	49	75
Europe	16,040,563	26	4.7	38,325	22	55
Latin America	1,930,728	3.1	0.4	5,815	3	37
Middle East and North Africa	915,046	1.5	0.3	2,978	2	33
East Asia	12,705,846	20	1.0	35,718	21	31
Russian Federation and Central Asia	230,834	0.4	0.1	1,378	1	31
South and Southeast Asia	848,937	1.4	0.1	3,905	2	20
Sub-Saharan Africa	243,221	0.4	0.04	726	0	17

Source: Original table for this publication based on Chancel et al. (2022), Tables 7.1 and 7.3, and the World Inequality Database.

Note: "Net household wealth" refers to the total value of financial and nonfinancial assets owned by individuals, net of debt. The population includes individuals ages 20 or older. The World Inequality Database series covers 216 core countries grouped into 8 world regions.
USD = US dollars.

Figure 4.4 Annual income needed to belong to the richest 1 percent, 2023



Source: Original figure for this publication using data from the World Inequality Database (from Alvaredo et al. 2024), which combines survey and tax data.

Note: Monetary amounts are expressed in 2022 current USD. HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries; USD = US dollars.

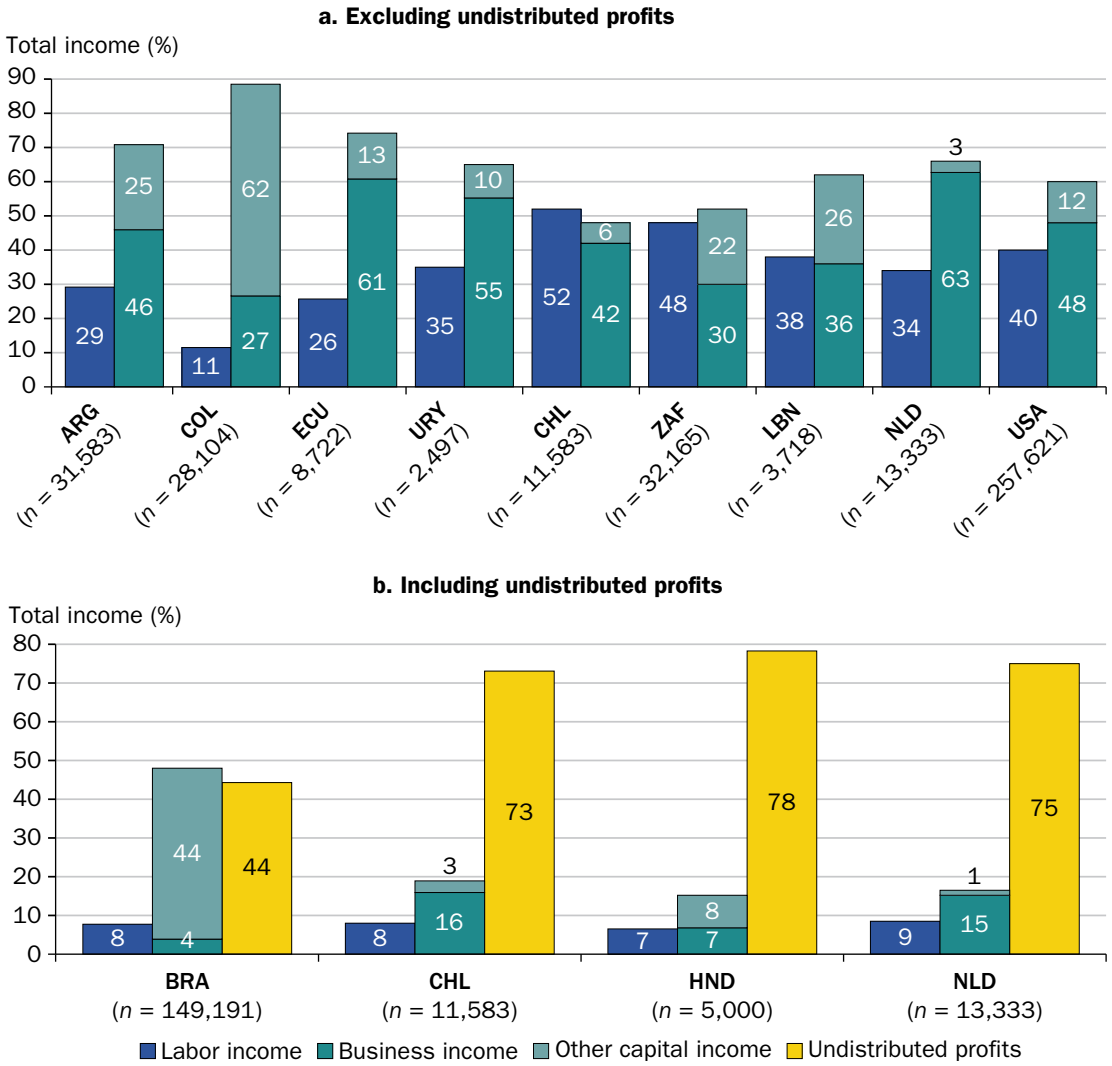
Measuring the full economic footprint of HNWIs is a tall order, as surveys underrepresent the affluent, and even in administrative data, a share of their capital is concealed offshore (refer to the section "*A* Is for Automatic Exchange of Information on Offshore Financial Wealth"). The evidence on wealth concentration and income thresholds presented earlier is largely sourced from the World Inequality Database, which ingeniously combines national accounts, surveys, fiscal data, and wealth rankings (for a review on measurement challenges in EMDEs, refer to Kerr and Zondi 2024). More granular insights come from semi-aggregate tax tabulations, country case studies, and international data leaks, which collectively reveal large inequality, porous tax bases, and the significant scale of hidden wealth.

Capital rules at the top. Given the outsized economic role of the affluent, the composition of their income and wealth is central to understanding how they are taxed. Global evidence remains limited, but a set of country studies—combining tax microdata, surveys, and national accounts—provides new insights into the income mix of top earners. Figure 4.5 reports estimates for the top 0.1 percent across 11 countries, mostly in Latin America, as well as Lebanon, the Netherlands, South Africa, and the United States. While wages and pensions constitute the bulk of income for the bottom 99 percent, they represent less than one-third of income for the top 0.1 percent in most countries. Business income—profits from unincorporated firms, partnerships, self-employment, and dividends—accounts for 40–60 percent of total fiscal income at the top, with financial and rental income adding another 10–30 percent. In Ecuador, for instance, 74 percent of income at the top derives from business and capital sources, compared to 26 percent from labor; in Argentina, these shares are 71 percent and 29 percent, respectively. Similar patterns emerge in Lebanon and South Africa, although these figures likely understate capital income, as some capital income types are tax exempted.

Figure 4.5, panel b, accounts for undistributed corporate profits, or retained earnings, by allocating them to the firms' shareholders. These profits do not appear in PIT data because they are retained within firms rather than distributed to shareholders. Yet four recent studies linking firm ownership registries to individual taxpayers show that retained earnings are a major source of income at the top, rivaling or exceeding distributed capital income.

How are HNWIs taxed? Because capital income is often taxed less than labor—or sometimes untaxed (refer to annex 2A, "PIT and Efficiency," in chapter 2)—the PIT tends to be regressive at the top: Effective PIT rates fall within the richest 1 percent (Bergolo et al. 2023). This picture changes once undistributed profits and the CIT are attributed to firm owners. In Brazil and Honduras, the combined PIT–CIT ETR rises slightly with income, even at the top (Del Carmen et al. 2025; Palomo et al. 2025), underscoring the role CIT plays as a backstop to low PIT. By contrast, in advanced economies such as France, Italy, the Netherlands, and the United States—where CIT rates are lower than top PIT rates—the CIT offsets the declining PIT burden only partially, leaving combined income taxation regressive (Bruil et al. 2022).

Figure 4.5 Income composition of the top 0.1 percent, by country



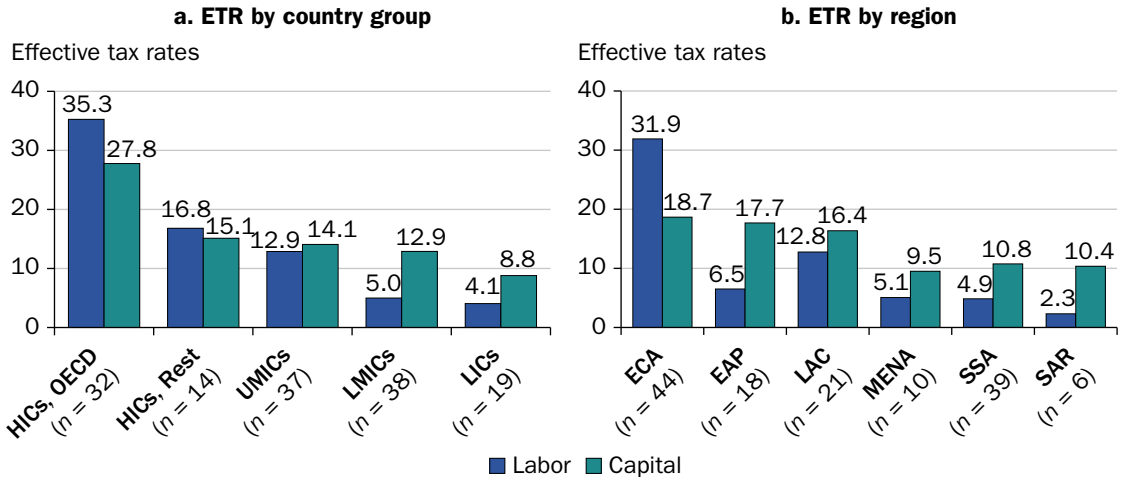
Sources: Original figure for this publication drawn from studies using PIT records and supplemented with survey and national accounts: Argentina in 2021 (data from the Customs Collection and Control Agency [Agencia de Recaudación y Control Aduanero], not drawn from any specific study; refer to https://www.afip.gob.ar/institucional/estudios/anuario-estadisticas-tributarias/); Brazil in 2019 (Palomo et al. 2025); Chile in 2009 (Fairfield and Jorratt De Luis 2016); Colombia in 2010 (Alvaredo and Londoño-Vélez 2013); Ecuador in 2011 (Cano 2015); Honduras in 2011–19 (Del Carmen et al. 2025); Lebanon in 2014 (Assouad 2023); the Netherlands in 2016 (Bruil 2023; Bruil et al. 2022); South Africa in 2011 (Bassier and Woolard 2021); the United States in 2014 (Smith et al. 2019); and Uruguay in 2016 (Burdín et al. 2022).

Note: The numbers below each country abbreviation indicate the number of adults in this group. In panel a, "labor income" includes wages and pensions; "business income" includes profits from unincorporated enterprises, partnerships, self-employment (mixed income), and distributed dividends; and "other capital income" includes financial income from passive investments and rentals. Panel b draws on four new studies that leverage ownership registries to include undistributed profits (that is, retained earnings) allocated to individuals based on their ownership shares. Country codes are from World Bank Country and Lending Groups (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups). PIT = personal income tax.

Figure 4.6 complements the micro results with macro evidence on labor and capital ETRs in 140 countries. Because this approach captures all taxes (personal, corporate, and property), it is well suited to assess the total burden on HNWIs, whose income is capital derived. First, consistent with the tax collection patterns discussed in chapter 2, ETRs are much lower in EMDEs, reflecting both policy design and compliance gaps. Second, the labor–capital gap flips: In HICs, labor is taxed more heavily, while, in many EMDEs, capital ETRs exceed labor ETRs—sometimes by a factor of two—due to the CIT's greater relative weight. These macro patterns reinforce a micro-level point: Including corporate taxes, retained earnings, and asset levies in distributional analyses is key to avoiding understating the tax burden on the rich and inequality.

Key lessons and open questions for HNWI taxation. Three patterns from this analysis stand out. First, although estimates remain uncertain, HNWIs in EMDEs account for shares of income and wealth at least as large as those of their counterparts in HICs. Second, the income of HNWIs in EMDEs comes mainly from firms and capital rather than wages, distinguishing them from individuals from the upper-middle class. Third, PIT-only analyses understate HNWIs' income and tax burden by excluding undistributed profits and CIT payments.

Figure 4.6 Macroeconomic effective tax rates on labor income and capital, by country group and region, 2018



Source: Original figure for this publication based on Bachas et al. (2022).

Note: This figure shows macroeconomic ETRs on labor and capital income for 140 countries with populations above 1 million in 2018. Each ETR divides all taxes collected on a factor by the national income accruing to that factor. Because it relies on actual taxes collected, macro ETRs capture the net past effect of all tax rules and, importantly for EMDEs, tax evasion and avoidance. The ETRs on capital include CIT, wealth taxes, and property taxes. The ETRs on labor include payroll taxes and social security. PIT revenue is allocated partly to labor and partly to capital. We report the median ETR in each group. CIT = corporate income tax; EAP = East Asia and Pacific; ECA = Europe and Central Asia; ETRs = effective tax rates; HICs = high-income countries; LAC = Latin America and the Caribbean; LICs = low-income countries; LMICs = lower-middle-income countries; MENA = Middle East and North Africa; OECD = Organisation for Economic Co-operation and Development; PIT = personal income tax; SAR = South Asia; SSA = Sub-Saharan Africa; UMICs = upper-middle-income countries.

These patterns raise two central questions: How responsive are HNWIs to taxation, and how should tax policy adjust? Evidence from EMDEs shows large elasticities of income and wealth at the top—often near or above one (refer to Bachas et al. [2024] and Bergolo et al. [2023] for recent reviews)—that reflect the wide avoidance and evasion opportunities historically available to taxpayers. Recent advances in tax transparency are reshaping what governments observe about HNWIs' offshore assets and corporate control. By tracing asset ownership and linking capital income to individuals, administrations can map and track top earners more accurately and close evasion gaps, laying the foundation for coherent personal and corporate tax design. For many EMDEs, leveraging these transparency gains to guide direct tax reform is a key frontier for strengthening tax capacity.

The ABCD of international taxation

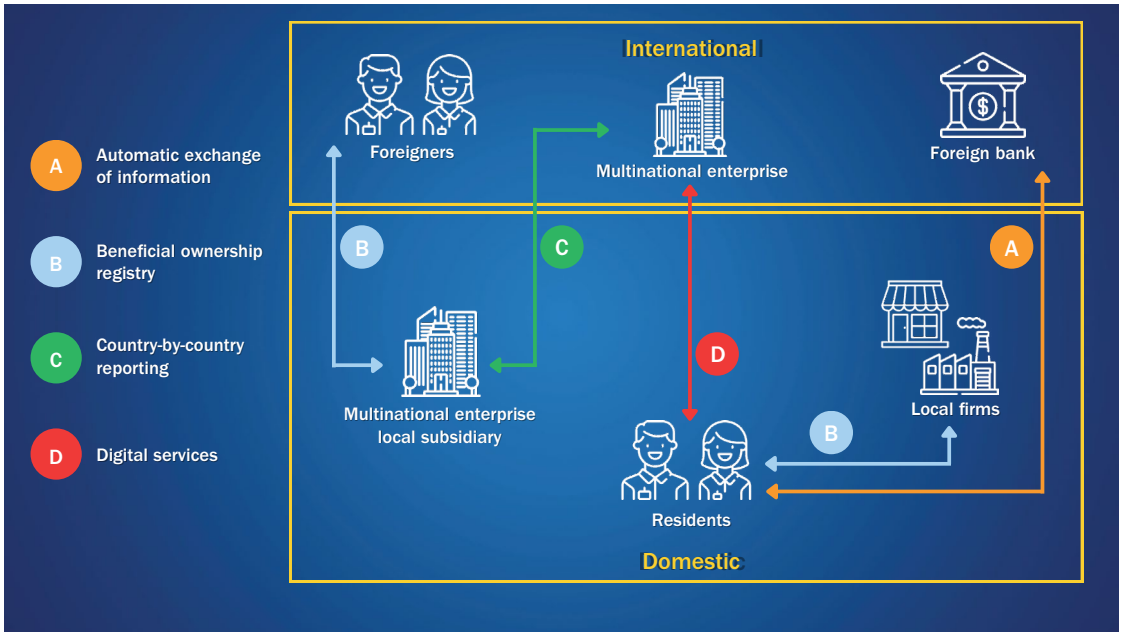
The previous section underscores how little tax authorities know about the activities of top economic actors. Over the past decade, however, a breakthrough in tax transparency and international coordination has occurred, due in large part to the Panama (2016), Paradise (2017), and Pandora (2021) Papers, which leaked records of secret offshore investments and dealings by wealthy and powerful financial actors. In the wake of these leaks, a coalition of countries implemented new systems of data collection, information exchange, and coordinated policies that shed light on previously unobservable activity, both across borders and through complex ownership networks.

The tax transparency and international coordination developments of the past decade are summarized by the ABCD framework[1]: *a*utomatic exchange of information, *b*eneficial ownership registries, *C*bCR by multinationals, and *d*igital services taxation. A growing body of research is evaluating the effectiveness of these innovations. This section synthesizes the emerging findings, with a focus on how EMDEs can leverage transparency instruments to strengthen their fiscal capacity.

Figure 4.7 highlights the different dimensions of economic activity included in the ABCD framework. Together, these transparency innovations provide unprecedented visibility into the channels that link international economic activity with the domestic economy.

- **Automatic exchange of information.** Financial income that is held in foreign bank accounts should, in principle, be subject to PIT. However, historically, taxpayers rarely report foreign-held income in their country of residence. Until recently, the exchange of information between tax administrations and tax haven jurisdictions was limited. However, the automatic exchange of financial information under the Common Reporting Standard (CRS) initiative implemented in 2016 has sought to close this gap by mandating that foreign banks report the accounts of residents of all other countries (orange arrow).

Figure 4.7 International taxation data generation process



Source: Original figure for this publication. Icons from Flaticon and licensed by CC-BY 3.0.

- **Beneficial ownership registry (BOR).** Although identifying the individual owners of firms operating in a given country is challenging, a lack of transparency in this regard creates obstacles for tax policy and administration: Owners can conceal income within complex corporate structures, labor and capital income can become entangled, owners can use firms to finance personal consumption, and related-party transactions can facilitate collusion and abuse. Beneficial ownership reporting addresses these challenges by requiring firms to disclose their natural person owners, who can be foreigners or domestic persons (light blue arrows).
- **CbCR.** MNEs can exploit differences in tax rates across countries to report profits in low-tax jurisdictions, even when their real economic activity in these locations is minimal. Historically, little information regarding where firms actually conduct their economic activity and where they record their profits has been available. However, the introduction of the CbCR changed this by requiring large multinational groups to disclose key indicators of their operations and profit allocation across countries (green arrow). Together with the 2024 global minimum tax on corporate income (Pillar II), it aims to curb profit shifting and ensure multinationals pay a fairer share of tax.
- **Digital services taxation.** Digital services account for a growing share of trade. The traditional source-based model of corporate taxation that requires a permanent

establishment is ill suited to the digital economy, where firms can earn substantial income without having a physical presence. MNEs can then use tax rate differentials and treaty networks to book these profits in low-tax locations. Several countries have adopted digital services taxes (red arrow), while international efforts aim to renegotiate treaties and update profit allocation rules for the largest MNEs (Pillar I) to better share taxing rights.

A is for automatic exchange of information on offshore financial wealth

What is offshore financial wealth? *Offshore financial wealth* refers to financial assets, such as bank deposits and investment portfolios, held by domestic residents in foreign countries. While holding assets abroad is not illegal, those who do so should pay taxes on the income generated by these assets (interest, dividends, and capital gains). However, because it is difficult for tax authorities to monitor these assets—especially when they are located in tax havens—their holders might evade taxes. Before the Automatic Exchange of Information (AEOI) was implemented, an estimated 90 percent of offshore financial wealth, which was concentrated among the wealthiest, went unreported (Alstadsaeter, Godar, et al. 2023).

The scale and location of offshore financial wealth. As of 2022, total household offshore financial wealth was estimated at US$12 trillion, 12 percent of world GDP (Alstadsaeter, Godar, et al. 2023). Since the early 2000s, this share has remained stable (at 10–12 percent) but with large regional variation. Offshore wealth represents a high share of GDP in Africa and the Middle East (18 percent), followed by Latin America (13 percent), and Asia (5 percent), which has more capital controls (Alstadsaeter et al. 2018). In more recent years, the location and ownership of these assets have shifted. For instance, the share of total offshore wealth held in Switzerland fell from 40 percent to 20 percent between 2001 and 2021. Over the same period, the share held in Asian financial centers such as Hong Kong and Singapore rose from 20 percent to 40 percent. While residents of HICs own most offshore assets (about 70 percent of the total), LICs' and middle-income countries' (MICs') shares have grown from 20 percent to 30 percent over the past decade (Faye et al. 2025).

The end of bank secrecy? Historically, offshore financial wealth was protected by strict bank secrecy laws, and cooperation between tax authorities was limited to case-by-case requests under the Exchange of Information on Request (EOIR) standard. EOIR proved slow and ineffective: Authorities had to present evidence of likely evasion for specific taxpayers before information could be shared. The 2008 financial crisis prompted the G20 to declare "the era of bank secrecy is over," which led to new standards of exchange of information: the US Foreign Account Tax Compliance Act (FATCA) in 2010, followed by the OECD's CRS in 2014. These arrangements require financial institutions to collect data on nonresidents' accounts and automatically share it

with the account holders' countries of residence (refer to box 4.2). Since 2017, more than 100 countries have adopted the CRS (OECD 2025b).

How information exchanges deter tax evasion. The AEOI curbs offshore evasion through two main channels: first, by making taxpayers expect that tax authorities will receive third-party data on their offshore accounts, which may induce taxpayers to voluntarily disclose (or repatriate) assets before sanctions occur, often facilitated by tax amnesties, and, second, the new data improves enforcement by allowing tax administrations to cross-check declarations and detect hidden income via audits.

Box 4.2 Architecture of the AEOI: FATCA and CRS

From voluntary disclosure to automatic transparency. By enabling tax authorities to receive standardized information on foreign-held financial accounts automatically, the Automatic Exchange of Information (AEOI) standard replaces the former "on-request" approach with proactive data exchange and, thereby, represents a structural shift in international tax cooperation. Two systems underpin this global framework: the US Foreign Account Tax Compliance Act (FATCA) and the Common Reporting Standard (CRS) of the Organisation for Economic Co-operation and Development (OECD).

What is FATCA? Enacted by the United States in 2010 and implemented in 2014, FATCA requires foreign financial institutions (FFIs), including banks, investment funds, brokers, and insurance companies, to identify and report financial accounts held by US taxpayers or by entities with substantial US ownership. Noncompliant FFIs face a 30 percent withholding tax on US source income. Although some data exchanges are reciprocal, FATCA remains largely unilateral, with limited data flowing back to partner countries.

What is the CRS? Drawing on FATCA's architecture but designed for global reciprocity, the OECD developed and the G20 endorsed the CRS in 2014. The standard establishes a multilateral system for participating countries, including offshore financial centers, to exchange financial information annually. Countries enact domestic rules requiring FFIs—banks and investment entities—to identify nonresident account holders and report the account information to the national tax authority. The latter then sends this information to partner countries. The CRS extends FATCA's reach by requiring FFIs to "look through" passive entities (for example, trusts) to identify who truly controls the entity (OECD 2023a).

(Continued)

Box 4.2 Architecture of the AEOI: FATCA and CRS *(continued)*

What information is exchanged under CRS?

The following information is exchanged under CRS:

- **Account details:** account number; and account holder's name, address, date of birth, and tax identification number. For passive entities, reporting also includes the beneficiary.
- **Financial information:** account balance or year-end value, as well as gross interest, dividends, and proceeds from the sale of financial assets.

Which parties exchange the information, and to whom does the information pertain? Reporting FFIs in the source country, where the account is held, transmit data to their domestic tax authority. This information is then shared with the country where the account holder resides. Under FATCA, the data pertain to US taxpayers and US-owned entities, whereas under the CRS, the data concern nonresident account holders of participating countries.

Sources: For more details, refer to the FATCA portal (https://www.irs.gov/businesses/corporations/foreign-account-tax-compliance-act-fatca) and OECD's Tax Transparency Resource Centre (https://www.oecd.org/en/topics/sub-issues/international-standards-on-tax-transparency/tax-transparency-resource-centre.html).

Evidence on the effectiveness of CRS. Tracking offshore deposits across countries reveals how information exchanges reshape global financial flows. The early EOIR framework, which covered fewer countries, had a modest impact: Deposits in exposed tax havens fell by 10 percent. Much of this effect, however, simply reflected how funds shifted to nonparticipating countries (Johannesen and Zucman 2014; Menkhoff and Miethe 2019; O'Reilly et al. 2021). The introduction of the CRS, on the other hand, led to a much larger drop—up to 25 percent—in foreign-owned deposits held in tax havens, which is likely attributable to its broader coverage and automatic nature (Beer et al. 2019; Casi et al. 2020; Janský et al. 2024).

Micro-level evidence is starting to paint a more detailed picture: In Denmark, around 70 percent of the offshore reporting gap was closed when CRS was announced, through voluntary disclosures and repatriation (Boas et al. 2024), with similar effects found in France (Davoine et al. 2026). In Colombia, reported offshore financial wealth quadrupled—from about 1 percent to 4 percent of GDP—within a few years of the introduction of CRS exchanges. Compliance increased immediately upon receipt of the data and rose further following enforcement campaigns that actively used the information (Bachas, Hernández, et al. 2026). In South Africa, most compliance gains stemmed from the active use of AEOI data in enforcement rather than from the arrival of

the information itself (Larsen et al. 2026). Taken together, the evidence shows that AEOI can substantially improve compliance on offshore wealth, with the largest gains occurring when transparency is backed by credible administrative capacity and taxpayers expect the information to be used for enforcement.

Implementation challenges and loopholes remain. Despite the CRS' broad reach, coverage gaps remain: Aggregate data suggest that CRS-reported wealth is 30 percent lower than independent benchmarks, implying that, if both estimates are correct, then about 70 percent of offshore assets are currently captured (Boas et al. 2025). Reporting gaps stem from weak due diligence and complex ownership structures that obscure beneficial owners (BOs). For example, some entities (such as private investment companies) can register as financial institutions, relieving the banks that manage their assets from reporting obligations, in effect creating "shell banks" that bypass third-party reporting (Bomare and Collin 2025; Noked and Marcone 2023). Some of the reduction in offshore financial wealth reflects asset relocation to non-CRS countries (for example, the United States), to assets not covered by CRS (for example, real estate), and to complex investment vehicles (Beer et al. 2019; Casi et al. 2020). New evasion channels, such as "golden visas" and cryptocurrency investments, are also emerging (Knobel and Heitmüller 2018; Langenmayr and Zyska 2023).

EMDEs and the CRS: Capacity constraints are limiting results. EMDEs were exposed at least as much as HICs to offshore tax evasion. Many EMDEs have made progress since joining the CRS and, in absolute terms, the scale of progress is impressive: EMDEs received information on 33 million accounts worth US$3 trillion in 2022. Voluntary disclosure programs (partial amnesties) have recovered around US$40 billion in additional tax revenue in total over the past decade (refer to the Argentina case study that follows) (OECD 2023b, 2025b). Most EMDEs now have AEOI legal frameworks rated at least as "in place but needs improvement" (OECD 2024b). Yet, many struggle to process large financial data inflows, with only 60 percent of accounts matched to taxpayers (OECD 2025b). As a result, stronger administrations saw far more wealth repatriation after CRS than weaker ones (Alstadsaeter, Casi-Eberhard, et al. 2023); residents of EMDEs mainly shifted assets into non-CRS-covered forms (Janský et al. 2024); and data quality issues (for example, missing owners, mismatched identifiers, and reporting errors) limit how useful CRS is for enforcement.

Case study: Argentina's 2016 Voluntary Disclosure Program (VDP). A striking example of the power of transparency comes from Argentina's 2016 VDP, which capitalized on AEOI (Londoño-Vélez and Tortarolo 2025). While previous amnesties have failed to uncover undeclared wealth, this initiative led to the disclosure of hidden assets worth 21 percent of GDP and raised

1.8 percent of GDP in revenue from penalties, making it one of the most-successful tax amnesties to date. About 255,000 Argentines participated; 80 percent of their disclosed assets were held abroad, mainly in high-secrecy countries; and disclosures were concentrated among the richest 0.1 percent of taxpayers.

The impact of Argentina's VDP on the tax base was both immediate and sustained. The value of reported foreign assets quadrupled after 2016, permanently broadening the capital income and wealth tax bases. Reported capital income tripled, leading to a 60 percent increase in income tax payments among the top 0.1 percent of earners between 2015 and 2021. A decisive factor behind the program's success was a shift in taxpayers' expectations about offshore secrecy: The amnesty was launched alongside Argentina's adoption of the CRS and new bilateral agreements with key offshore financial centers. This experience illustrates how coupling information exchange with domestic reforms can foster lasting gains in top economic actors' tax compliance.

B is for beneficial ownership: Corporate control and benefits

Seeing beyond the corporate veil. A firm may have many layers of ownership (for example, a company owned by another company in a tax haven), but at the top, there should be an individual owner. A *BOR* is an official database that aims to identify the persons (and not the firms) who ultimately own, control, or benefit from legal entities such as corporations, trusts, and foundations. A *BO* is the person who owns or controls more than a certain threshold of the shares or voting rights (often 25 percent) or exercises effective control (for example, through contracts or influence). This person can be a national or a foreigner.

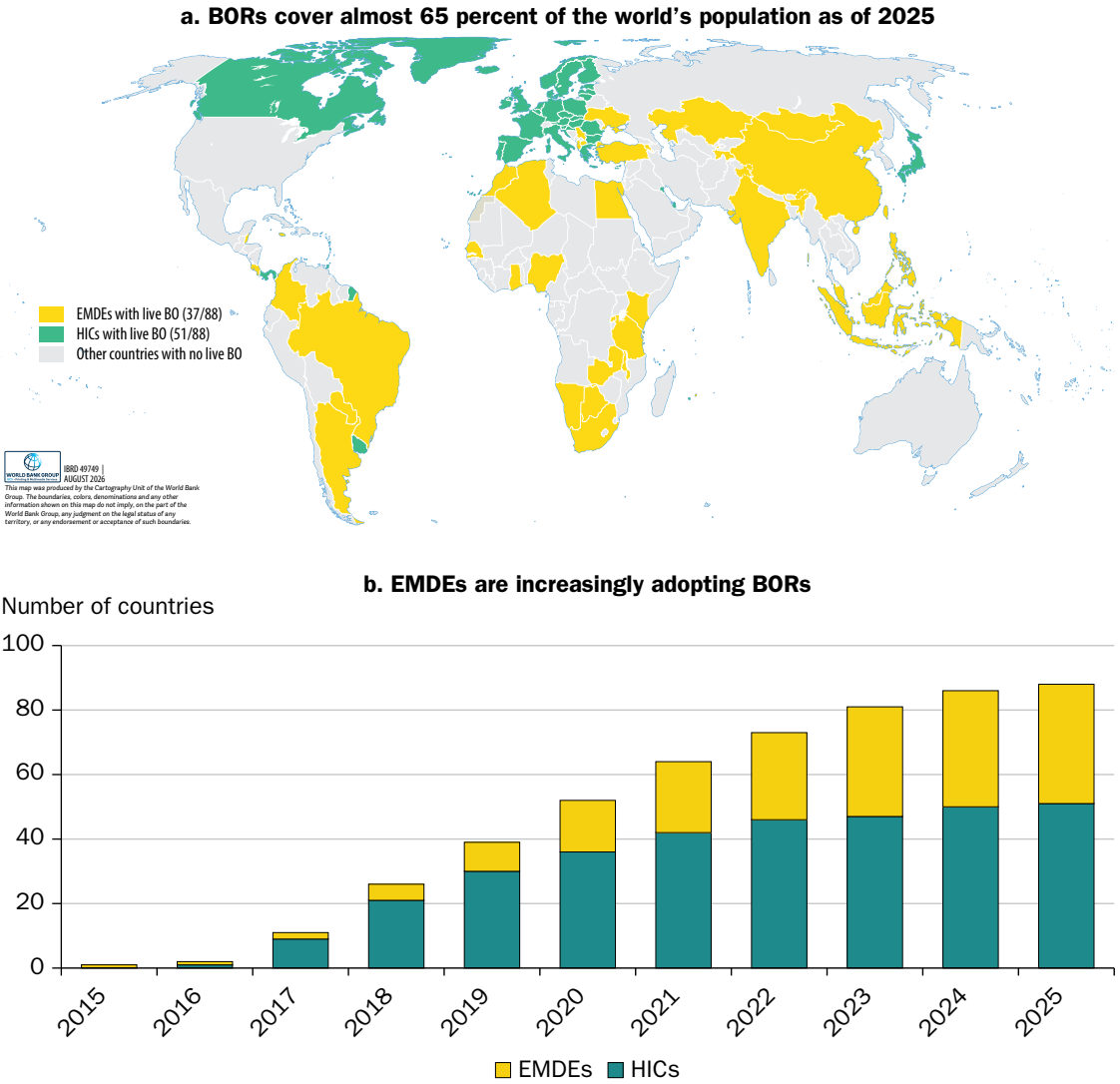
Why beneficial ownership matters. Fundamentally, it is people who pay taxes and make decisions, not corporations. Therefore, identifying the persons who ultimately control firms is critical for a range of policy objectives that extend beyond tax collection. First, identification of beneficiaries can curb tax evasion by uncovering offshore entities, hidden profits, and undeclared wealth. Second, it helps combat illicit financial flows, such as sanction evasion and terrorism and drug financing. Third, identifying BOs levels the playing field by reducing opportunities for politically connected firms to receive undue advantages in taxation or procurement. Finally, linking firms to their ultimate owners enables the construction of comprehensive measures of income, wealth, and taxes paid that, in addition to individual fiscal income and taxes, consider undistributed corporate profits and corporate tax payments. This makes it possible for policy makers to assess inequality and understand how the full tax burden is distributed.

BORs around the world. The adoption of BORs represents a major transparency innovation of the past decade. While only a handful of countries maintained such registries a decade ago, 88 countries had adopted them by 2025 (refer to figure 4.8). Although adoption is higher among HICs, 37 EMDEs now operate a live BOR. Together, these registries cover about 65 percent of the world's population. Nearly half of the countries considered low-tax jurisdictions have implemented a BOR, potentially enabling improved exchange of information upon request. In most countries, BORs are administered by company registrars, but tax administrations, ministries of finance or commerce, and central banks are sometimes involved (Open Ownership 2025). Roughly half of the BORs are open to the public (under certain conditions), while the other half are accessible only to competent authorities.

Building high-quality and accessible BORs. Effective BORs have four important elements (FATF 2019; Fernando and Berkhout 2022; OECD and IDB 2019; Oxford Insights and Lateral Economics 2022). First, they are based on a clear and consistent definition of beneficial ownership to ensure full coverage. The BOR rules should apply to ownership chains, nominee shareholders, and trust beneficiaries, along with simplified requirements for small firms. Second, they contain systems for data verification, interoperability, and access, to allow different authorities to access and cross-check declared ownership information against civil registries, tax filings, banks, and notaries. Third, they require firms to update their ownership records frequently and confirm these changes annually as part of the CIT return. Fourth, they have effective enforcement and oversight to maintain credibility. This includes targeted audits and verifications with financial intelligence data and sanctions that scale with firm size.

Who should have access? To balance privacy and transparency, best practice recommends tiered access to BORs (FATF 2019; Fernando and Berkhout 2022) that determines what information is available. Level 1 (full) real-time unrestricted access can be granted to authorities such as tax administrations, financial intelligence units, and law enforcement. Level 2 (partial) access can be given to private sector entities that conduct customer due diligence under anti–money-laundering frameworks, such as banks, notaries, lawyers, and accountants. These entities need access to verify the information of their own clients as to detect inconsistencies in the BOR early. Level 3 (restricted) access to a limited set of BOR data can be given to the public for statistical, media, and research purposes to enhance accountability and civil society oversight. The United Kingdom's *Persons with Significant Control Register* is recognized as an example of BO transparency. Since 2016, it has maintained an open register that allows the relevant parties to scrutinize corporate ownership structures, improve data quality, and uncover corruption (Leon and Palmer 2016, 51).

Figure 4.8 Adoption of BORs



Sources: Both panels draw on beneficial ownership information from the Open Ownership dataset and World Bank Group official boundaries and population data. For countries without World Bank GNI per capita or population data, complementary sources, including UN Population, UN Statistics, and country-specific data, are used.

Note: EMDEs include LICs, LMICs, and UMICs as classified by the World Bank; BORs = beneficial ownership registries; EMDEs = emerging market and developing economies; GNI = gross national income; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries; UN = United Nations.

BORs and tax collection. Because BORs have only recently been implemented and their enforcement actions remain secret, little is known about how effective they are in combating tax evasion. One way in which authorities can use BOR information is to flag potential mismatches between reported personal income and firm ownership. For instance, authorities may prioritize individuals who declare low income but are identified in the BOR as ultimate owners of high-revenue firms for audit. A more sophisticated use involves mapping networks of related firms and individuals (for example, common ownership links across multiple entities) and detecting complex ownership structures (for example, chains involving offshore entities) that are more likely to evade taxes. In addition, BORs are directly useful for tax collection. For example, they help ensure that withholding obligations (for example, on dividends, interest, and royalties) are applied correctly based on the residency of the BO rather than that of an intermediate entity. Tax authorities can also take advantage of foreign BO registers to observe if their domestic taxpayers hold foreign assets.

Beyond taxation: Other uses of BORs. Taxation is only one of the many potential ways in which high-quality BORs can be used. In public procurement, evidence from the staggered adoption of BORs across the European Union shows that transparency increased competition, particularly in more opaque markets. Smaller firms gained access to contracts, and execution improved, which was driven by public scrutiny rather than government oversight (Seregni 2024). At the same time, BOR requirements reduced tax havens' investments in the European Union (Amberger et al. 2025). Regarding sanctions, following the start of the Russian Federation and Ukraine conflict in 2022, the United Kingdom required offshore companies to disclose their BOs for property holdings, eliminating anonymous ownership and reducing purchases by tax haven–based firms (Collin et al. 2025). BORs have also supported high-profile criminal investigations in eastern European countries and revealed conflicts of interest and large-scale asset diversion from state-owned enterprises (Open Government Partnership 2019). BOR allows authorities to freeze or seize assets when taxes are unpaid or illicit flows are detected during investigations (Knobel 2023).

Billions at stake: The case for BORs. A well-designed BOR adds a crucial layer of transparency that raises the cost of concealment and facilitates tracing illicit funds. Major scandals such as Lava Jato in Brazil reveal how opaque corporate structures enable the diversion of billions in public and private resources across borders. The sums at stake are staggering: In Ukraine, roughly US$5.5 billion were siphoned from the country's largest bank following its nationalization (Open Government Partnership 2019); in Malaysia, investigations into the 1MDB sovereign fund uncovered more than US$4.5 billion in misappropriated assets (Ellis-Petersen 2020; Ramesh 2016); and in Viet Nam, authorities recently found that a real estate tycoon had embezzled

US$12.5 billion—roughly 3 percent of the country's 2022 GDP (Ratcliffe 2024). While BORs cannot eradicate financial crime, they are an indispensable tool for enforcement agencies, especially as criminal networks continually adapt to evade regulation.

Case study: Ecuador's tax on tax haven ownership. In 2012, Ecuador was one of the first countries to establish a BOR. By 2015, it used registry information to implement a higher CIT rate for firms owned by entities located in jurisdictions deemed "non-cooperative." The policy had two main objectives: to curb Ecuadorian PIT and CIT through tax havens and to improve offshore ownership transparency, because many firms were still declaring holding companies as their ultimate owners. The tax surcharge led 20 percent of exposed firms to sever their ownership ties and transactions with tax havens and to report persons, instead of firms, as their BO. The majority of exposed firms remained tax haven owned and, consequently, paid higher CITs, thus boosting revenue collection without reducing payroll and investments in Ecuador (Brounstein et al. 2026). Ecuador's example illustrates how a unilateral tax that targets ownership secrecy can enhance transparency and reduce tax base erosion at a limited efficiency cost.

C is for the CbCR of multinational activity

Shifting profits, shrinking tax revenues. *Profit shifting* refers to strategies to artificially move taxable profits from countries where taxpayers carry out real economic activity to low or no corporate tax jurisdictions, often via intragroup transactions, whose intrinsic values are difficult to assess (for example, royalties or interest payments). This minimizes firms' global tax bill without changing where production, sales, and employment occur. It is estimated that MNEs shift just under US$1 trillion in profits annually—equivalent to around 15 percent of total global profits and 40 percent of MNE profits—resulting in a loss of roughly 10 percent of global corporate tax revenue (Hugger et al. 2024; Tørsløv et al. 2022; Wier and Zucman 2022) (also refer to the section "MNEs and Corporate Taxation").

First-generation policy responses fell short. Profit shifting has been amplified by the surge in cross-border services and the growing weight of intangible assets. An international corporate tax system built for a world of physical goods and factories is ill suited to the 21st-century economy. In the wake of these changes, countries initially attempted unilateral fixes (for example, controlled foreign company rules and withholding taxes [WHTs]) that yielded modest gains (Clifford 2019).

The first major coordinated effort to curtail MNEs' profit shifting and tax avoidance occurred in 2010 when the OECD/G20 started the Base Erosion and Profit Shifting (BEPS) project: a complex set of anti-avoidance rules that achieved, at best, mixed results. Global time series

estimates show that BEPS only slowed down the growth rate of profit shifting over time rather than decreasing its actual scale (Wier and Zucman 2022). Multiple studies point out that there were persistent challenges in implementing BEPS rules. For example, transfer pricing regulations in Chile failed to curb MNE transfers to low-tax countries because firms found ways to circumvent the rules (Bustos et al. 2025). In Uganda, rather than leading MNEs to report higher profits and pay higher taxes, an anti-avoidance rule targeting excessive debt deductions was associated with contractions in turnover, employment, and trade (Bashir et al. 2024). Evidence from Chile, Spain, and Uruguay suggests that the BEPS rules mainly raised MNEs' demand for tax advisory services rather than curbing avoidance (Bustos et al. 2025).

CbCR. Despite its deficiencies, the BEPS agenda led to a key tax transparency innovation: the launch of CbCR. CbCR requires MNEs with over €750 million in global revenue to disclose where they book profits, pay taxes, and locate their assets and workers across all jurisdictions. Before CbCR, tax administrations had only a narrow view of MNE activity within their borders, with little to no visibility of the group's global footprint (refer to box 4.1 for preexisting data sources on MNEs). Mandating CbCR marks a decisive step toward uncovering profit shifting, and early analysis of country-by-country data complements the estimates of profit shifting estimated via partial and indirect sources (Boukal et al. 2025; di Barbara Bratta et al. 2021; Chiocchetti et al. 2025; Fuest et al. 2025).

A coordinated minimum tax of 15 percent. CbCR also paved the way for the introduction of the Global Minimum Tax (GMT), or Pillar II of the OECD/G20 Inclusive Framework (refer to box 4.3). In 2021, 137 countries agreed that MNEs should be subject to a minimum effective tax rate of 15 percent on their global profits by fiscal year 2024. The GMT is calculated by aggregating the activities of all affiliates of an MNE within each country and calculating the ratio of covered taxes to profits. If this effective tax rate is below 15 percent, a top-up tax is imposed on profits after excluding an amount based on a share of domestic payroll and tangible assets.

GMT's self-enforcing architecture. The core innovation of the GMT is a cascading set of collection rules that ensure top-up taxes are collected somewhere. First, the Qualifying Domestic Minimum Top-up Tax (QDMTT) lets the source country collect the minimum itself. If it does not, then the Income Inclusion Rule (IIR) allows the headquarter country to tax the under-taxed foreign profits. If neither party acts, the Under-Taxed Profits Rule (UTPR) allocates the remaining top-up tax to other countries where the MNE operates, in proportion to local activity. This structure gives countries strong incentives to adopt the GMT. Nonadoption does not protect a country's MNE affiliates; it merely shifts the tax base abroad.

Box 4.3 Two-pillar solution to address corporate income tax erosion

The two-pillar solution addresses two interlinked challenges: the misalignment of taxing rights with value creation and the global race to the bottom in corporate taxation. Pillar I determines *where* profits are taxed, and Pillar II sets a floor on *how much* is taxed.

Pillar I: Allocation of taxing rights to market countries

- **Objective:** Address the disconnect between where multinational enterprises (MNEs) operate and where they pay taxes, particularly in the digital economy.
- **Key features:** Assign a portion of MNEs' global profits to be taxed by market countries where sales and users are located. The tax base is 25 percent of "excess" profits (above 10 percent profit margin). This applies to MNEs with global revenue above €20 billion and profitability above 10 percent and excludes financial and extractive sectors.
- **Expected impact:** Strengthen the link between economic activity and taxing rights; reduce the need for unilateral digital taxes; and create modest revenue gains.
- **Challenges:** Challenges include limited scope, complexity, and strong coordination requirements.

Pillar II: A global minimum corporate tax

- **Objective:** Limit aggressive tax competition by putting a floor on effective tax rates.
- **Mechanism:** The mechanism is a 15 percent minimum tax rate on the profits of MNEs with turnover above €750 million. This permits the deduction of a share of payroll and tangible assets. A layered set of rules include the following: Countries taxing below 15 percent lose the residual tax to other countries unless they adopt their own minimum tax to collect the top-up domestically (Qualifying Domestic Minimum Top-up Taxes).
- **Expected impact:** Impacts include reducing profit shifting, encouraging the adoption of domestic minimum taxes, and providing some revenue gains for high-income countries and less for emerging market and developing economies.
- **Challenges:** Challenges include requiring legal and administrative capacity to implement effectively, interacting with preexisting tax incentives, and not providing a floor on real tax competition.

A floor on profit shifting, not on tax competition. The GMT marks a shift in the fight against profit shifting: Setting a floor on the taxes paid in every country where an MNE operates reduces the appeal of routing profits to "paper-only" entities in low-tax countries. However, its impact on tax competition is likely to be more modest. The 15 percent tax rate is relatively low, and the generous deductions that allow for real economic activity (payroll and tangible assets) mean that the real floor is substantially lower: Countries can still compete aggressively. Moreover, subsidies granted outside the tax system, as well as certain types of tax credits (for example, nonrefundable credits), are not captured under the GMT.

Expected GMT impacts. Simulations suggest that HICs (where most MNEs are headquartered) would capture most of the estimated US$150–$200 billion in additional corporate tax revenues (Hugger et al. 2024). Low-tax jurisdictions would also gain. For EMDEs, the gains are expected to be more modest: The few available country-level projections suggest that corporate tax revenue will increase by around 5 percent under a QDMTT, although estimates vary substantially across countries (Bachas, Brockmeyer, et al. 2026). At the same time, broader general equilibrium effects, particularly a reduction in global profit shifting, could benefit EMDEs (Ferrari et al. 2024). The GMT also raises important questions about the future design of corporate tax incentives, many of which may need to be restructured or replaced (refer to the section "Corporate Taxation Going Forward").

D is for digital services taxation

Taxation in the digital economy. While the GMT may curb profit shifting, countries only benefit if MNE affiliates have capital and workers within their jurisdiction. Digital firms, however, often fall outside of traditional tax rules that rely on physical presence. Consequently, these firms can earn substantial income in countries where they have users but no offices, through software, online platforms, cloud computing, and digital advertising.[2] This disconnect has weakened countries' ability to tax corporate income and, because many cross-border services historically have fallen outside VAT rules, eroded consumption tax bases. In response, governments have increasingly sought to adapt corporate and consumption taxes to capture a share of the value created by digital activities (Junquera-Varela and Lucas-Mas 2021; OECD 2015).

Recent empirical evidence shows that highly mobile digital income is particularly responsive to source-based taxation (Liu et al. 2025). Using bilateral data on cross-border service payments and WHT rates, the study finds that intellectual property–related royalty flows—commonly used for profit shifting in digital business models—are roughly four times more responsive to WHT changes than overall service imports, underscoring the heightened mobility of intangible-driven income in the digital economy.

A globally coordinated effort to share taxing rights remains unlikely to be implemented. Pillar I aims to reallocate a portion of the profits of the world's largest and most-profitable MNEs to the countries where their customers are located (refer to box 4.3). This concerns about 150 firms with global revenues above €20 billion and profit margins exceeding 10 percent, including many digital sector firms. This reallocation seeks to compensate for missing taxing rights under the CIT, curb profit shifting, and replace the proliferation of unilateral DST with a unified framework that reduces the risk of double taxation. Yet, implementing this change requires ratification by countries that account for at least 60 percent of the MNEs that would fall under Pillar I, an unlikely outcome.

Unilateral measures: The rise of DSTs. The uncertainty in reaching a global agreement has prompted countries to move ahead with unilateral digital services taxes (DSTs), a tax on the gross income that large digital firms earn from users in their domestic markets. Over 35 countries, including Colombia, France, India, Nigeria, and the United Kingdom, have implemented or announced DSTs at rates between 2 percent and 7 percent (Caragher 2025). Although DSTs provide a means for countries to claim taxing rights over digital activity, they introduce new complications. For instance, because DSTs tax gross revenue rather than profit, they lead to economic distortions and double taxation.

In addition, their scope, thresholds, and administrative requirements vary across countries, creating compliance and regulatory burdens. Moreover, DSTs have triggered retaliatory trade tensions. While revenue yields have been modest—typically around 0.1 percent of total tax receipts (Borders et al. 2023)—the political visibility of DSTs has been high, reflecting countries' frustration with the pace of multilateral reform.

A middle path: Updating bilateral frameworks and rebalancing taxing rights. Bilateral tax treaties aim to facilitate cross-border investment and avoid double taxation. Yet, when abused, they can lead to double nontaxation and often allocate taxing rights in ways that disadvantage EMDEs, particularly as capital importers and net service importers. Innovations in "model" tax treaties try to guarantee source-based taxing rights to address challenges posed by cross-border services and digital platforms. The 2017 UN Model Tax Convention introduced Article 12A, which grants source countries the right to tax technical and consultancy services provided by nonresidents without a permanent establishment. Building on this in 2021, Article 12B extends source taxation to income from digital services (for example, online advertising, user data monetization, and platform intermediation), thereby offering an alternative path to raise taxes from digital services providers. Implementing these provisions is demanding and requires that bilateral treaties be renegotiated.

To support these efforts, the Subject to Tax Rule (STTR) under the Pillar II framework empowers source countries to impose WHTs on intragroup payments, such as interest, royalties, and service fees, when taxed below a 9 percent rate. To facilitate adoption, a multilateral convention has been developed to embed the STTR in existing tax treaties.

Parallel development: Extending VAT to digital services. Alongside corporate tax measures, 113 countries, representing 80 percent of global services imports, have broadened their VAT base to cover cross-border digital trade (OECD 2025a). Unlike DST, VAT reforms have become an accepted best practice that ensures neutrality between foreign and domestic suppliers (for example, streaming services and domestic cable providers).[3] These regimes require nonresident online service providers to register, collect, and remit VAT on offshore sales, identified through the customer's billing, internet protocol, or payment method address. These reforms level the playing field between online and brick-and-mortar firms while mobilizing nontrivial revenues—around 0.1 percent of GDP in Chile, 0.06 percent in Costa Rica, and 0.04 percent in South Africa and Thailand (OECD 2025a). However, evidence on these reforms' compliance, price incidence, and welfare effects remains limited.

Opportunities to tax top economic actors

Transparency as a catalyst for broader reform. The implementation of the ABCDs can sharply curb the ability of top earners and MNEs to shift tax bases across countries or hide income in low-tax jurisdictions. They can also help identify individuals who control firms and limit shifting across income sources. As public support for tax reforms hinges on perceptions of fairness (Stantcheva 2021), stronger transparency and compliance at the top can reinforce the social contract and build momentum to enact broader reforms.

Integrating income taxation. Most EMDEs operate dual ("schedular") income tax systems that, by law, tax labor more than capital, as progressive rates apply to wages and, less often, to capital income. These systems are simpler to administer and, at times, justified by an inverse-elasticity logic: Tax less the income deemed more responsive. Yet, lower capital taxation undermines equity and creates scope for arbitrage, as taxpayers relabel and shift income across bases, a common practice among owner–managers, professionals, and closely held firms (for example, refer to Bergolo et al. 2025). A reform path is to integrate income taxation across all sources, eliminating arbitrage opportunities and applying progressive rates to total income. The case of Senegal is illustrative: Simply applying the existing PIT schedule, as intended by law, to the consolidated income of the 2,500 richest taxpayers could increase PIT revenue by 3.4 percent

(Bachas et al. 2023). Most capital income is currently subject to low, final WHTs and is never consolidated with other income for PIT purposes.

More ambitiously, countries could move toward fuller PIT–CIT integration, reflecting the fact that firms are ultimately owned by individuals. Yet, corporations are often easier to tax than individuals due to their size, reporting obligations (for example, for listed firms), and reliance on accounting structures (Kleven et al. 2016). In an integrated system, the CIT operates as a WHT at source—a backstop—creditable against PIT liabilities, mirroring wage withholding (Piketty et al. 2023). Realistically, for most countries, administrative and political constraints limit full income tax integration, and, even under an integrated system, the choice of taxing capital flows or stocks remains (refer to box 4.4). Therefore, for most EMDEs, the path forward lies in building on the ABCDs and pursuing incremental PIT and CIT reforms to strengthen efficiency, equity, and revenue. In what follows, we draw lessons for each income tax and highlight emerging risks.

Box 4.4 Taxing capital: Income or wealth?

Taxing capital. Calls to strengthen taxes on capital have gained momentum among academics, policy makers, and even the wealthy (Güçeri and Slemrod 2023). Two forces underpin this renewed attention: First, economic thought and political concerns have evolved, and the conventional "zero capital tax" result has lost ground (for example, Scheuer and Slemrod 2021; Straub and Werning 2020). Rising concentration has fueled perceptions that the wealthy are undertaxed, a sentiment reflected in initiatives such as the 2024 Rio G20 Declaration, the "Proud to Pay More" campaign by billionaires, and proposals for a global coordinated 2 percent minimum tax on billionaires (Zucman 2024). Second, EMDEs face mounting revenue pressures, which increases the appeal of taxing capital.

Capital income or wealth? Against this backdrop, countries can turn to two *imperfect* instruments with distinct tradeoffs: wealth taxes and capital income taxes (Bastani and Waldenström 2023). The former is levied on the *stock* of net wealth, whereas the latter taxes *flows,* the returns generated by those assets. Thus, a capital income tax targets both *normal* returns (yield from a safe investment) and *excess* returns (above-normal yields), but it fails to capture unrealized capital gains.[a]

(Continued)

Box 4.4 Taxing capital: Income or wealth? *(continued)*

Conversely, a wealth tax reaches unrealized gains and normal returns but does not differentiate between low- and high-yield assets. A wealth tax imposes heavier burdens on illiquid or low-return holdings while taxing high-yielding investments more lightly. Historically, wealth taxes have proven fragile, and many advanced economies have abandoned them because of valuation difficulties, liquidity constraints, and avoidance opportunities (OECD 2018). Greater financial transparency and third-party reporting may alleviate some of these challenges today (Saez and Zucman 2019).

New developments. While the relative merits of wealth and capital income taxes are better understood today, debate persists over which instrument is preferable. When returns vary across entrepreneurs and credit markets are imperfect, a broad-based wealth tax can reallocate capital toward more productive investors (Guvenen et al. 2023, 2024). This is because capital income taxes disproportionately affect high-return, credit-constrained entrepreneurs, whereas wealth taxes impose equal tax burdens on wealth holders regardless of productivity, effectively penalizing low-return investors. Schjelderup and Zoutman (2025) similarly find that wealth taxes can improve efficiency when income is taxed on a realization basis by mitigating distortions to portfolio choices.

Yet, both forms of capital taxation can trigger large offshore evasion responses, eroding the tax base and reducing welfare (Rotberg and Steinberg 2024).[b] This result, however, hinges on behavioral elasticities that appear too high relative to the evidence, particularly in the post–Automatic Exchange of Information environment.[c] In any case, effective capital taxation requires parallel efforts to curb offshore evasion through international cooperation and enforcement.

For emerging market and developing economies, it is important to determine whether taxing wealth is preferable (or even feasible) relative to improving capital income taxes. While mainstream guidance favors comprehensive capital income taxation because of valuation challenges and capital flight risks (for example, refer to Hebous et al. 2024), advances in transparency and third-party reporting make progressive wealth taxation a feasible complement in settings with sufficient capacity.

a. Accrual-based taxation is one solution to this problem, but it remains difficult to tax unlisted assets.

b. Aguiar et al. (2024) also caution against wealth taxes and accrual-based capital gains taxes, favoring realization-based approaches instead.

c. Their model's short-run elasticity of reported wealth is around 10, compared to 2–4 in Londoño-Vélez and Ávila Mahecha (2024) for Colombia. Similarly, reported wealth in Argentina appears less sensitive to tax rates than the model suggests (Londoño-Vélez and Tortarolo 2025).

Personal taxation going forward

The PIT is often perceived as the tax that EMDEs should seek to rely on more heavily but, in effect, struggle to deploy effectively (refer to chapter 2). The PIT does, however, have potential where formal markets, administrative capacity, third-party reporting, and political space are stronger.

The scope for PIT reform depends on understanding the roots of narrow and often elastic tax bases (Piketty and Saez 2013). Some weaknesses are policy induced: Features of the tax code, such as exemptions for fringe benefits or preferential rates, can, in principle, be addressed by legislative reform, although vested interests often block such efforts (refer to chapter 5). Other weaknesses are structural and costly to overcome: taxing cash-based earnings, identifying personal consumption through the firm, or preventing offshore evasion. Thus, the space for policy action varies across EMDEs. In LICs, where small-scale and informal activities dominate, PIT reforms risk missing the target population and, consequently, collect little revenue. By contrast, many MICs can now operate on the *expanded frontier:* Use data integration, digital filing, and transparency to revisit their PIT design. Indeed, innovations in transparency, coordination, and technology can play a pivotal role in broadening the tax base and reducing avoidance opportunities, particularly for closely held business owners and capital income earners.

Lesson 1: Narrow tax differentials between labor and capital income. If income-shifting elasticities are large, labor and capital tax rates should be close and their taxation ideally integrated (Piketty et al. 2023). For countries that operate HNWI units, maintain ownership registries, and have robust reporting systems, integrated income tax systems are within reach. For instance, a recent reform in Nigeria aligned capital gains taxes with PIT and CIT schedules, underscoring that integration is feasible even for some LMICs. The reform seeks to curb arbitrage and enhance progressivity while safeguarding small investors. For LICs with narrow PIT nets and weak third-party reporting, simplicity of filing and enforceability remain paramount. Schedular systems with moderate differentials, final withholding on passive income, and presumptive minimum taxes may perform better until capacities deepen. In these cases, minimizing opportunities for income shifting should be the guiding principle.

More generally, progress on income tax integration depends critically on data integration. Linking personal and corporate tax records with BO registries is essential to measure *comprehensive* income of top earners and estimate income shifting—key statistics for policy design that remain largely unknown in EMDEs. As discussed in the section "HNWIs and Income Taxation," recent studies from Brazil and Honduras illustrate this potential: Undistributed profits represent over half of total income for the richest adults, and the CIT acts as a backstop to the PIT at the very top.

Lesson 2: Ensure progressive tax rates extend to the very top. As shown in chapter 2, top marginal PIT rates are lower in EMDEs than in OECD economies (refer to figure 2.4), and capital income (dividends, interest, and capital gains) is often taxed more lightly than labor income by law (refer to figure 2A.1). In countries with detailed micro studies (refer to Palomo et al. 2025 for Brazil and Scot et al. 2025 for Honduras), the tax burden tends to flatten at the top, meaning that upper-middle-income individuals pay the same effective tax rate as the very richest. Without meaningful contributions from top economic actors and progressivity of income taxes, any further reform, such as extending the PIT further down the income distribution, becomes politically difficult.

Besides closing the gap between labor and capital tax rates, optimal income tax models tend to predict higher top rates when societies place a lower welfare weight on top earners; behavioral elasticities—whether real, avoidance, or migration related—are small; and income is more concentrated at the top. Tax elasticities remain poorly measured in most EMDEs, underscoring the need for more empirical work using tax return data and reform episodes to calibrate rate structures for top economic actors. Yet, to the extent that the early mentioned conditions hold, there may be scope to raise the ETR on top economic actors. Such rate increases should ideally be accompanied by base expansion and enforcement improvements, as stand-alone hikes in weak-enforcement settings often risk raising avoidance and evasion.

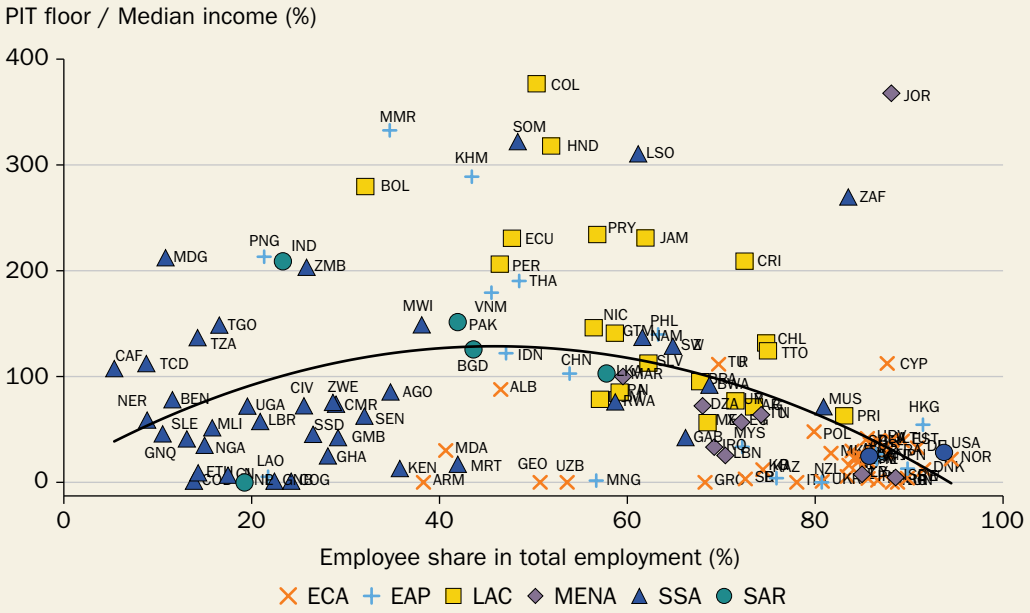
Lesson 3: Broaden the tax base by rationalizing concessions and lowering thresholds. In many EMDEs, the PIT base is eroded by tax expenditures that disproportionately benefit top earners. PIT-related expenditures account for a meaningful share of forgone revenue in LMICs and UMICs (refer to chapter 2, figure 2.7) and accrue to top economic actors falling above exemption thresholds (refer to chapter 2, figure 2.6). Personal deductions vary across countries: While some limit them to dependents, others allow expenses such as private education, health insurance, domestic workers, or restaurant meals. These provisions blur the line between social policy and tax policy, create scope for avoidance, and generate heterogeneity in tax burdens, complicating tax administration. Streamlining these provisions could enhance revenue and equity.

While not specifically about the taxation of top earners, some governments could broaden the PIT by lowering the exemption threshold—an often-overlooked-yet-fertile ground for reform. As economies develop and transition from self-employment to wage employment, the availability of third-party information facilitates enforcement, enabling governments to lower thresholds and gradually extend the tax net (Jensen 2022). Across countries, thresholds are typically set such that the share of employees above them is very high (85–95 percent); in fact, wage withholding accounts for over 90 percent of PIT revenue in many EMDEs (Bird and Zolt 2014). Thus, both the composition of employment and growth prospects matter when designing threshold reforms aimed at expanding coverage to next-to-top earners (refer to box 4.5 for further details).

Box 4.5 Cross-country comparison of PIT exemption thresholds

A cross-country comparison of personal income tax (PIT) exemption thresholds relative to median incomes provides new insights. Figure B4.5.1 plots these thresholds against the share of salaried workers in total employment and reveals a clear pattern. At low levels of labor formality (for example, Sub-Saharan Africa), thresholds appear moderate yet are unlikely to be binding given the small share of employees subject to the PIT. As the employee share rises, thresholds increase—possibly reflecting political constraints, administrative limits, and horizontal equity concerns. At high levels of formality, thresholds sharply decline. Figure B4.5.1 suggests that there is scope for reform in some upper-middle-income countries (UMICs), particularly in Latin America, where thresholds are high relative to countries with similar levels of salaried employment.

Figure B4.5.1 PIT exemption thresholds and wage employment



Sources: Original figure for this publication using data from the *Ernst & Young Worldwide Personal Tax and Immigration Guide 2023–24,* among others (PricewaterhouseCoopers, tax expenditure reports, and general tax codes); the World Inequality Database; and the World Development Indicators.

Note: This figure plots ratios of the PIT exemption threshold (where tax liability becomes positive) to the median pretax national income against the share of salaried workers in total employment. Median pretax national income is the level required to enter the top 50 percent of the income distribution in each country. Ratios are calculated for 2023 or 2024. Wage and salaried workers (employees) hold employment contracts that give them a remuneration that does not depend upon the revenue of the unit for which they work. Employee shares are averages from 2018 to 2023. Country codes are from World Bank Country and Lending Groups (https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups). EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; PIT = personal income tax; SAR = South Asia; SSA = Sub-Saharan Africa.

(Continued)

Box 4.5 Cross-country comparison of PIT exemption thresholds *(continued)*

Country experiences illustrate the importance of context and political economy. For example, in China, the PIT base expanded drastically from covering 0.1 percent to 20 percent of the population between 1986 and 2008, whereas in India, despite sustained growth, frequent upward adjustments of exemption levels kept the base narrow (Piketty and Qian 2009). Argentina offers a cautionary tale in the opposite setting: In a stagnant economy, under-indexing thresholds relative to nominal wage growth during the 2000s and 2010s effectively broadened the tax base but provoked backlash from upper-middle-class employees, prompting policy reversals around election cycles (Tortarolo et al. 2020).

Therefore, lowering exemption thresholds is feasible only under some conditions. Countries with high tax capacity and a sizable formal wage sector—typically UMICs—have room to expand PIT coverage gradually, provided there is political will and careful communication. In settings where wage employment remains low, however, the scope is inherently limited; for instance, as of 2019, only 2.3 percent of the labor force in the Democratic Republic of Congo and 4.2 percent in Uganda were in formal wage employment (McNabb and Granger 2023), leaving little room for a broad-based PIT. Moreover, without sustained growth, attempts to expand the base risk triggering societal resistance. Even in countries with leeway, lowering thresholds raises horizontal equity concerns: At similar income levels, wage earners face higher effective tax rates than self-employed individuals who are often covered by simplified regimes with low compliance (Bachas, Hoy, et al. 2026).

Corporate taxation going forward

CbCR has opened new frontiers for taxing MNEs. By disclosing where MNEs record profits, sales, and employment, CbCR provides the conceptual and administrative foundation for international tax reform. Ensuring that CbCR data are actively used and verified for accuracy is crucial for effective corporate taxation (Aliprandi and von Zedlitz 2023). International developments, such as the OECD two-pillar framework and the US Global Intangible Low Taxed Income regime, promise to reduce profit shifting globally but also imply that CIT reforms cannot be designed in isolation. EMDEs must anticipate how digitization, global minimum taxes, and the reallocation of taxing rights will reshape their corporate tax bases. Failing to adapt to this evolving architecture risks policy misalignment, forgone revenues, and reduced competitiveness. This section discusses the likely path of international taxation and lessons for the design of the CIT in EMDEs.

A paradigm shift under the OECD Two-Pillar Solution. Beyond the technical complexity and multiple acronyms surrounding the Two-Pillar Solution, two elements stand out as genuine innovations in international corporate taxation: the GMT and the global apportionment logic. Regardless of whether they are adopted in the current reform effort, these innovations are likely to resurface in future debates and are worth examining in detail:

- The GMT (Pillar II) includes a system of self-enforcement that could be collation proof. Even if some countries do not participate, the system might continue to function as taxing rights are passed on to participating countries. This represents a shift in global coordination that addresses a long-standing collective action problem: Individual countries could free-ride, and coordination coalitions are unstable (Keen and Konrad 2013; Slemrod and Wilson 2009). The GMT limits such behavior by ensuring that undertaxed profits are ultimately taxed somewhere. If fully implemented, it could also reduce reliance on the complex web of bilateral tax treaties, thereby improving certainty and overall efficiency.
- The global apportionment logic—allocating profits to countries based on economic factors such as domestic sales—emerges directly and indirectly (Delpeuch et al. 2026). Under Pillar I, a share of "residual" profits of the largest MNEs is allocated to market countries based on consumer location. Under Pillar II, the UTPR allows market countries to levy a top-up tax on globally low-taxed profits when neither the source nor parent jurisdiction does so, with taxing rights allocated proportional to sales. While global formulary apportionment appears revolutionary, it already operates across states within federations such as Canada and the United States.

Likely outcomes for Pillars I and II. Because the OECD Two-Pillar Solution represents a deep shift in international corporate taxation, it is unlikely to be fully implemented:

- **Pillar I: An unlikely implementation.** Pillar I faces major political and technical hurdles, making its implementation unlikely. Its design requires a multilateral convention to reallocate a share of profits from the largest MNEs to market countries and consensus on the definition of excess profits. Progress in negotiations has been slow, and countries remain divided. In response, several countries have reactivated unilateral DSTs as a fallback option. If multilateral talks continue to stall, this patchwork of DSTs could become entrenched, raising the risks of double taxation and regulatory uncertainty. In the short run, improvements in digital services taxation are thus more likely to emerge through bilateral agreements (refer to the section "*D* Is for Digital Services Taxation").

- **Pillar II: Moving ahead at different speeds.** More than 50 countries—including most high-income economies and a dozen EMDEs—have already transposed the GMT into domestic law. Early adopters include Canada, the European Union, Japan, Korea, and the United Kingdom. The recent "side-by-side" deal, allowing US-based multinationals to operate under a parallel minimum tax system, has weakened the effective scope of the GMT. Many EMDEs have delayed implementing Pillar II due to limited legal and administrative capacity, as well as uncertainty over the implications for tax incentives and revenue gains. Yet, several countries are exploring domestic minimum taxes to protect their tax base without adopting the full framework. Pillar II might result in a patchwork system, with most advanced economies applying the GMT rules, the United States having US MNEs be subject to US minimum tax rules, and EMDEs engaging selectively with the GMT.

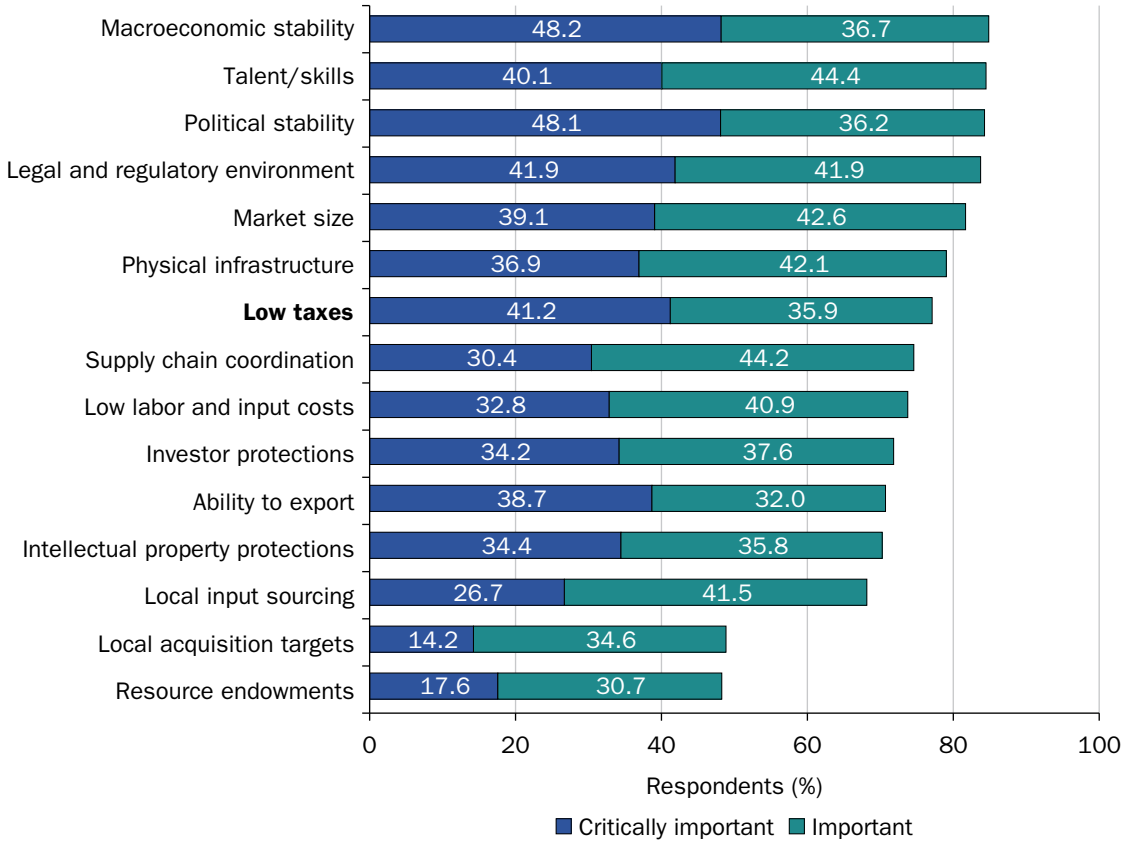
Given these global developments, what CIT reforms should EMDEs adopt?

- **Lesson 1: Advance a feasible domestic agenda for MNE taxation while engaging globally.** The future of international taxation is difficult to predict and navigate. For EMDEs, the priority is to focus on reforms that are both administratively feasible and revenue relevant: investing and adopting best practices such as using the CbCR and introducing BO registries to improve corporate tax audits; considering implementing a domestic minimum tax (QDMTT) that is consistent with Pillar II to safeguard domestic revenues and preempt revenue losses to foreign countries; extending VAT to digital services and exchange data on cross-border transactions to capture digital activity; and participating in international forums, such as the United Nations Tax Convention, to ensure that EMDEs' interests are considered in global rule-making.
- **Lesson 2: Reform tax incentives to widen the base.** The GMT provides a timely impetus to reform CIT incentives. While these exist in countries of all income levels, many EMDEs rely on profit-based incentives such as tax holidays, reduced rates, and income exemptions to attract investments. These incentives are often opaque, poorly targeted, and unconditional. As a result, ETRs vary across firms, mainly at the benefit of top firms (Bachas, Brockmeyer, et al. 2025), without necessarily having an economic rationale for these differences. A shift from profit-based to expenditure-based incentives would permit more transparent schemes that tie fiscal support to measurable investments in research and development, infrastructure, and job creation (refer to chapter 6). At the same time, CbCR data give governments a powerful means to assess the effectiveness of tax incentives. By comparing taxes forgone with the jobs and investment generated, policy makers can judge whether incentives for MNEs deliver commensurate benefits. More broadly, incentives should form part of a broad strategy

to create jobs and investment. Surveys of MNEs in EMDEs show that regulatory quality, infrastructure, and talent matter at least as much as low tax rates (refer to figure 4.9). Taxes are only one of the many factors that determine firms' location and production decisions, as firms respond to a country's amenities (Fajgelbaum et al. 2018), which can amplify or offset tax differentials (Egger et al. 2014).

- **Lesson 3: A simple, broad, and moderately rated CIT remains indispensable.** Besides acting as a backstop to the PIT—or as a withholding tool under integrated labor–capital tax systems—the CIT also serves broader policy aims. First, it taxes economic rents and

Figure 4.9 Factors that affect MNEs' investment decisions



Source: Original figure for this publication based on the World Bank's 2019/2020 Global Investment Competitiveness survey.

Note: The 2019/2020 Global Investment Competitiveness survey is based on MNEs in the following 10 EMDEs: Brazil, China, India, Indonesia, Malaysia, Mexico, Nigeria, Thailand, Türkiye, and Viet Nam. EMDEs = emerging market and developing economies; MNEs = multinational enterprises.

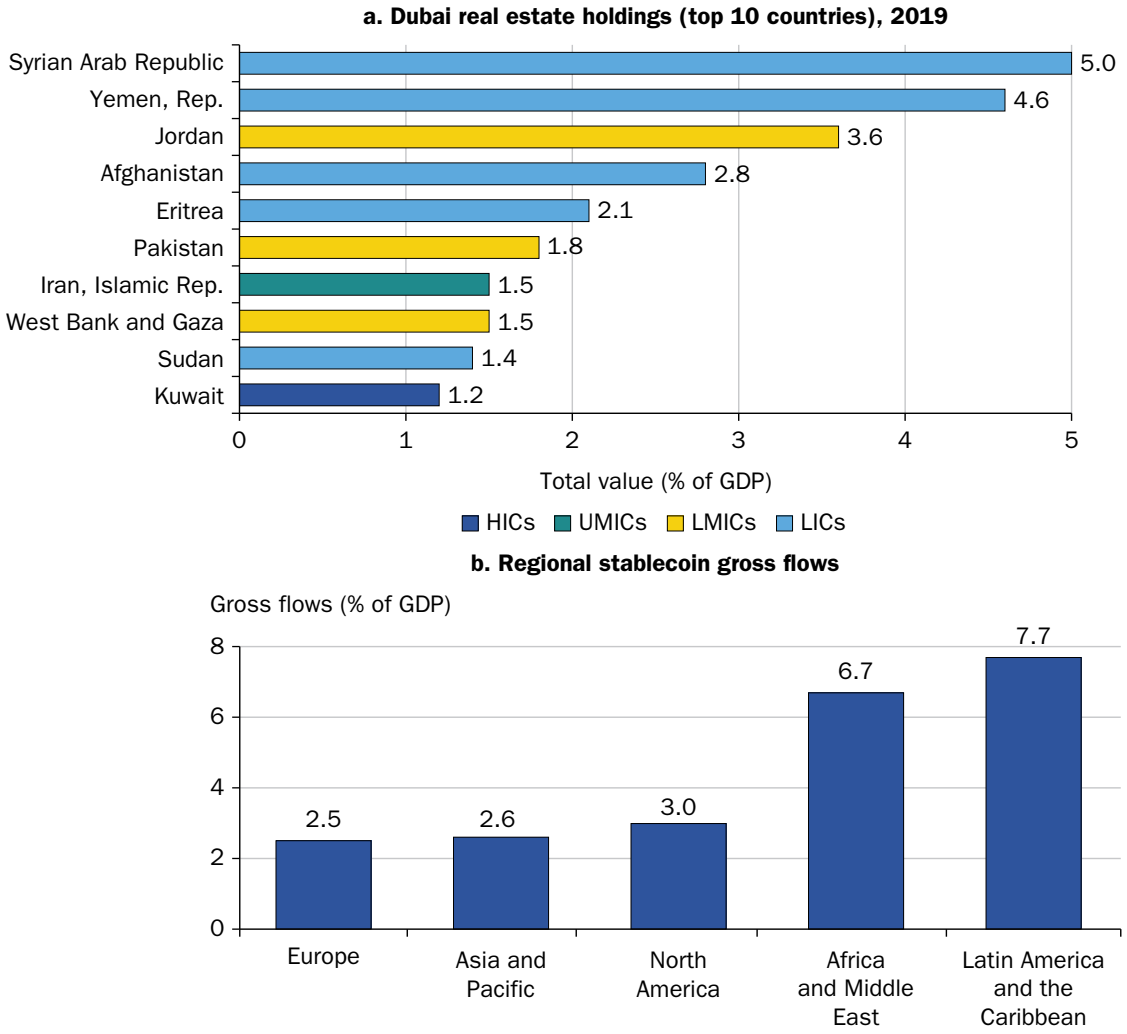
monopoly profits (Eeckhout et al. 2026), capturing returns from market power or location-specific advantages. If this role weakens, governments need substitutes such as stronger antitrust. Second, firms are major users of public goods (for example, infrastructure, legal systems, and human capital) and should help finance them; replacing the CIT would require alternative levies such as user fees. Third, the CIT enables governments to collect taxes from foreign-owned corporations operating domestically. Finally, the CIT is a key interface between firms and the state: It generates accounting and statistical information and can confer benefits to firms like access to procurement, credit, and investment incentives. The CIT embodies a compromise insofar as it ties tax payments to firms' liquidity and performance while serving multiple policy goals. Maintaining a broad-base, moderately rated, and simple CIT is essential for revenue, fairness, and accountability.

Staying ahead in the cat-and-mouse game of tax minimization

As transparency closes some gaps, new ones emerge. This section examines the evolving frontier of tax evasion and avoidance and the policies needed to keep pace.

- **Consumption through the firm.** High-income earners can use corporations to finance personal expenditures and bypass the PIT (Kopczuk and Zwick 2020) while generating CIT deductions. This form of tax avoidance is hard to observe and is sizable. For instance, in Portugal, tax losses via this channel are estimated at 1 percent of GDP (Leite 2024). Linking firm-level and personal expenditures through BORs can help identify avoidant behavior.
- **From bank secrecy to property secrecy.** As financial assets have come under AEOI, investors have increasingly shifted hidden wealth into assets outside CRS coverage, especially real estate. One estimate finds that of the post-AEOI drop in tax haven financial assets, 9 percent was reinvested in the UK property market alone (US$45 billion) (Bomare and Le Guern Herry 2025). Overall, about 15 percent of high-end UK residential property (worth £75 billion) is held by offshore corporations in low-tax jurisdictions, many ultimately owned by UK residents through "round-tripping" (Bomare 2019; Johannesen et al. 2022). Similar patterns appear elsewhere: In Norway, foreign ownership of corporate real estate rose from 6 percent in 2011 to 10.5 percent in 2017, driven by tax haven firms (Alstadsaeter and Økland 2022), and in Dubai, nonresidents own 30 percent of residential property (US$68 billion), with tax evasion and sanctions-driven capital flight as major motives (Alstadsaeter et al. 2025). The value of Dubai property owned by foreign citizens exceeds 1 percent of home-country GDP for 10 countries and reaches 3 percent in some (refer to figure 4.10, panel a).

Figure 4.10 New strategies for tax evasion and avoidance



Sources: Panel a: Adapted from Figure 4, panel b, in Alstadsaeter et al. (2025). Panel b: Adapted from Figure 8, panel a, in Reuter (2025).

Note: In panel b, percentages are calculated as (inflows + outflows + within flows)/GDP. Regional GDP numbers are aggregated from country-level World Economic Outlook 2023 data. GDP = gross domestic product; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

- **Cryptocurrency assets and digital mobility.** Cryptocurrency is becoming a key channel to move money across borders, particularly to send remittances and circumvent capital controls in EMDEs (Graf von Luckner et al. 2023). By 2024, cryptocurrency gross flows represented a sizable share of GDP in several EMDE regions—almost 8 percent for Latin America and 7 percent for the Middle East and Africa (Reuter 2025) (refer to figure 4.10, panel b).

Because transactions are pseudonymous, identifying BOs is hard, and, as most of these assets are held outside regulated financial institutions, they remain invisible under the CRS. This creates a digital veil of secrecy that facilitates tax evasion, capital flight, and regulatory avoidance. Nascent attempts to close this gap involve extending CRS-equivalent automatic reporting to cryptocurrency transactions (for example, the OECD's Crypto-Asset Reporting Framework, adopted by 69 countries for 2028; OECD 2023a, 2025b).

- **Circumventing transparency through passports and residency.** Citizenship and residency by investment programs, or "golden visas," allow individuals to obtain new nationalities or residencies for under US$100,000. Over 80 countries offer such programs (Surak 2022; *The Economist* 2024). While intended to attract investment, these programs facilitate tax evasion, money laundering, and sanctions avoidance (FATF and OECD 2023; Surak 2022). After the launch of these initiatives, deposits in tax havens rose by 50 percent, consistent with individuals using alternate passports to misreport residence and escape CRS reporting (Langenmayr and Zyska 2023).

Policy lessons

This section summarizes the main policy lessons, organized around general principles and tax-specific guidance for the PIT and CIT. Table 4.2 places these lessons within the broader fiscal frontier framework, illustrating how priorities for transparency measures and income tax policy vary with countries' structural fundamentals and distance to the frontier.

General policy lessons

General policy lessons include the following:

- The full activities of HNWIs and MNEs often remain opaque. The ABCD transparency and coordination reforms can close this gap.
- Beyond raising compliance, transparency innovations enable countries to rethink income tax design to be more progressive and efficient. Past elasticities reflect how easily income can be shifted or concealed, not laws of nature.
- Closer integration of labor and capital income taxation is desirable, but full PIT–CIT integration is appropriate for only a few countries. Most can instead strengthen each tax separately, while accounting for their interactions.
- This agenda faces headwinds: Global cooperation is faltering, and new risks are emerging, such as golden visas, cryptocurrency assets, and the rising use of firms to shelter personal income from taxation.

Table 4.2 Transparency and income taxation

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming:*** **Minimal transparency and narrow-base income taxes** **Current situation** • Transparency innovations are not adopted. • Income tax bases are narrow: few taxpayers, many exemptions (notably for capital income), and special CIT regimes. **Actions** • Adopt the most-effective and most-feasible transparency tools. • Advance gradual PIT and CIT reforms, reducing exemptions and simplifying rate structures. • Consider aligning PIT and CIT rates to minimize income shifting.	***Constrained but functional:*** **Transparency-ready, simple income taxes** **Current situation** • Transparency tools are adopted but underused. • The PIT is collected via withholding over a narrow base, with limited progressivity. • The CIT has a moderate rate, with few exemptions or special regimes. **Actions** • Invest in technology and skills to unlock transparency innovations. • Broaden PIT coverage: Mandate filing, include capital income, and lower exemption thresholds. • Keep the income tax coherent: minimal PIT–CIT rate gaps and a moderately rated and broad-based CIT.
Strong fundamentals	***Capable but underperforming:*** **Information-rich, coherence-poor income taxes** **Current situation** • Transparency tools are adopted but are not systematically used. • The PIT and CIT are siloed and full of special provisions—eroding the tax base, reducing equity, and undermining trust. **Actions** • Use transparency reforms to reinforce tax progressivity. • Eliminate unjustified provisions benefiting top taxpayers, freeing revenue for redistribution or payroll tax relief. • Further integrate labor and capital taxation.	***Capable and high-performing:*** **High-transparency and broad-based income taxes** **Current situation** • Transparency tools are widely deployed, supported by global cooperation. • Comprehensive and granular view on income by source, including undistributed profits that can be linked to firm owners. **Actions** • Address inconsistencies in the taxation of HNWIs. • Track profit shifting, and cooperate to limit harmful tax competition. • Move toward comprehensive income taxation integrating PIT and CIT and addressing capital income timing.

Source: Original table for this publication.

Note: CIT = corporate income tax; HNWIs = high-net-worth individuals; PIT = personal income tax.

PIT lessons

PIT lessons include the following:

- Narrow the tax differentials between labor and capital income.
- Ensure progressivity extends to the very top of the income distribution.
- Broaden the tax base: Rationalize concessions and, in some cases, lower thresholds.

CIT lessons

CIT lessons include the following:

- Consider a simple, broad, and moderately rated CIT, which remains indispensable.
- Advance a feasible domestic agenda for MNE taxation while engaging globally.
- Review and reform corporate tax incentives to widen the tax base.

Notes

1. The International Tax Justice Network first coined the ABC term.
2. Unlike the other components of the ABCD framework, the digital taxation is primarily an adaptation of tax policy to changes in the economy rather than a transparency innovation per se.
3. The World Bank Group and OECD, in partnership with regional organizations, have produced three Regional VAT Digital Toolkits for Africa, Asia Pacific, and Latin America and the Caribbean that outline key aspects of implementation. Refer to OECD (2015, 2017) for the core principles that underpin this framework.

References

Aguiar, Mark A., Benjamin Moll, and Florian Scheuer. 2024. "Putting the 'Finance' into 'Public Finance': A Theory of Capital Gains Taxation." NBER Working Paper 32951. National Bureau of Economic Research.

Aitken, Brian J., and Ann E. Harrison. 1999. "Do Domestic Firms Benefit from Direct Foreign Investment? Evidence from Venezuela." *American Economic Review* 89 (3): 605–18.

Alfaro-Urena, Alonso, Isabela Manelici, and Jose P. Vasquez. 2021. "The Effects of Multinationals on Workers: Evidence from Costa Rican Microdata." Working Paper 285. Princeton University, Department of Economics, Center for Economic Policy Studies.

Alfaro-Urena, Alonso, Isabela Manelici, and Jose P. Vasquez. 2022. "The Effects of Joining Multinational Supply Chains: New Evidence from Firm-to-Firm Linkages." *Quarterly Journal of Economics* 137 (3): 1495–552.

Aliprandi, Giulia, and Gerrit von Zedlitz. 2023. "Benchmarking Country-by-Country Reports." Working Paper 17. EU Tax Observatory.

Alstadsaeter, Annette, Elisa Casi-Eberhard, Jakob Miethe, and Barbara Stage. 2023. "Lost in Information: National Implementation of Global Tax Agreements." Discussion Paper 2023/22. NHH Department of Business and Management Science.

Alstadsaeter, Annette, Matthew Collin, Bluebery Planterose, Gabriel Zucman, and Andreas Økland. 2025. "Who Owns Offshore Real Estate? Evidence from Dubai." Working Paper 1. EU Tax Observatory.

Alstadsaeter, Annette, Sarah Godar, Panayiotis Nicolaides, and Gabriel Zucman. 2023. *Global Tax Evasion Report 2024*. EU Tax Observatory.

Alstadsaeter, Annette, Niels Johannesen, and Gabriel Zucman. 2018. "Who Owns the Wealth in Tax Havens? Macro Evidence and Implications for Global Inequality." *Journal of Public Economics* 162: 89–100.

Alstadsaeter, Annette, and Andreas Økland. 2022. "Increasing Cross-Border Ownership of Real Estate: Evidence from Norway." Working Paper 8. EU Tax Observatory.

Alvaredo, Facundo, Anthony B. Atkinson, Thomas Piketty, and Emmanuel Saez. 2024. World Inequality Database. https://wid.world.

Alvaredo, Facundo, and Juliana Londoño-Vélez. 2013. "High Incomes and Personal Taxation in a Developing Economy: Colombia 1993–2010." Working Paper 12. Commitment to Equity.

Amberger, Harald J., Jaron H. Wilde, and Yuchen Wu. 2025. "Cross-Border Investment, Deterrence, and Compliance Effects of Ownership Transparency." *Journal of Accounting and Economics* 80 (2–3): 101809.

Assouad, Lydia. 2023. "Rethinking the Lebanese Economic Miracle: The Extreme Concentration of Income and Wealth in Lebanon, 2005–2014." *Journal of Development Economics* 161: 103003.

Bachas, Pierre, Anne Brockmeyer, Roel Dom, and Camille Semelet. 2026. "Effective Tax Rates, Firm Size and the Global Minimum Tax." *Journal of Public Economics* 261: 105721.

Bachas, Pierre, Léo Czajka, Aissatou Diallo, Justine Knebelmann, and Anaelle Toure. 2023. *Strengthening Personal Income Taxation in Senegal: Case Study*. Prosperity Notes Series. World Bank.

Bachas, Pierre, Matthew H. Fisher-Post, Anders Jensen, and Gabriel Zucman. 2022. "Capital Taxation, Development, and Globalization: Evidence from a Macro-Historical Database." NBER Working Paper 29819. National Bureau of Economic Research.

Bachas, Pierre, Helena Hernández, Valentina Laverde, Juliana Londoño-Vélez, and Gabriel Zucman. 2026. "Automatic Exchange of Information and Offshore Tax Compliance: Evidence from Colombia." SSRN. http://dx.doi.org/10.2139/ssrn.7122974.

Bachas, Pierre, Christopher Hoy, Anders Jensen, and Mahvish Shaukat. 2026. "Horizontal Equity of Taxation: Citizen Beliefs and Policy Preferences." Policy Research Working Paper 11367. World Bank.

Bachas, Pierre, Anders Jensen, and Lucie Gadenne. 2024. "Tax Equity in Low- and Middle-Income Countries." *Journal of Economic Perspectives* 38 (1): 55–80.

Bashir, Muhammad, Usama Jamal, Kyle McNabb, and Mazhar Waseem. 2024. "Intended and Unintended Consequences of Anti-Avoidance Rules." WIDER Working Paper 2024/70. United Nations University–World Institute for Development Economics Research.

Bassier, Ihsaan, and Ingrid Woolard. 2021. "Exclusive Growth? Rapidly Increasing Top Incomes amid Low National Growth in South Africa." *South African Journal of Economics* 89 (2): 246–73.

Bastani, Spencer, and Daniel Waldenström. 2023. "Taxing the Wealthy: The Choice between Wealth and Capital Income Taxation." *Oxford Review of Economic Policy* 39 (3): 604–16.

Beer, Sebastian, Maria Coelho, and Sebastien Leduc. 2019. "Hidden Treasure: The Impact of Automatic Exchange of Information on Cross-Border Tax Evasion." IMF Working Paper 286. International Monetary Fund.

Beer, Sebastian, Ruud de Mooij, and Li Liu. 2020. "International Corporate Tax Avoidance: A Review of the Channels, Magnitudes, and Blind Spots." *Journal of Economic Surveys* 34 (3): 660–88.

Bergolo, Marcelo, Gabriel Burdin, Mauricio De Rosa, Matias Giaccobasso, Martin Leites, and Horacio Rueda. 2025. "How Do Top Earners Respond to Taxation? Own- and Cross-Tax Base Responses, Efficiency, and Inequality." Working Paper 34. Finnish Centre of Excellence in Tax Systems Research.

Bergolo, Marcelo, Juliana Londoño-Vélez, and Darío Tortarolo. 2023. "Tax Progressivity and Taxing the Rich in Developing Countries: Lessons from Latin America." *Oxford Review of Economic Policy* 39 (3): 530–49.

Bird, Richard M., and Eric M. Zolt. 2014. "Redistribution via Taxation: The Limited Role of the Personal Income Tax in Developing Countries." *Annals of Economics and Finance* 15 (2): 625–83.

Boas, Hjalte, Matthew Collin, Sarah Godar, Carolina Moura, and Andreas Økland. 2025. *Assessing the Coverage of the Automatic Exchange of Information under the CRS*. Report 7. EU Tax Observatory.

Boas, Hjalte, Niels Johannesen, Claus Thustrup Kreiner, Lauge Truels Larsen, and Gabriel Zucman. 2024. "Taxing Capital in a Globalized World: The Effects of Automatic Information Exchange." NBER Working Paper 32714. National Bureau of Economic Research.

Bomare, Jeanne. 2019. "Tax Evasion and British Real Estate: An Estimation of the Offshore Wealth Held through British Real Estate." Paris School of Economics.

Bomare, Jeanne, and Matthew Collin. 2025. "When Bankers Become Informants: Behavioural Effects of Automatic Exchange of Information." Working Paper 33. EU Tax Observatory.

Bomare, Jeanne, and Ségal Le Guern Herry. 2025. "Avoiding Transparency through Offshore Real Estate: Evidence from the United Kingdom." SSRN. http://dx.doi.org/10.2139/ssrn.5260099.

Borders, Kane, Sofia Balladares, Mona Barake, and Enea Baselgia. 2023. "Digital Service Taxes." Note 6. EU Tax Observatory.

Boukal, Tomáš, Petr Janský, and Miroslav Palanský. 2025. "Global Minimum Tax and Profit Shifting." Working Paper 25. EU Tax Observatory.

Brounstein, Jakob, Pierre Bachas, and Alex Bajana. 2026. "The Transparency Tax: Discouraging Firm Ownership via Tax Havens in Ecuador." Unpublished paper.

Bruil, Arjan. 2023. "Distributional National Accounts for the Netherlands and a Comparison with 12 Other Countries." *Review of Income and Wealth* 69 (4): 886–906.

Bruil, Arjan, Céline van Essen, Wouter Leenders, et al. 2022. "Inequality and Redistribution in the Netherlands." Discussion Paper 436. CPB Netherlands Bureau for Economic Policy Analysis.

Burdín, Gabriel, Mauricio De Rosa, Andrea Vigorito, and Joan Vilá. 2022. "Falling Inequality and the Growing Capital Income Share: Reconciling Divergent Trends in Survey and Tax Data." *World Development* 152: 105783.

Bustos, Sebastián, Dina Pomeranz, Juan Carlos Suárez Serrato, José Vila-Belda, and Gabriel Zucman. 2025. "The Race between Tax Enforcement and Tax Planning: Evidence from a Natural Experiment in Chile." NBER Working Paper 30114. National Bureau of Economic Research.

Cano, Liliana. 2015. "Top Income Shares in a Growing South American Economy: Ecuador 2004–2011." SSRN. http://dx.doi.org/10.2139/ssrn.2890309.

Caragher, Jacinta. 2025. "Digital Services Taxes (DST) Global Tracker." VATCalc. https://www.vatcalc.com/global/digital-services-taxes-dst-global-tracker/.

Casi, Elisa, Christoph Spengel, and Barbara M. B. Stage. 2020. "Cross-Border Tax Evasion after the Common Reporting Standard: Game Over?" *Journal of Public Economics* 190: 104240.

Chancel, Lucas, Thomas Piketty, Emmanuel Saez, and Gabriel Zucman. 2022. *World Inequality Report 2022*. Harvard University Press.

Chiocchetti, Alice, Manon Francois, Laure Heidmann, and Giulia Aliprandi. 2025. "Shift or Share: Profit Shifting and Workers' Profit Sharing." Working Paper 39. EU Tax Observatory.

Clifford, Sarah. 2019. "Taxing Multinationals beyond Borders: Financial and Locational Responses to CFC Rules." *Journal of Public Economics* 173: 44–71.

Collin, Matthew, Florian Hollenbach, and David Szakonyi. 2025. "The End of Londongrad? Ownership Transparency and Offshore Investment in Real Estate." Working Paper 28. EU Tax Observatory.

Davoine, Eva, Ségal Le Guern Herry, Elvin Le Pouhaer, and Wouter Leenders. 2026. "Global Transparency and Tax Enforcement on Foreign Capital." Unpublished paper. https://segal-leguernherry.github.io/assets/DLLL.pdf.

De Backer, Koen, Sébastien Miroudot, and Davide Rigo. 2019. "Multinational Enterprises in the Global Economy: Heavily Discussed, Hardly Measured." VoxEU, Center for Economic Policy Research. https://cepr.org/voxeu/columns/multinational-enterprises-global-economy-heavily-discussed-hardly-measured.

Del Carmen, Giselle, Santiago Garriga, Wilman Ponce, and Thiago Scot. 2025. "Two Decades of Top Income Shares in Honduras." *Journal of Public Economics* 246: 105362.

Delpeuch, Samuel, Ana-Cinta González Cabral, Felix Hugger, and Pierce O'Reilly. 2025. "MNE Business Functions and Corporate Taxation." OECD Taxation Working Paper 71. Organisation for Economic Co-operation and Development.

Delpeuch, Samuel, Sébastien Laffitte, Elvin Le Pouhaër, Quentin Parrinello, and Giulia Varaschin. 2026. "Revisiting Formulary Apportionment in the UN Tax Negotiations: Design Choices and Policy Implications." EU Tax Observatory.

di Barbara Bratta, Vera, Vera Santomartino, and Paolo Acciari. 2021. "Assessing Profit Shifting Using Country-by-Country Reports: A Non-Linear Response to Tax Rate Differentials." Working Paper 11. Ministero dell'Economia e delle Finanze, Dipartimento delle Finanze.

Eeckhout, Jan, Chunyang Fu, Wenjian Li, and Xi Weng. 2026. "Optimal Taxation and Market Power." *American Economic Review* 116 (1): 119–63.

Egger, Peter, Christian Keuschnigg, Valeria Merlo, and Georg Wamser. 2014. "Corporate Taxes and Internal Borrowing within Multinational Firms." *American Economic Journal: Economic Policy* 6 (2): 54–93.

Ellis-Petersen, Hannah. 2020. "1MDB Scandal Explained: A Tale of Malaysia's Missing Billions." *The Guardian*, July 28, 2020. https://www.theguardian.com/world/2018/oct/25/1mdb-scandal-explained-a-tale-of-malaysias-missing-billions.

Fairfield, Tasha, and Michel Jorratt De Luis. 2016. "Top Income Shares, Business Profits, and Effective Tax Rates in Contemporary Chile." *Review of Income and Wealth* 62 (Suppl. 1): S120–44.

Fajgelbaum, Pablo D., Eduardo Morales, Juan Carlos Suárez Serrato, and Owen Zidar. 2018. "State Taxes and Spatial Misallocation." *Review of Economic Studies* 86 (1): 333–76.

FATF (Financial Action Task Force). 2019. *Best Practices on Beneficial Ownership for Legal Persons*. FATF.

FATF (Financial Action Task Force) and OECD (Organisation for Economic Co-operation and Development). 2023. *Misuse of Citizenship and Residency by Investment Programmes*. FATF and OECD.

Faye, Souleymane, Sarah Godar, and Gabriel Zucman. 2025. *Global Offshore Wealth, 2001–2021*. Working Paper 41. EU Tax Observatory.

Fernando, Francisca, and Richard Berkhout, eds. 2022. *Unmasking Control: A Guide to Beneficial Ownership Transparency*. International Monetary Fund.

Ferrari, Alessandro, Sébastien Laffitte, Mathieu Parenti, and Farid Toubal. 2024. "Profit Shifting and International Tax Reforms." Working Paper 11. EU Tax Observatory.

Fuest, Clemens, Stefan Greil, Felix Hugger, and Florian Neumeier. 2025. "Global Profit Shifting of Multinational Companies: Evidence from Country-by-Country Reporting Micro Data." *Journal of the European Economic Association* 23 (5): 1773–1808.

Fuest, Clemens, and Florian Neumeier. 2023. "Corporate Taxation." *Annual Review of Economics* 15: 425–50.

Garetto, Stefania, Nina Pavcnik, Natalia Ramondo, et al. 2025. "Foreign Direct Investment and Development." *VoxDevLit* 13 (1).

Graf von Luckner, Clemens, Carmen M. Reinhart, and Kenneth Rogoff. 2023. "Decrypting New Age International Capital Flows." *Journal of Monetary Economics* 138: 104–22.

Güçeri, İrem, and Joel Slemrod. 2023. "Taxing the Rich (More)." *Oxford Review of Economic Policy* 39 (3): 399–405.

Guvenen, Fatih, Gueorgui Kambourov, Burhan Kuruscu, and Sergio Ocampo-Diaz. 2024. "Book-Value Wealth Taxation, Capital Income Taxation, and Innovation." NBER Working Paper 32585. National Bureau of Economic Research.

Guvenen, Fatih, Gueorgui Kambourov, Burhan Kuruscu, Sergio Ocampo, and Daphne Chen. 2023. "Use It or Lose It: Efficiency and Redistributional Effects of Wealth Taxation." *Quarterly Journal of Economics* 138 (2): 835–94.

Haddad, Mona, and Ann Harrison. 1993. "Are There Positive Spillovers from Direct Foreign Investment? Evidence from Panel Data for Morocco." *Journal of Development Economics* 42 (1): 51–74.

Hebous, Shafik, Alexander Klemm, Geerten Michielse, and Carolina Osorio Buitron. 2024. "How to Tax Wealth." *IMF How-To Notes* 2024 (1): 1.

Hijzen, Alexander, Pedro S. Martins, Thorsten Schank, and Richard Upward. 2013. "Foreign-Owned Firms around the World: A Comparative Analysis of Wages and Employment at the Micro-Level." *European Economic Review* 60: 170–88.

Hugger, Felix, Ana Cinta González Cabral, Massimo Bucci, Maria Gesualdo, and Pierce O'Reilly. 2024. "The Global Minimum Tax and the Taxation of MNE Profit." OECD Taxation Working Paper 68. OECD Publishing.

Janský, Peter, Tereza Palanská, and Miroslav Palanský. 2024. "Hide-Seek-Hide? On the Effects of Financial Secrecy." Working Paper 2024-03. Tax Justice Network.

Jensen, Anders. 2022. "Employment Structure and the Rise of the Modern Tax System." *American Economic Review* 112 (1): 213–34.

Johannesen, Niels, Jakob Miethe, and Daniel Weishaar. 2022. "Homes Incorporated: Offshore Ownership of Real Estate in the UK." CESifo Working Paper 10159. CESifo.

Johannesen, Niels, Thomas Tørsløv, and Ludvig Wier. 2020. "Are Less Developed Countries More Exposed to Multinational Tax Avoidance? Method and Evidence from Micro-Data." *World Bank Economic Review* 34 (3): 790–809.

Johannesen, Niels, and Gabriel Zucman. 2014. "The End of Bank Secrecy? An Evaluation of the G20 Tax Haven Crackdown." *American Economic Journal: Economic Policy* 6 (1): 65–91.

Junquera-Varela, Raúl Félix, and Cristian Oliver Lucas-Mas. 2021. *Tax Theory Applied to the Digital Economy: A Proposal for a Digital Data Tax and a Global Internet Tax Agency*. World Bank.

Keen, Michael, and Kai A. Konrad. 2013. "The Theory of International Tax Competition and Coordination." In *Handbook of Public Economics,* vol. 5, edited by Alan J. Auerbach, Raj Chetty, Martin Feldstein, and Emmanuel Saez, 257–328. Elsevier.

Kerr, Andrew Nicholas, and Mxolisi Zondi. 2024. "Measuring the Upper Tail of the Income and Wealth Distributions." Policy Research Working Paper 10836. World Bank.

Kleven, Henrik Jacobsen, Claus Thustrup Kreiner, and Emmanuel Saez. 2016. "Why Can Modern Governments Tax So Much? An Agency Model of Firms as Fiscal Intermediaries." *Economica* 83 (330): 219–46.

Knobel, Andres. 2023. *Uses and Purposes of Beneficial Ownership Data*. Technical Report. Tax Justice Network.

Knobel, Andres, and Frederik Heitmüller. 2018. *Citizenship and Residency by Investment Schemes: Potential to Avoid the Common Reporting Standard for Automatic Exchange of Information*. Technical Report. Tax Justice Network.

Kopczuk, Wojciech, and Eric Zwick. 2020. "Business Incomes at the Top." *Journal of Economic Perspectives* 34 (4): 27–51.

Langenmayr, Dominika, and Lennard Zyska. 2023. "Escaping the Exchange of Information: Tax Evasion via Citizenship-by-Investment." *Journal of Public Economics* 221: 104865.

Larsen, L., N. Johannesen, and N. Riedel. 2026. "Does Global Financial Transparency Improve Tax Compliance in Developing Countries?" WIDER Working Paper 58. United Nations University–World Institute for Development Economics Research.

Leite, David. 2024. "The Firm as Tax Shelter: Micro Evidence and Aggregate Implications of Consumption through the Firm." Working Paper 25. World Inequality Lab.

Leon, Sam, and Robert Palmer. 2016. "What Does the UK Beneficial Ownership Data Show Us?" Global Witness. https://globalwitness.org/en/campaigns/anonymous-company-holders/what-does-uk-beneficial-ownership-data-show-us/.

Liu, Li, Alexander Klemm, and Parijat Lal. 2025. "Shaping Services Trade: The Heterogeneous Effects of Withholding Taxes." IMF Working Paper 214. International Monetary Fund.

Londoño-Vélez, Juliana, and Javier Ávila Mahecha. 2024. "Behavioural Responses to Wealth Taxation: Evidence from Colombia." *Review of Economic Studies* 92 (4): 2624–655.

Londoño-Vélez, Juliana, and Dario Tortarolo. 2025. "Revealing 21% of GDP in Hidden Assets: Evidence from Argentina." *Journal of Public Economics* 250: 105471.

Lu, Yi, Zhigang Tao, and Lianming Zhu. 2017. "Identifying FDI Spillovers." *Journal of International Economics* 107: 75–90.

McNabb, Kyle, and Hazel Granger. 2023. "The Taxation of Employment Income in African Countries: Findings from a New Dataset." *Journal of International Development* 35 (7): 1595–618.

Mendoza, Enrique G., Assaf Razin, and Linda L. Tesar. 1994. "Effective Tax Rates in Macroeconomics: Cross-Country Estimates of Tax Rates on Factor Incomes and Consumption." *Journal of Monetary Economics* 34 (3): 297–323.

Menkhoff, Lukas, and Jakob Miethe. 2019. "Tax Evasion in New Disguise? Examining Tax Havens' International Bank Deposits." *Journal of Public Economics* 176: 53–78.

Noked, Noam, and Zachary Marcone. 2023. "Closing the 'Shell Bank' Loophole." *Virginia Journal of International Law* 64 (1): 119–70.

OECD (Organisation for Economic Co-operation and Development). 2015. *Addressing the Tax Challenges of the Digital Economy, Action 1—2015 Final Report*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2017. *International VAT/GST Guidelines*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2018. *The Role and Design of Net Wealth Taxes in the OECD*. OECD Tax Policy Studies 26. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2020. *Tax Challenges Arising from Digitalisation—Economic Impact Assessment: Inclusive Framework on BEPS, OECD/G20 Base Erosion and Profit Shifting Project*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2023a. *International Standards for Automatic Exchange of Information in Tax Matters: Crypto-Asset Reporting Framework and 2023 Update to the Common Reporting Standard*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2023b. *Update on the Implementation of the 2021 Strategy on Unleashing the Potential of Automatic Exchange of Information for Developing Countries*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2024a. *Corporate Tax Statistics 2024*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2024b. *Peer Review of the Automatic Exchange of Financial Account Information: 2024 Update*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2025a. *A Decade of the BEPS Initiative: An Inclusive Framework Stocktake Report to G20 Finance Ministers and Central Bank Governors*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2025b. *Taking Stock of Progress on Transparency and Exchange of Information for Tax Purposes: OECD and Global Forum Report to G20 Finance Ministers and Central Bank Governors*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development) and IDB (Inter-American Development Bank). 2019. *A Beneficial Ownership Implementation Toolkit*. OECD and IDB.

Open Government Partnership. 2019. *Global Report: The State of Open Government, Volume 1*. Open Government Partnership.

Open Ownership. 2025. "Open Ownership map: Worldwide action on beneficial ownership transparency." https://www.openownership.org/en/map/

O'Reilly, Pierce, Kevin Parra Ramírez, and Michael A. Stemmer. 2021. "Exchange of Information and Bank Deposits in International Financial Centres." *Hacienda Pública Española / Review of Public Economics* 239 (4): 27–69.

Oxford Insights and Lateral Economics. 2022. *Measuring the Economic Impact of Beneficial Ownership Transparency: A Landscape Study*. Open Ownership.

Palomo, Theo, Davi Bhering, Thiago Scot, et al. 2025. *Tax Progressivity and Inequality in Brazil: Evidence from Integrated Administrative Data*. Report 9. EU Tax Observatory.

Piketty, Thomas, and Nancy Qian. 2009. "Income Inequality and Progressive Income Taxation in China and India, 1986–2015." *American Economic Journal: Applied Economics* 1 (2): 53–63.

Piketty, Thomas, and Emmanuel Saez. 2013. "Optimal Labor Income Taxation." In *Handbook of Public Economics,* vol. 5, edited by Alan J. Auerbach, Raj Chetty, Martin Feldstein, and Emmanuel Saez, 391–474. Elsevier.

Piketty, Thomas, Emmanuel Saez, and Gabriel Zucman. 2023. "Rethinking Capital and Wealth Taxation." *Oxford Review of Economic Policy* 39 (3): 575–91.

Ramesh, Randeep. 2016. "1MDB: The Inside Story of the World's Biggest Financial Scandal." *The Guardian*, July 28. https://theguardian.com/world/2016/jul/28/1mdb-inside-story-worlds-biggest-financial-scandal-malaysia.

Ramondo, Natalia. 2014. "A Quantitative Approach to Multinational Production." *Journal of International Economics* 93 (1): 108–22.

Ratcliffe, Rebecca. 2024. "Vietnamese Property Tycoon Sentenced to Death in $27bn Fraud Case." *The Guardian*, April 11. https://www.theguardian.com/world/2024/apr/11/vietnamese-property-tycoon-sentenced-to-death-in-27bn-case.

Reuter, Marco. 2025. "Decrypting Crypto: How to Estimate International Stablecoin Flows." IMF Working Paper 141. International Monetary Fund.

Rotberg, Shahar, and Joseph B. Steinberg. 2024. "Tax Evasion and Capital Taxation." *Journal of Political Economy* 132 (7): 2488–529.

Saez, Emmanuel, and Gabriel Zucman. 2019. "Progressive Wealth Taxation." *Brookings Papers on Economic Activity* 50 (2): 437–533.

Scheuer, Florian, and Joel Slemrod. 2021. "Taxing Our Wealth." *Journal of Economic Perspectives* 35 (1): 207–30.

Schjelderup, Guttorm, and Floris Zoutman. 2025. "Wealth Taxation: The Key to Unlocking Capital Gains." CESifo Working Paper 12254. CESifo.

Scot, Thiago, Pierre Bachas, Santiago Cesteros, et al. 2025. "Income Taxation of Top Earners in Honduras: Linking Personal and Corporate Taxes." Prosperity Insight Series. World Bank.

Seregni, Carol. 2024. "Who Are You Doing Business With? Beneficial Ownership Disclosure and Public Procurement." Wharton School Research Paper. SSRN. http://dx.doi.org/10.2139/ssrn.4826537.

Slemrod, Joel, and John D. Wilson. 2009. "Tax Competition with Parasitic Tax Havens." *Journal of Public Economics* 93 (11): 1261–270.

Smith, Matthew, Danny Yagan, Owen Zidar, and Eric Zwick. 2019. "Capitalists in the Twenty-First Century." *Quarterly Journal of Economics* 134 (4): 1675–745.

Stantcheva, Stefanie. 2021. "Understanding Tax Policy: How Do People Reason?" *Quarterly Journal of Economics* 136 (4): 2309–369.

Straub, Ludwig, and Iván Werning. 2020. "Positive Long-Run Capital Taxation: Chamley-Judd Revisited." *American Economic Review* 110 (1): 86–119.

Surak, Kristin. 2022. "The Economics of Investment Migration: The Citizenship and Residence Industry and Economic Outcomes." Working Paper 158. Centre on Migration, Policy and Society.

The Economist. 2024. "What Are 'Golden Visas'? And Why They Are So Controversial." *The Economist*, April 9. https://www.economist.com/the-economist-explains/2024/04/09/what-are-golden-visas.

Tortarolo, Dario, Guillermo Cruces, and Victoria Castillo. 2020. "It Takes Two to Tango: Labor Responses to an Income Tax Holiday in Argentina." Working Paper 2020-07. Nottingham Interdisciplinary Centre for Economic and Political Research. https://www.nottingham.ac.uk/research/groups/nicep/documents/working-papers/2020/nicep-2020-07.pdf.

Tørsløv, Thomas, Ludvig Wier, and Gabriel Zucman. 2022. "The Missing Profits of Nations." *Review of Economic Studies* 90 (3): 1499–534.

Wier, Ludvig S. 2024. *Corporate Tax Havens and Their Impact on Development*. International Growth Centre.

Wier, Ludvig, and Hayley Erasmus. 2023. "The Dominant Role of Large Firms in Profit Shifting." *IMF Economic Review* 71: 791–816.

Wier, Ludvig, and Gabriel Zucman. 2022. "Global Profit Shifting, 1975–2019." NBER Working Paper 30673. National Bureau of Economic Research.

World Bank. 2020. *Global Investment Competitiveness Report 2019/2020: Rebuilding Investor Confidence in Times of Uncertainty*. World Bank.

Zucman, Gabriel. 2024. *A Blueprint for a Coordinated Minimum Effective Taxation Standard for Ultra-High-Net-Worth Individuals*. EU Tax Observatory.

CHAPTER 5

Trust and the Political Economy of Taxation

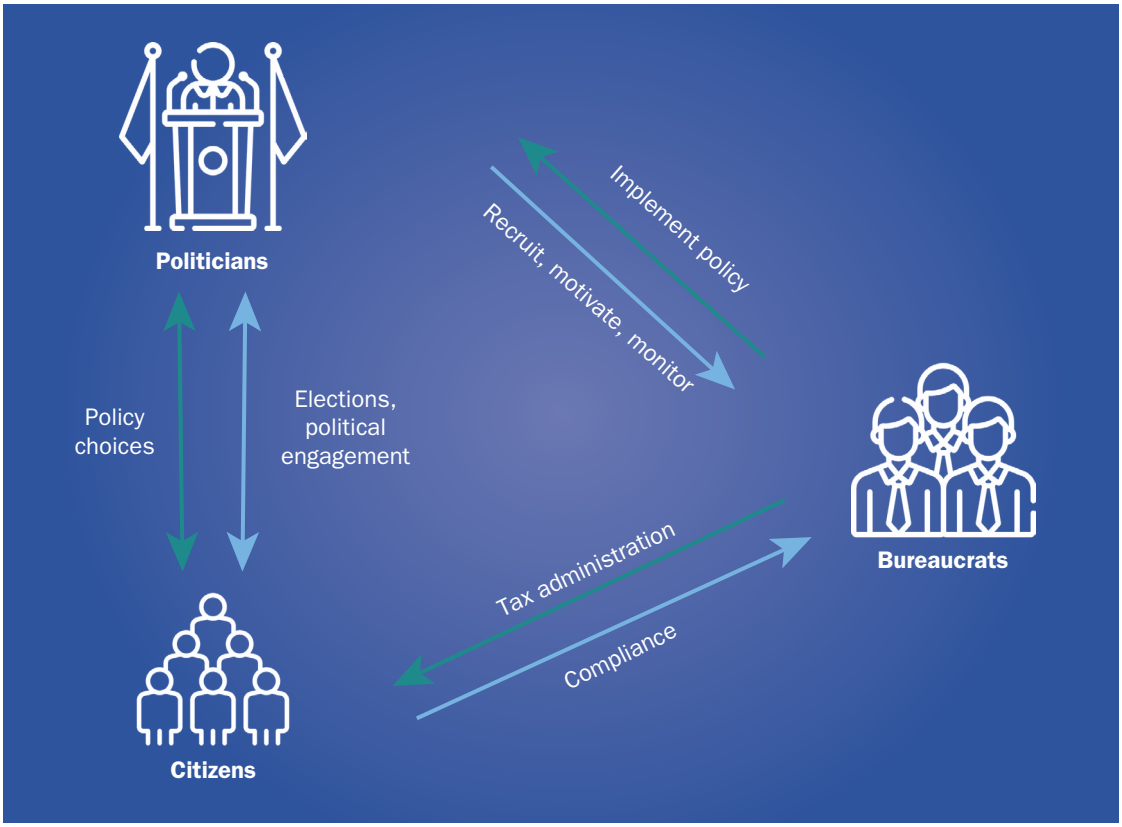
Prepared by Christopher Hoy, Oyebola Okunogbe, and Mahvish Shaukat

Introduction

Taxation is as much a political process as a technical one. Even when governments know which policies are needed to build a good tax system, and even when they have the technology (refer to chapter 3) and transparency (refer to chapter 4) tools to implement them, they can still fall short of the fiscal frontier. This is because good tax systems require the cooperation of the three actors responsible for designing, implementing, and complying with tax policy: politicians, bureaucrats, and citizens (refer to figure 5.1). Politicians bargain with citizens in designing tax policy and allocating resources. Besides these direct interactions on policy preferences, politicians and citizens also interact through the tax system, mediated by the bureaucracy.

Politicians, bureaucrats, and citizens have different, sometimes conflicting, incentives; ensuring these groups' cooperation is essential. Politicians design tax policy but may put electoral survival or personal gain ahead of broader social objectives. Bureaucrats translate policy into practice but may have limited resources or weak incentives to do their job well. Citizens decide whether to comply with taxes and support reform, judging whether revenues are well used, whether others are paying their rightful share, and whether the overall tax system is fair. *Trust in the state,* or "the belief that the government will pursue the common good rather than private interests" (Besley and Dray 2024), determines whether these actors work with or against one another, with direct consequences for tax outcomes.[1]

Figure 5.1 Political actors and taxation



Sources: Original figure for this publication. Icons are from Flaticon and licensed by CC-BY 3.0.

Trust is particularly important for taxation because enforcement is costly and imperfect. No government can monitor every taxpayer, so voluntary compliance is essential for raising revenue efficiently. Citizens are more likely to comply when they believe tax officials collect taxes fairly, and politicians use public revenues effectively and transparently.[2] Similarly, politicians cannot perfectly monitor bureaucrats to implement tax policy as prescribed. Having the right team and incentives in place increases the confidence that the actions of bureaucrats will be aligned with policy intentions. Trust helps sustain a fiscal contract in which citizens are willing to meet their tax obligations in return for a government that delivers fair taxation and reliable public services (Dom et al. 2022).

Trust also determines which tax reforms governments can feasibly implement. When trust in the state is high, citizens more willingly accept higher taxes and broader tax bases. Box 5.1 summarizes evidence on the factors that drive citizen trust in the state. Similarly, when politicians can rely on tax officials to implement reforms fairly and effectively, they can pursue

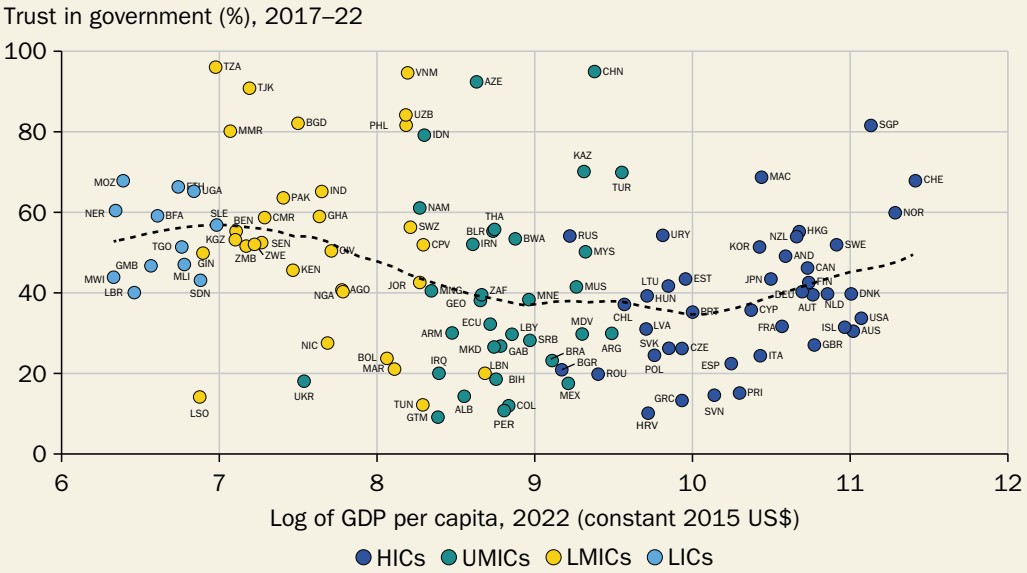
ambitious tax reforms. In this way, trust determines how far a country can move toward its fiscal frontier: More reforms are politically possible when trust is high, fewer reforms are likely to hold when trust is low (refer to chapter 1).

Box 5.1 A closer look at citizens' trust in the state

Recent studies provide a clearer picture of what determines whether citizens trust the state.

Income levels alone do not explain differences in trust. A natural question is whether trust is simply higher in richer countries. Figure B5.1.1 shows self-reported trust in government across 117 countries is only weakly related to GDP per capita.

Figure B5.1.1 Trust in government, by income group



Sources: Original figure for this publication based on data from the IVS, the Afrobarometer, and the World Development Indicators.

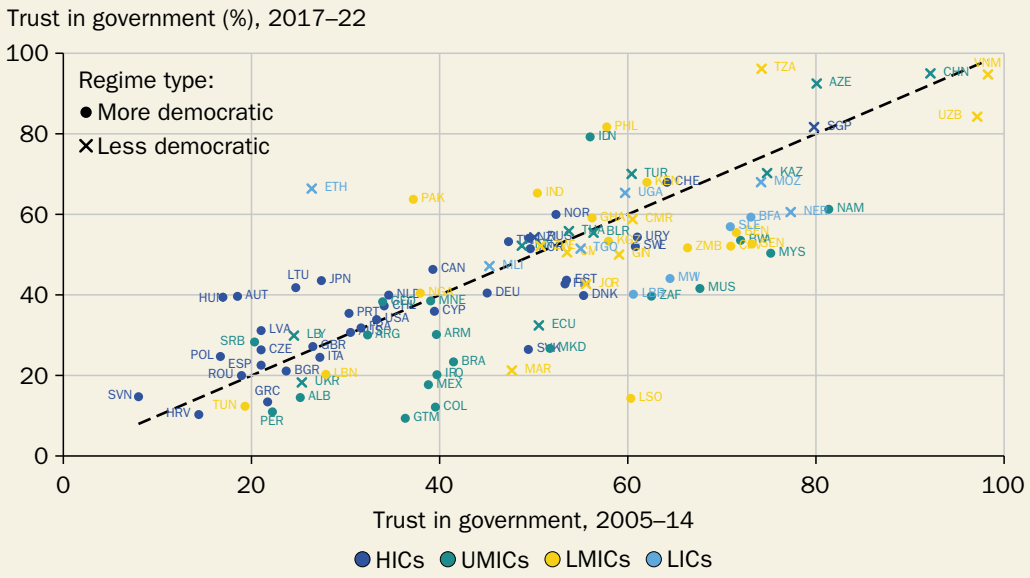
Note: The sample includes 117 countries: 89 from IVS Wave 7 (41 HICs, 28 UMICs, 19 LMICs, and 1 LIC) and 28 from Afrobarometer Round 8 (5 UMICs, 12 LMICs, and 11 LICs). The IVS measures trust in government, while the Afrobarometer measures trust in the president. IVS trust in government is the average country share of respondents reporting "a great deal" or "quite a lot" of confidence in their government. Afrobarometer trust in the president is the average country share of respondents reporting "somewhat" or "a lot" of trust in their president. The dashed line shows a local polynomial regression fitted to the data. Country abbreviations are from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups. GDP = gross domestic product; HICs = high-income countries; IVS = Integrated Values Surveys; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

(Continued)

Box 5.1 A closer look at citizens' trust in the state *(continued)*

Improvements in state performance increase citizens' trust. Citizens who experienced higher GDP growth in their lifetimes have greater trust in the state (Besley et al. 2026). This relationship between state performance and trust can be perceived even in the raw data. Figure B5.1.2 plots changes in trust in government over the past 20 years. Points above the 45-degree line are countries where trust increased. Contrary to narratives of a global decline in trust, trends vary substantially across countries. Both declines and increases in trust occur for countries at all income levels. The increase in trust observed in some countries is driven at least in part by improvements in state performance. Cross-country evidence from HICs shows trust is higher where incomes and public spending are higher, and inflation, unemployment, and public debt are lower (Boskin et al. 2025).[a]

Figure B5.1.2 Trust in government over time



Sources: Original figure for this publication based on data from the IVS, the Afrobarometer, and the Polity Project.

Note: The sample includes 99 countries: 75 from IVS Wave 7 (37 HICs, 25 UMICs, 12 LMICs, and 1 LIC) and 24 from Afrobarometer Round 8 (2022; 4 UMICs, 11 LMICs, and 9 LICs). The IVS measures trust in government, while the Afrobarometer measures trust in the president. IVS trust in government is the average country share of respondents reporting "a great deal" or "quite a lot" of confidence in their government. Afrobarometer trust in the president is the average country share of respondents reporting "somewhat" or "a lot" of trust in their president. "Regime type" is measured using the Polity score (Polity Project), which ranges from −10 to +10 and classifies regimes as autocracies (−10 to −6), anocracies (−5 to +5), and democracies (+6 to +10). "More democratic" includes democracies, and "less democratic" includes both anocracies and autocracies. Country abbreviations are from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups.
HICs = high-income countries; IVS = Integrated Values Surveys; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

Box 5.1 A closer look at citizens' trust in the state *(continued)*

Providing citizens with information also increases trust. In settings as distinct as rural Pakistan and the United States, experiments show providing citizens information about state institutions increases trust (Acemoglu et al. 2020; Briscese and Grignani 2025). However, these effects may remain limited to the specific policy domain in which information is provided and may not translate into broader trust in government (Khan et al. 2021).

Political institutions affect state performance and citizens' expectations. Although democracies generally perform better on measures of governance, they do not always have higher levels of trust. One reason is that greater political participation raises citizens' expectations and makes it easier to express dissatisfaction. As a result, citizens in well-functioning democracies may report lower trust than those living under less accountable regimes (Besley et al. 2026). Trust, therefore, reflects not only government performance but also the standards against which citizens evaluate this performance.

Citizens decide whether to trust the state through their day-to-day experiences with public officials and service delivery. Frontline bureaucrats, such as tax officials and service providers, are, therefore, especially important for building trust. Citizens tend to report higher trust in local governments than in national governments, reflecting the importance of visibility and accessibility (Boskin et al. 2025; OECD 2024).

Implications. Trust is neither fixed over time nor determined by income alone. Countries can build trust by improving government performance and ensuring that citizens experience the state as fair, responsive, and transparent. Another implication of the preceding discussion is that trust will vary across people and places within countries. Differences in state capacity and service delivery over time and across regions can change how citizens experience the state and, in turn, how much they trust it.

a. These correlations do not require the state to be fully responsible for economic outcomes; rather, they are consistent with citizens' perceptions that the state is responsible for facilitating favorable economic conditions.

This chapter synthesizes recent research on the political economy of taxation to identify practical strategies for improving voluntary tax compliance and implementing tax reform. Where evidence from taxation is limited, we also draw on insights from the broader political economy literature.

The chapter is organized around the relationships of the three actors shown in figure 5.1. The section "Politicians and Citizens" examines how politicians can build trust with a three-pronged strategy: Listen to citizens, deliver public benefits, and communicate reforms effectively. The section "Politicians and Bureaucrats" considers how politicians should recruit, motivate, and monitor bureaucrats for the effective implementation of tax policy. The section "Bureaucrats and

Citizens" explores how ensuring fair processes, strategically assigning tax officials to taxpayers, and promoting inclusion strengthens trust and, in turn, tax compliance. The chapter concludes with the section "Policy Lessons for Property Tax Reform" by considering these relationships within the context of property taxation, illustrating how a trust-centered approach can support more effective, equitable, and sustainable reforms.

Politicians and citizens

The left side of figure 5.1 shows the relationship between politicians and citizens. Tax policy reflects a continuing bargain between the two. That bargain can be difficult to sustain: Citizens may resist taxes when they do not trust government to use revenues well, different citizen groups may have conflicting interests, and politicians may have political or personal incentives that run counter to an efficient and equitable tax system (Prichard 2019). For example, politicians themselves may be exposed by the beneficial ownership registries discussed in chapter 4, giving them little reason to establish or invest in them. Nevertheless, reform-minded governments can take practical steps to make reforms more politically feasible. Three are especially important:

- **Listen.** Understand the tax policy preferences of citizens from all parts of society.
- **Deliver.** Manage tax revenue responsibly by providing services wanted by citizens and curbing corruption.
- **Communicate.** Explain tax reforms clearly, including what they aim to achieve, what they will cost, and why they are needed.

Each strategy addresses a different political economy constraint on reform. Listening can address politicians' information constraints by revealing citizen preferences and competing interests; delivery can strengthen tax morale by showing that taxes deliver public benefits; and communication can address citizens' information constraints by building understanding and support for reform. These are relatively accessible steps. Deeper constraints—such as entrenched interests and political incentives—are harder to overcome and require sustained investment over time. We consider each strategy in detail below. The section closes by discussing how the timing and sequencing of reforms can help governments pursue more ambitious changes.

Listen

Knowing what kind of tax policy citizens want helps governments design feasible and durable reforms. This section is organized around four questions. First, what do citizens want?

Recent advances in data collection and survey methods have made it easier to collect tax policy preferences. We discuss the evidence on citizens' attitudes toward taxation, support for different tax instruments, and perceptions of fairness. Citizens are not all alike: Preferences are formed by demographic characteristics, geographic region, political partisanship, and experiences with the state (refer to box 5.1). Where evidence is available, we highlight this heterogeneity.

Second, do politicians know what citizens want? Despite strong incentives to acquire this information, studies from different settings show that politicians often misperceive policy preferences. This means there is real scope to improve policy design by better understanding what citizens value. Third, how can politicians learn what citizens want? Large-scale surveys may not always be available, so governments typically learn citizen preferences from other signals such as electoral outcomes and protests. Finally, what steps can governments take to protect policy making from the threat of capture by narrow interests? This threat is present throughout policy design, beginning with the listening and consultation stages.

What do citizens want?

Citizens in low tax-to-GDP countries tend to be less supportive of taxation. Survey evidence suggests that the low tax-to-GDP ratios observed in many emerging market and developing economies (EMDEs; refer to chapters 1 and 2) may partly reflect citizens' preferences (Besley and Persson 2009; Martin 2023; Robinson 2023; Weigel 2020). For example, in Sub-Saharan Africa, Robinson (2023) finds limited public support for expanding taxation or increasing the size of government. This preference may reflect persistent historical norms or citizens' skepticism that additional tax revenues will be used effectively.

Support for taxation is positively correlated with government performance (Giaccobasso et al. 2025; Nichelatti and Hiilamo 2024; Okunogbe and Edjigu n.d.; Prichard 2019; Sandholtz et al. 2025). This positive correlation suggests that fiscal reciprocity, or the willingness to pay taxes in exchange for benefits from the state (Luttmer and Singhal 2014), is an important component of tax morale. Providing citizens a voice through participatory budgeting may also increase support for taxation. In Sierra Leone, allowing citizens to vote on public goods that were subsequently provided increased the perceived legitimacy of the government and tax compliance, although only among government supporters (Grieco et al. 2025). Whether improvements in government performance translate into sustained increases in tax compliance is an open question. Evaluations of policies that tie taxes more closely to benefits have produced mixed results, suggesting that what matters is not simply whether taxes are linked to benefits but also how they are linked and the settings in which they are implemented (refer to the section "Deliver").

Citizens are more likely to support taxes when they believe the taxes are fair and equitable. Surveys in both developed and developing countries consistently find that citizens favor progressive taxation, and these preferences affect their stated willingness to comply with taxes (Campos-Vazquez et al. 2023; Heilbrun 2025; Hoy 2025; Stantcheva 2021).

Expressed support for fairness does not always translate into action. In Argentina, both low- and high-income households expressed similar support for redistribution. However, only low-income households increased tax payments after learning that the property tax system was progressive, and higher-income households decreased compliance (Ajzenman et al. 2024). So, citizens broadly endorse equitable taxation, but their willingness to comply also depends on how tax policies affect their own tax burden.

Citizens care about vertical and horizontal equity. Tax fairness is not only about whether the rich pay more than the poor *(vertical equity)*. It is also about whether people with similar incomes pay similar amounts *(horizontal equity)*. Horizontal inequities can arise from insufficient administrative capacity. One example is the gap between employees and the self-employed: People with the same income may face different tax liabilities because the self-employed often have more opportunities to evade taxes. Bachas et al. (2026) show that the tax gap between employees and the self-employed is large in many developing countries and that citizens consider these disparities to be unfair. Best et al. (2025) find that differences in property tax liabilities across neighboring areas reduce compliance among those taxed more heavily. From these examples, it follows that tax fairness depends not only on progressivity but also on equitable treatment among groups.

Do politicians know what citizens want?

Politicians frequently misperceive citizen preferences. Citizen preferences can inform policy only insofar as politicians know what these preferences are. A large body of research documents gaps between what citizens want and what politicians believe they want (Broockman and Skovron 2018; Capozza et al. 2025; Dur et al. 2025; Hug et al. 2025; Lucas et al. 2025; Pilet et al. 2024; Walgrave et al. 2023). In Pakistan, Liaqat (2023) finds politicians misperceive citizen preferences across a range of policy issues, including taxation and public goods. Pereira (2021) argues that misperceptions arise partly because politicians have unequal exposure to different constituencies and partly because politicians project their own preferences onto voters. Using data from Swedish members of parliament, they show that legislators' beliefs are more closely aligned with the views of privileged voters and with their own policy positions than with the preferences of the broader electorate.

Information flows between politicians and citizens can be improved. Direct contact with citizens can help politicians learn what citizens want. Bazzi et al. (2024) show that, following a

change in leadership, officials in Indonesian village governments increased their interactions with citizens. These officials knew more about public goods preferences, and their villages better aligned spending with those preferences. Similarly, Bergeron et al. (2024) find that local leaders who conducted door-to-door tax collection in the Democratic Republic of Congo were better at identifying poor households in need of aid. Of course, direct interaction is feasible primarily at the local level, and then, too, not for every issue or with every citizen. But even improving aggregate information flows to politicians can make a difference: Jablonski and Seim (2024) find that providing Malawian officials with data on public goods needs changed how they allocated spending.

How do governments learn what citizens want?

Governments rarely observe citizens' tax preferences directly. Most citizens do not regularly interact with policy makers, participate in consultations, or respond to surveys. Instead, governments infer what citizens want from a small number of signals such as elections and public demonstrations. Understanding these signals—and their limitations—is important for designing tax policies that reflect citizens' preferences.

Elections

Elections can reveal citizens' preferences. Voters reveal which policies they support and create incentives for politicians to respond to their preferences by rewarding or punishing incumbents. The classical benchmark for understanding how preferences translate into policy in competitive political settings is the median voter theorem: Under majority rule, electoral candidates will seek to align policies with the preferences of the median-income or median-ideology voter (Downs 1957). When applied to taxation, the median voter theorem implies taxes and transfers will reflect the preferences of middle-income voters rather than those of economic elites or ideological extremes.[3] The median voter theorem also helps explain why politicians often opt for incremental tax reforms: Smaller changes are more likely to attract majority support than large redistributive shifts (Bierbrauer et al. 2021). Box 5.2 considers how citizen voice in taxation differs across systems of governance.

Election outcomes do not perfectly represent preferences because participation and information differ across voter groups. The relationship between preferences and tax outcomes depends on who votes and how informed these voters are. Turnout and political knowledge vary across income groups, meaning election outcomes may not reflect the broader population's preferences. Lower turnout among poorer citizens, for example, can weaken political support for redistribution even in highly unequal societies (Larcinese 2007). Evidence from Organisation for Economic Co-operation and Development (OECD) countries suggests that higher taxation and

public spending are associated with higher overall voter turnout (Franzese 2002). Information also matters: Providing voters with better information has been shown to improve the allocation of public resources (Casey 2015).

Public demonstrations

Protests provide a nonelectoral channel for citizens to communicate their preferences. Elections provide important signals of citizen preferences, but they may not capture the views of all. Protests provide an alternative channel through which citizens can signal opposition to policies and draw politicians' attention to grievances (Chenoweth et al. 2022).[4]

Protests can reveal preferences that electoral institutions miss. By aggregating grievances, protests provide policy makers with information that may not emerge through elections alone (Chenoweth et al. 2022). The preferences expressed through protests are not necessarily those of only small or extreme groups. In Jordan, a national survey found that most citizens supported protests against a proposed tax bill, even though many citizens did not participate directly (Al-Ajlouni and Hartnett 2019).

Box 5.2 Political regimes, citizen voice, and taxation

A country's system of governance determines how politicians and citizens interact. More democratic regimes tend to give citizens formal ways to make their voices heard such as through elections. These channels allow citizens to reward or punish governments, which encourages politicians to respond to public demands. Less democratic regimes provide fewer such channels, leaving protests, reports from local officials, or administrative records as sources of information.

Regime type matters for taxation. Micro-level studies find that expanding political participation can increase tax collection and pro-poor public spending (Baland and Robinson 2008; Fujiwara 2015; Martinez-Bravo et al. 2012). Cross-country evidence shows that democratization is correlated with higher tax revenue over the long run (Acemoglu, Naidu, et al. 2015). These findings suggest that political institutions matter not only because they give citizens ways to express their preferences but also because they determine whether governments will act on them.

There are exceptions to the general relationship between regime type and taxation. In more democratic regimes, electoral concerns may lead politicians to favor some groups over others. Politicians often use tax exemptions or spending commitments to reward specific constituencies and secure political support (Khemani 2004, 2015; Tendler 2002). Such policies may reduce efficiency, equity, and revenue (refer to chapters 2 and 6).

Governments must interpret protest signals carefully. Protesters do not always represent the broader population. Those who organize may be more homogeneous or more intensely motivated than other citizens (Passarelli and Tabellini 2017). Then there is the risk that governments will respond selectively to protests rather than to the underlying preferences. In Nigeria, for example, protests influenced how the government allocated intergovernmental transfers, but only in politically aligned regions (Archibong et al. 2026). At the same time, ignoring or suppressing protests altogether can cause governments to miss important information about citizen concerns and undermine trust. In the Russian Federation, government tolerance of protests was associated with higher citizen trust (Frye and Borisova 2019). The goal then should be to listen to protests without allowing organized or politically connected groups to receive disproportionate influence.

How can governments protect policy making from the threat of capture?

Governments need to ensure that tax policy is accountable to the public, not captured by powerful interests. When citizens see government responding mainly to groups with greater political influence, they may view the tax system as unfair and lose trust in the state. Elite capture can occur at different stages of policy making. This section focuses on the challenge of ensuring that governments hear a representative range of views when developing tax policy.

Organized interests often have greater resources and stronger incentives to influence policy than the general public. Through lobbying, campaign contributions, and other types of political support, these groups can secure favorable tax provisions that benefit narrow constituencies and encourage rent-seeking (Grossman and Helpman 1994; Krueger 1974). The taxpayers who bear the costs of these policies are typically more numerous and less organized, making it difficult to counterbalance these interests (Gawande et al. 2012). The upshot is the persistence of loopholes, exemptions, and preferential tax rates that benefit narrow groups, even when these policies lack broad public support (refer to chapters 2 and 6).

Governments need safeguards against the influence of organized interests. Although it is difficult to measure the effects of lobbying,[5] there is evidence to show the tactics used by organized interests to secure preferential tax treatment are often successful. In the United States, firm lobbying and campaign contributions are associated with lower corporate tax burdens (Chirinko and Wilson 2010; Richter et al. 2009). Evidence from EMDEs shows similar patterns: Business groups have protected elite interests in Bangladesh, blocked reforms in Chile, and expanded tax exemptions in Tanzania (Bak and Therkildsen 2022; Fairfield 2010, 2013; Hassan and Prichard 2016).

Governments must distinguish between useful input and undue influence. Interactions between interest groups and governments are not inherently undesirable. As discussed in

Bombardini and Trebbi (2020), firm lobbying can serve both a quid pro quo role and an informational role. Firms' private information about costs, constraints, and likely impacts can improve tax policy design. This is especially true for tax policy designed to achieve industrial goals because governments must anticipate how firms will respond to policy interventions (refer to chapter 6). The challenge is to capture useful information from organized interests without allowing them to dominate the policy-making process.

Engagement with interest groups should be transparent and fair. The goal of interaction between governments and affected groups should be to ensure that policy makers receive useful information without engaging in preferential treatment. Transparent consultation processes, disclosure requirements, and clear rules governing political influence can help distinguish legitimate policy input from undue influence. Where campaign contributions or other forms of political financing create unequal access to policy makers, stronger safeguards may be needed to prevent tax policy from favoring narrow interests. These reforms help preserve the informational benefits of engagement while protecting the tax system's fairness and legitimacy.

Case study: Chile's encuentros ciudadanos. In Chile, the government actively sought public input to build support for tax reform in 2022 (Ministerio de Hacienda, Gobierno de Chile 2025). Through a series of citizen gatherings, or encuentros ciudadanos, participants were invited to deliberate on the principles and structure of the tax system. These discussions consistently revealed that resistance to taxation often stems from distrust in how tax policy is typically designed and implemented. Participants frequently raised concerns about fairness and unequal application of tax rules. Although the reform itself was ultimately rejected by Congress, this case illustrates the importance of fairness to taxpayers and the potential for participatory processes to help governments better understand a broad range of citizen preferences.

Deliver

Citizen support for taxation depends in part on what citizens see in return. But governments with weak public services often lack the revenue needed to improve them, creating a cycle of low taxes and poor services. Breaking this cycle requires governments to show what taxes deliver while improving their ability to raise and use revenue well. This section examines how governments can strengthen tax–benefit links in practice, including by making the benefits of taxation more visible and by improving the capacity of governments to raise and use tax revenue effectively.

Evidence on tax–benefit links. Recent studies have examined whether improving public services can increase tax compliance. Much of the causal evidence comes from property taxation, where the link between local revenues and public services is typically meant to be direct and visible.

This evidence suggests that improvements in public services can increase tax compliance, but the effects are generally modest. Infrastructure investments increased compliance in some settings, including sidewalk construction in Santa Fe, Argentina (Carrillo et al. 2021); street paving in Acayucan, Mexico (Gonzalez-Navarro and Quintana-Domeque 2022); and delivery of public goods in Punjab, Pakistan (Khan et al. 2022). However, other programs, such as infrastructure provision in Mexico City (Brockmeyer et al. 2024), produced no measurable change in tax compliance. These findings suggest that improving services is unlikely to change citizen behavior on its own.

Benefits must be visible and credible. Several factors explain why tax–benefit links sometimes produce limited behavioral responses. First, citizens may update their beliefs about government capacity slowly. A single improvement in service delivery may not be enough to change perceptions of state performance. Second, public investments must be sufficiently visible and meaningful to inform citizens' views. Small or isolated projects may not signal a broader improvement in state capacity.[6] Finally, citizens must attribute these improvements to the tax system itself. If they instead credit individual politicians or nonstate actors, better services may do little to strengthen tax morale. Communication can help address this issue. In Freetown, Sierra Leone, informing taxpayers about nearby public services increased property tax payments by 20 percent (Montenbruck 2025). This suggests governments can increase the impact of public investment by making clear what tax revenues finance.

Tax–benefit links should be backed by enforcement. Few studies compare the two approaches in the same setting, and the existing evidence mostly compares enforcement to tax morale messages rather than actual links between taxes and benefits. In Ethiopia, both an audit threat letter and a persuasive letter highlighting the benefits of taxation, including development projects, increased compliance, but the audit threat had a slightly larger effect (Shimeles et al. 2017).[7] Both approaches likely have a role, but more research is needed to determine how best to combine them.

Governments can strengthen the tax–benefit link within reform packages. Some governments have recognized that tax reform is more politically sustainable when citizens can see how additional revenues will be used. The Philippines' Tax Reform for Acceleration and Inclusion Law, enacted in 2017, illustrates this approach. The reform reduced personal income taxes for most wage earners while increasing excise taxes on fuel, tobacco, and sugar-sweetened beverages. The government earmarked much of the additional revenue for infrastructure and social programs, including unconditional cash transfers to poor households. By linking higher taxes to visible public spending and targeted transfers, the reform sought to strengthen the fiscal contract between citizens and the state.

Earmarking ties tax revenue to spending, but it should be used carefully. Survey evidence, particularly in the context of environmental taxation, shows that citizens are more willing to support taxes when revenues are dedicated to specific uses (Dechezleprêtre et al. 2025; also refer

to chapter 6). However, earmarking can limit a government's ability to allocate resources according to changing fiscal needs. One approach is to dedicate revenue to visible priorities when introducing new taxes to build support, then phasing out earmarking over time (Carattini et al. 2018; refer to chapter 6). Over time, greater confidence in government may reduce the need to link specific taxes to specific expenditures.

Credible tax–benefit links require low corruption. Citizens are less willing to support taxation when they believe revenues are wasted, misappropriated, or captured by narrow interests. Cross-country evidence shows that perceptions of governance quality are closely associated with tax morale (Nichelatti and Hiilamo 2024; Okunogbe and Edjigu n.d.). Similarly, evidence from Sub-Saharan Africa highlights how corruption, politicized tax exemptions, and elite tax avoidance undermine confidence in the fairness and effectiveness of tax systems (Moore et al. 2018). Transparency and accountability can strengthen citizens' confidence that taxes generate shared benefits rather than private gains. In the short run, reducing waste and rent extraction may even create fiscal space for improving public services without requiring immediate increases in tax revenue.

Governments must have the capacity to deliver. Collecting taxes and providing services requires state capacity. When state capacity is weak, governments may struggle to implement even well-designed tax policies or translate revenues into high-quality services. Box 5.3 further discusses how the success or failure of tax reform is connected to state capacity.

Box 5.3 State capacity for taxation

State capacity determines whether governments can raise revenue effectively and deliver public benefits. State capacity has three related dimensions: *legal capacity,* which supports the enforcement of rules and property rights; *fiscal capacity,* which supports revenue collection; and *administrative capacity,* which supports policy implementation and service delivery (Besley and Persson 2009). Emerging market and development economies typically have lower state capacity than advanced economies. This limits their ability to enforce tax laws, regulate economic activity, and translate public revenues into service provision (Acemoglu, García-Jimeno, et al. 2015). It is no surprise, then, that tax-to-GDP ratios are positively correlated with various measures of good governance (Awasthi 2024; Benitez et al. 2023). This relationship holds even after controlling for income levels.

(Continued)

Box 5.3 State capacity for taxation *(continued)*

State capacity can strengthen the tax–benefit link. Governments able to raise revenue directly from citizens have stronger incentives to provide public services than those that rely on transfers (Gadenne 2017; Martinez 2025). Gadenne (2017), for example, finds that Brazilian municipalities that modernized property taxation increased tax revenues and education infrastructure, while those that received intergovernmental grants did not.

Weak state capacity limits the range of feasible tax reforms. Even when governments favor broad-based or redistributive taxation in principle, limited fiscal capacity can prevent these policies from being implemented (Fjeldstad and Moore 2008). Differences in fiscal capacity help explain why countries with similar political institutions can achieve very different tax outcomes. Governments with weaker capacity often rely on simpler taxes that are easier to administer, such as trade taxes or turnover taxes, rather than broader-based taxes that require stronger enforcement and information systems (Best et al. 2015; Moore et al. 2018).

State capacity requires low corruption. Governments that lack effective oversight mechanisms struggle to enforce tax rules, prevent revenue losses, and deliver public goods (Besley and Persson 2011, 2014). As discussed before, citizens are also less likely to support taxation when they believe that revenues are diverted for private gain, further undermining reforms.

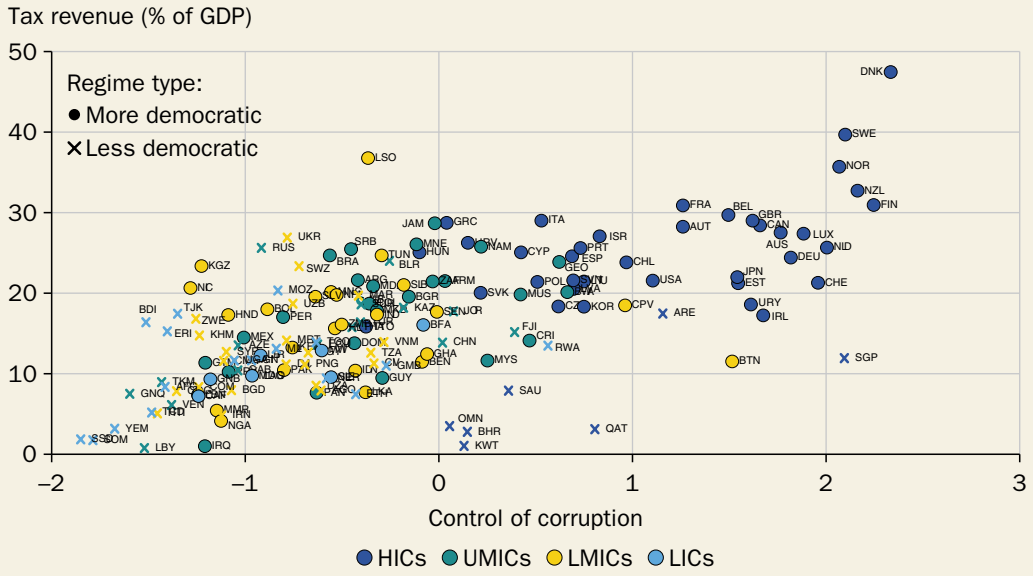
Political institutions matter for curbing corruption and building capacity. More democratic regimes, with stronger checks on executive authority, are generally better able to limit corruption and prevent the misuse of public resources. Less democratic regimes often face weaker constraints on executive power, increasing the risk that public revenues are diverted for private or political purposes. Figure B5.3.1 illustrates this relationship empirically: More democratic countries (marked by circles) tend to exhibit stronger control of corruption than less democratic countries (marked by ×), and stronger control of corruption is associated with higher tax revenue as a share of GDP.

Political concerns influence investments in state capacity. Leaders who rely on clientelist strategies may have limited incentives to strengthen broad-based taxation, because strong institutions can constrain their ability to distribute resources selectively to supporters (Martin 2023). Conversely, fiscal pressures such as the need to finance public investment or respond to crises can create incentives to build the capacity for taxation (refer to box 5.4).

(Continued)

Box 5.3 State capacity for taxation *(continued)*

Figure B5.3.1 Tax revenue and corruption, by income and regime type



Sources: Original figure for this publication based on data from the International Monetary Fund's World Revenue Longitudinal Database, the World Bank's World Governance Indicators, and the Polity Project.

Note: The sample includes 158 countries (44 HICs, 43 UMICs, 47 LMICs, and 24 LICs). "Control of corruption" ranges from approximately −2.5 to 2.5, with higher values corresponding to better governance. "Regime type" is measured using the Polity score (Polity Project), which ranges from −10 to +10 and classifies regimes as autocracies (−10 to −6), anocracies (−5 to +5), and democracies (+6 to +10). "More democratic" includes democracies, and "less democratic" includes both anocracies and autocracies. This figure is consistent with that presented in figure 8 of Besley and Persson (2014) using perceptions of corruption. Country abbreviations are from https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups. GDP = gross domestic product; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

Communicate

Citizen support for taxation depends on whether governments can explain why reforms are needed and how they will affect different groups. Tax reforms are often complex, and the anticipated benefits and costs unevenly distributed across citizens. Without effective communication, uncertainty and misinformation can weaken public understanding and fuel opposition. How can governments communicate tax reforms effectively?

What governments choose to emphasize matters. The first challenge for policy makers is deciding which aspects of a reform to emphasize. Tax policy differs from many other domains because governments may sometimes seek to reduce the salience of taxation to improve

compliance or limit political resistance. Communication strategies may, therefore, focus on the benefits of reform and downplay costs, especially for those groups most likely to actively oppose reform (Scheuer and Wolitzky 2016). Anticipation of political responses can also influence policy design—for example, by encouraging governments to favor indirect over direct taxes or adopt collection technologies, such as withholding, that reduce the visibility of taxation at the point of payment (De la Cuesta et al. 2023; Okunogbe and Tourek 2024).

Limited communication can undermine support for tax reform. When governments do not clearly explain a reform, citizens may be uncertain about what it means for them, increasing opposition. In Pati, Indonesia, a proposal to increase land and building taxes triggered local protests, prompting the central government to emphasize the importance of "public outreach, clear explanations, and time to build legitimacy" (ANTARA News 2025, para. 4). This case illustrates that, even when governments may wish to limit the visibility of tax increases, communication remains essential for securing public acceptance.

Credibility matters. Communication creates another chicken-and-egg problem for policy makers: Effective communication can build trust, but some level of trust is often needed for messages to be persuasive in the first place. Evidence on how the messenger affects the impact of government communication is limited in taxation, but research in health policy offers some relevant insights. Alatas et al. (2024) find that celebrity endorsements changed vaccination beliefs in Indonesia, while Banerjee et al. (2024) show that information from credible messengers increased adherence to health directives in India during the COVID-19 pandemic. Although tax policy is often more complex and politically contested than these examples, these findings suggest that governments may benefit from working with trusted intermediaries, such as independent institutions or community leaders, to communicate reforms (refer to the section "Strategically Assign Tax Officials to Taxpayers").

Case studies. Several EMDEs have used public information campaigns to improve citizens' understanding of tax reforms. In the Lao People's Democratic Republic, a widespread media campaign preceded the introduction of the VAT in 2010. Surveys revealed that many citizens were familiar with the campaign, believed it improved their understanding of the VAT system, and viewed it to be beneficial to their perceptions of taxation (Rahman and Yang 2011; World Bank 2010). In Sierra Leone, the government partnered with musicians as trusted intermediaries to communicate the benefits of the goods and services tax and build public support for taxation (World Bank 2010).

Listening, delivering, and communicating can improve tax policy, increase compliance, and increase support for reform. But when and how reforms are introduced also matter. Box 5.4 discusses how governments can choose reform strategies and use political windows to pursue more ambitious reforms (Dom et al. 2022).

Box 5.4 Smart tax reform: Choosing the right strategy and timing

The success of tax reform depends on when and how reforms are introduced. Even when the economic case for a reform is clear, governments must make difficult choices about timing, sequencing, and implementation. For example, a government seeking to increase revenue from the value-added tax must decide whether to adopt a large one-time rate increase or to introduce changes gradually. It must also decide when to act, considering political support, administrative capacity, and citizen acceptance.

Tradeoffs between comprehensive and gradual reform. Large, comprehensive reforms can generate quick gains, but they may also attract opposition from the groups that expect to lose. Gradual reforms may face less immediate political resistance, allow governments to learn from implementation, and create early gains that build support for further changes.[a] However, gradual approaches may prolong distortions, create uncertainty, and give opposition groups time to organize against future reforms (Independent Evaluation Group 2023).

More research is needed to identify when comprehensive or gradual reform works best. In the meantime, policy makers should assess who gains and who loses, how strongly affected groups are likely to resist, and whether the state can implement the reform. Where opposition is strong or capacity is weak, gradual reforms may help build support and capacity before tackling more difficult changes. Where the gains are large and capacity is strong, more comprehensive reform may be feasible.

Whatever the type of reform, early communication is important. One experimental study finds little difference in tax compliance between comprehensive and gradual reforms (Barinas-Forero et al. 2025). Instead, providing information in advance appears more important for reducing evasion. This suggests that reducing uncertainty through clear communication and credible timelines can strengthen public acceptance of either approach.[b]

Wars and crises can create windows for tax reforms by changing political incentives. Historically, fiscal pressures generated by wars and economic crises led governments to expand revenue systems (Besley and Persson 2009). During World War II, the United States expanded income taxation; this expansion persisted after the conflict ended as new demands for public spending emerged (Beetsma et al. 2016). Similarly, economic crises have prompted tax reforms in many countries by creating urgent financing needs. However, crises alone do not guarantee durable reform. In Sierra Leone, the COVID-19 pandemic temporarily increased support for progressive taxation, but this support declined likely because public service delivery failed to meet expectations (Orgeira et al. 2024).

(Continued)

Box 5.4 Smart tax reform: Choosing the right strategy and timing *(continued)*

Electoral cycles also create favorable windows for reform. Governments often avoid politically costly tax increases *before* elections but may introduce reforms shortly after gaining a mandate. Evidence from advanced economies and emerging market and developing economies suggests that governments are more likely to enact tax reforms immediately after elections and less likely before them (David and Sever 2024; Fuest et al. 2024). Term limits may further affect the incentives for reform by reducing concerns about electoral consequences. Evidence from close elections in Brazil shows that term-limited incumbents were significantly more likely to update cadastral maps recording land ownership and values, resulting in substantial increases in property tax revenue (Christensen and Garfias 2021).

Reform windows create opportunities, but lasting change requires strong institutions and trust. Fiscal pressure, crises, and political mandates can create the incentives for reform, but these conditions are temporary. Governments seeking durable tax reforms must use windows strategically by pairing policy changes with measures that build long-term trust in the tax system (Dom et al. 2022).

a. Refer to Akitoby et al. (2019) for case studies in which governments phased in complementary tax policy and tax administration measures, generating immediate gains that could help build momentum for broader reform.

b. Afonso and Galiani (2026) provide a useful case study of strategic reform timing in Argentina. The Macri administration pursued gradual reforms timed strategically after elections, when political capital was strongest. The authors characterize the approach as a "sober appraisal of available political capital and a deliberate staging of the reform agenda."

Politicians and bureaucrats

This section turns to the evidence on increasing the alignment between politicians' policy goals and bureaucrats' actions, the top-right side of figure 5.1. As in a principal–agent framework, politicians (the principal) determine tax policy based on certain objectives, such as achieving revenue targets, minimizing distortions and other efficiency losses, and promoting equity and fairness, and delegate implementation to tax officials (agents).[8] Tax officials carry out tax collection, assessments, enforcement, auditing, and so on, and they may have different objectives from those of politicians, such as minimizing effort or securing private gain through bribes. Bureaucrats also have private information about their own actions and effort, as well as about taxpayer types and behavior that are not easily observable by politicians. While this principal–agent dynamic is common across government agencies, it is particularly pronounced for tax authorities or similar enforcement agencies: Unlike agencies that *provide* benefits such as health care, education, or cash transfers to citizens, tax officials *collect* resources from citizens on behalf of the government, which results in a heightened risk of collusion with taxpayers to minimize taxpayers' liability.

This section discusses three key lessons on promoting positive outcomes from the interaction of politicians and bureaucrats:

- **Recruit:** Build the right team using merit-based methods to attract employees with both high ability and high intrinsic motivation.
- **Motivate:** Incentivize the team for impact using a mix of financial and nonfinancial incentives appropriate for the context.
- **Monitor:** Hold bureaucrats accountable for the full range of outcomes for which they are responsible and not only for those easiest to measure.

Build the right team

Individual employees matter for tax administration outcomes. Variation in individuals' performance, even when working under the same institutional incentives and constraints, explains a large share of variation in performance in the public sector (Best et al. 2023). In taxation specifically, Bergeron et al. (2022) find that tax collectors explain 21 percent of the variance in tax compliance across neighborhoods in Kananga, Democratic Republic of Congo. This highlights the importance of attracting employees with both high technical ability and high intrinsic motivation (such as prosocial motivation, strong work ethic, and integrity) to work for tax administrations.

Developing effective ways to recruit and screen high-productivity officials is a fundamental challenge for tax authorities. As with other public agencies, tax authorities may face patronage pressure to employ staff based on political considerations rather than merit. In addition, there is worrisome evidence that people who are more inclined to engage in corrupt activities may be particularly attracted to these types of jobs (Banerjee et al. 2015; Hanna and Wang 2017). Whether these aforementioned factors would be an issue depends on a given country's level of corruption. Cowley and Smith (2014) find that, although public sector workers are, on average, more intrinsically motivated than private sector workers, this effect does not apply in countries with high levels of corruption. If dishonest individuals are more attracted to join the bureaucracy when there is opportunity in the system for corruption, this could perpetuate a vicious cycle.

Merit-based recruitment strategies are promising but not foolproof. Countries commonly use merit-based approaches such as examinations to screen candidates for civil service positions. While limited causal evidence on the impact of examinations or other merit-based recruitment for tax administration exists, other studies provide relevant and suggestive evidence. Across countries, there is a positive correlation between the use of merit-based recruitment in the public sector (not limited to tax collection) and the tax-to-GDP ratio (Jensen and Weigel 2026). As for country-specific evidence, a reform in Italy that replaced mayoral discretion with random selection in recruiting auditors to monitor local public finances led to improvements in property tax

revenue (Vannutelli 2022). While this study does not specifically address the use of merit-based methods in recruiting tax officials, it highlights the potential risks of patronage in revenue collection.

Even when countries adopt merit-based recruitment methods, they must grapple with additional issues. First, the assessment process, such as written knowledge tests, situational judgment tests, and simulations, must be well designed and predict on-the-job performance. For example, a general civil service entrance examination may not be predictive of performance in specialized roles of tax administration. Second, even when there is a merit-based system on paper, its integrity must be protected from political influence. Third, even if screening examinations may select for ability, they may be unable to screen for dishonesty (Hanna and Wang 2017). Lastly, once the right team is in place, ongoing training and upskilling is required to ensure they successfully adapt to the rapid technological and institutional changes that determine their effectiveness (Okunogbe and Santoro 2023).

Incentivize for impact: Financial and other incentives

Financial incentives play an important role in attracting a high-quality candidate pool, as well as in improving on-the-job performance. These should, however, be used with caution. While workers in the public sector earn more, on average, than those in the private sector (Finan et al. 2015), this trend does not usually extend to specialized skills required for tax administration such as accounting, auditing, and tax law. Typical rigid civil service compensation scales are often unable to effectively compete with the private sector (for example, banks, consulting firms, law firms, and information technology [IT] firms) for such talent. The desire for flexibility in compensation policy is a major motivation for the establishment of semi-autonomous revenue authorities (SARAs; refer to box 5.5 for more information). At the recruitment stage, there is evidence that higher wages attract stronger candidates for public sector positions measured based on both their skills and experience and their integrity and public sector motivation (Ashraf et al. 2020; Dal Bó et al. 2013).

Nonfinancial incentives may deliver superior results in some cases. In an influential field experiment in Punjab, Pakistan, property tax officials in selected areas were given high-powered financial incentives—bonuses equal to a share of revenues collected above a benchmark (Khan et al. 2015). Tax collection increased substantially—by almost 50 percent—in the areas with financial incentives. However, these gains came from a small group of high-valued properties. Most property owners did not pay more but, instead, reported paying higher bribes. One interpretation of this scenario is that the higher financial incentives increased the bargaining power of tax officials to extract higher bribes from citizens in exchange for undervaluing their properties. This unintended, perverse outcome highlights the need for caution and careful monitoring of impacts in the use of financial incentives. Nonfinancial incentives may be a promising alternative. In the same setting, an intervention to incentivize tax collection by giving the best performers priority in posting location resulted in even larger increases in revenue without the adverse impacts on bribes (Khan et al. 2019).

Box 5.5 Do SARAs deliver?

What is a SARA? A semi-autonomous revenue authority (SARA) is a specialized government entity that operates outside the typical civic service structure and is responsible for administering and enforcing a country's revenue laws. Its governance structure typically involves three main parties: a minister (typically finance, but sometimes revenue or economy) who represents the government, a board of management (typically appointed by the government but includes representation from the private sector), and a chief executive officer (CEO). The CEO reports to the board on management and administration issues and to the minister on the implementation and enforcement of revenue laws (Crandall et al. 2024).

This model is widespread, with 42 percent of countries having an autonomous body in charge of revenue collection, although only 23 percent of them (concentrated in low-income countries) meet the strict definition of a SARA in that they have a board (ADB et al. 2023). The adoption of the SARA model is often associated with tax reform efforts supported by international agencies such as the World Bank and International Monetary Fund starting in the 1990s.

What is the motivation for SARAs? SARAs are established to improve the effectiveness and productivity of tax administration by overcoming the constraints typical of traditional government revenue departments. They are designed to enjoy significant administrative and managerial autonomy to improve efficiency and attract higher-quality personnel.

For example, SARAs have the authority to determine their own human resources policies such as recruitment, remuneration, performance management, and promotions. This flexibility is intended to allow them to compete successfully with the private sector to attract and retain a professional group of highly qualified staff such as accountants, auditors, lawyers, and information technology personnel. Some tax authorities have had some success with this. For example, for multiple years, the South African Revenue Service was ranked as a top-5 employer by South African business management and commerce university students.[a]

SARAs also often have greater autonomy over their budget and organizational structure to allow the flexibility to make necessary investments and adapt to the evolving needs of business and the economy.

Governments may adopt the SARA model for political and signaling reasons, such as shielding tax collection from political influences or signaling to citizens and international partners (such as donor communities) that tax collection will be fairer, less discretionary, and more competent (Lees 2024).

(Continued)

Box 5.5 Do SARAs deliver? *(continued)*

What is the impact of SARAs? Despite the promise of a more professional, efficient, and fair tax agency expected to improve trust among citizens, bureaucrats, and politicians, there is limited evidence of the revenue impacts of SARAs. Causal impacts are difficult to estimate, and the current evidence is, at best, mixed. Using cross-country regressions and case studies, some studies find a short-lived positive impact after their creation (Ahlerup et al. 2015; Fjeldstad and Moore 2009), whereas other studies that use panel data find no statistically significant impact, particularly after accounting for dips in revenue that tend to precede the establishment of these agencies (Dom 2019). Still, others find heterogeneous effects by country using synthetic control methods (Sarr 2016). In all, it does not appear that establishing a SARA automatically leads to significant changes. The impact likely depends on institutional details of how the agencies are established and run; for example, despite similar de jure design, the de facto degree of autonomy (legal, financial, personnel, or operational) may vary significantly across countries.

a. Refer to the South African Revenue Service Careers website at https://www.sars.gov.za/careers/.

Lessons from behavioral science also provide guidance on shaping the incentives and actions of tax officials by directly targeting their values, attitudes, biases, beliefs, and norms (World Bank 2025a). While there is not yet much evidence directly from tax administration, other aspects of public service illustrate the possibilities of this approach. For example, a field experiment in Ghana that provided police officers ethics and integrity training with the goal of boosting their intrinsic motivation and creating a new shared identity found significant improvements in officers' values, beliefs, and attitudes, as well as reductions in their propensity to behave unethically (Harris et al. 2024). Another study in Nigeria that focused on the use of social incentives (in the form of stars displayed in the health center) for good performance in administrative tasks found that it led to improvements in one state but not in another (Gauri et al. 2021). These examples highlight behavioral interventions' potential while acknowledging the importance of context in determining successful outcomes.

Hold bureaucrats accountable

Politicians' ability to hold bureaucrats accountable for their actions determines politicians' success in implementing their desired policy goals (Raffler 2022). Because bureaucrats have private information about their actions, a key aspect of politicians' monitoring is to collect information on bureaucrat activity (Dodge et al. 2025). For tax collection, the principal–agent

relationship exists not only between the bureaucracy and politicians but also within layers of the bureaucracy as higher-level officials need to hold frontline officials responsible for assessments and collection accountable.

What gets measured gets done. Monitoring tax officials tends to result in a focus on more easily measured outputs, such as revenue targets, or intermediate outputs, such as the number of registered taxpayers. However, this approach risks trading off less easily measured outputs such as compliance costs borne by taxpayers, bribes extracted by tax officials, equity in administration, and accuracy of tax records, among others. For example, during the introduction of an e-tax system in Uganda, performance metrics that focused on quantity over quality resulted in poor administrative data as officials approved incomplete returns or duplicate taxpayer identification numbers despite system warnings (Mayega et al. 2019). Efforts to rapidly expand the taxpayer register through temporary external agents also sacrificed quality for speed (Scarpini et al. 2025). Agents were paid per registration, regardless of accuracy, leading to widespread misreporting.

Technology tools are useful to monitor or constrain. Recent advancements in technology enhance monitoring capacity by making it easier to collect information on these other metrics, for example, running data quality checks on taxpayer registries; increasing transparency around tax laws; determining liabilities through online tax education; and web portals for reporting extortion or providing feedback in general. Another approach to hold officials accountable is to directly constrain their actions through technology by, for example, using electronic filing and payment instead of paper and cash; determining audit case selection through risk profiling instead of officials' discretion; or determining property assessments using artificial intelligence (AI) tools. An important challenge for governments deploying these tools is to avoid disrupting productive relationships between tax officials and taxpayers (refer to the section "Ensuring Complementarities with Tax Officials" in chapter 3).

Sanctioning capacity is essential for monitoring to be effective. For these initiatives to be successful, there must also be sanctioning capacity to ensure accountability, as these reforms can provoke active resistance from public officials whose routines, authority, or informal rents are threatened.

Evidence from Madagascar describes how an IT system designed to disrupt collusion and evasion by randomly assigning customs officials to import declarations yielded limited impact as inspectors and brokers found ways to circumvent the system and reassign declarations manually

(Chalendard et al. 2023). A subsequent reform to outsource the assignment process to a third-party organization also proved vulnerable: Within months, inspectors began withholding a portion of declarations from the outsourced system, thereby regaining some control over inspector–declaration pairings. As the authors argue, an environment of weak sanctions for opportunistic behavior likely contributed to the limited impact of these reforms.

This example underscores how digital reforms that challenge entrenched discretion can trigger strategic resistance, especially in environments with high rents. Officials may find creative ways to reassert control or reshape implementation on the ground. As such, successful reform requires more than technical fixes: It must confront the power dynamics that technologies unsettle and include mechanisms to ensure adoption and compliance.

Bureaucrats and citizens

The third and final relationship in figure 5.1 is between bureaucrats and citizens. Bureaucrats implement the tax policies that emerge from the bargaining process of citizens and politicians and are at the frontline of securing tax compliance.

Bureaucrats shape citizens' experience of taxation. In lower-income countries, most tax collection relies on direct interactions between taxpayers and tax officials. Ideally, this proximity would allow tax officials to provide reliable and accessible tax education and help facilitate and monitor compliance. Unfortunately, in reality, opportunities for collusion and extortion also often arise from these interactions. This section highlights three complementary approaches that states can take to promote productive interactions between tax officials and citizens:

- **Ensure fairness** through robust internal mechanisms and by incorporating appropriate technology tools.
- **Strategically assign tax officials to taxpayers** to maximize outcomes from available resources.
- **Promote inclusion** by ensuring that the tax system serves the needs of all citizens, especially those from traditionally underserved groups.

Ensure fairness

Fairness is fundamental to fostering trust in the tax system. Even when tax policy is designed to be equitable (refer to chapter 2 for discussions of fairness in distributing the tax burden), bureaucrats' discretion, skills, and bias in their implementation of tax laws may

result in unfair outcomes in practice. If citizens perceive bureaucrats as being partial in applying tax laws, or if tax officials harass or extort taxpayers, the latter may be less likely to comply. Further, these abuses may lead to the entrenchment of social norms that deter tax compliance (refer to box 5.6 for a discussion of evidence on social norms). The rest of this section discusses how tax administrations can foster fairness by establishing robust internal mechanisms and by incorporating appropriate technology tools.

Box 5.6 Social norms and taxes

Social norms reflect trust and impact tax compliance. In many emerging market and developing economies, a relatively small share of the population contributes to the tax system, particularly when it comes to direct taxes like income taxes (Jensen 2022). Even if citizens support greater revenue collection and improved public services, their ability to influence this equilibrium on their own is limited (Bergolo et al. 2020; Castañeda 2024), which may, in turn, affect their willingness to pay taxes.

Empirical evidence. A survey of business owners and top managers in Indonesia found that firms are more likely to evade taxes if they perceive their competitors are doing the same (Hoy et al. 2024). Similarly, when a poll tax was introduced to fund local government in the United Kingdom, it led to an increase in evasion. Even after the return to property-based taxes, tax evasion remained higher for around a decade, suggesting persistent effects of temporary shocks driven by evolving social norms (Besley et al. 2023).

Public disclosure. Making citizens' tax behavior public influences compliance, but precisely how this works varies. In Pakistan, disclosing income taxes paid by each taxpayer increased compliance (Slemrod et al. 2022). In Uganda, however, compliance rose only among those publicly identified as delinquents, while it declined for those promised recognition for their compliance (Manwaring and Regan 2025). In this setting, public information led citizens to revise *downward* their beliefs about overall compliance. Compared to the social-norms interventions, simple enforcement reminders in Uganda were found to raise more revenue.

Two lessons. First, social norms interventions may backfire when public information reveals that compliance is less common than people had believed. Second, social norms are unlikely to sustain high compliance on their own. Moving toward a high-compliance, self-reinforcing equilibrium (Nathan et al. 2024) may require complementary enforcement measures.

To promote trust, tax institutions need built-in safeguards to protect taxpayers and address disputes. As prescribed by the Tax Administration Diagnostic Assessment Tool (TADAT), a robust tax dispute resolution system should be independent, efficient, and self-correcting: The administrative review mechanism should be independent of the audit process, ensuring that complaints are handled by officials with no prior involvement in the case. In addition, the system should be accessible to all taxpayers and include a clear and timely graduated process of appeal, ranging from administrative review to independent tribunals and higher courts. Lastly, the administration should update tax laws and administrative procedures based on tax dispute outcomes to prevent identical future disputes and improve the overall fairness of the tax system (TADAT Secretariat 2025).

Digitalization of tax systems has the potential to promote fairness by providing taxpayers with a streamlined, standardized experience with the tax system that minimizes the discretion of individual officials. For example, Okunogbe and Pouliquen (2022) show that electronic filing (e-filing) of taxes corrects for the disparate experiences of firms under paper filing. For firms with a higher baseline risk score for tax evasion, e-filing doubles tax payments, suggesting that it displaces collusion with tax officials. In contrast, for firms with a lower baseline risk of evasion, e-filing reduces the tax paid, indicating that tax officials may have previously required them to pay more. These firms are also less likely to pay bribes, likely due to less frequent interactions with tax officials.

Even in the absence of corrupt motivations, technology can correct inequitable outcomes due to differences in officials' skills, training, or biases. For example, Knebelmann et al. (2026) show that bureaucrats' lack of knowledge about high-end properties and their concern for fairness cause them to undervalue properties, resulting in a regressive tax structure. As shown in this study, with the introduction of a property valuation algorithm, technology can help mitigate these differences and create a consistent and equitable experience across taxpayers, which can increase trust in the system.

Strategically assign tax officials to taxpayers

Even with constraints on the number of available tax officials and their skill sets, beliefs, and attitudes, as well as the technology available to them, governments may still achieve improvements in revenue collection by strategically assigning tax officials to taxpayers. For example, a study in the Democratic Republic of Congo shows that pairing high-ability tax officials with other high-ability officials and assigning them to taxpayers with the highest propensity to pay yielded a 26 percent increase in revenues, compared to resource-neutral random assignment (Bergeron et al. 2022).

A related practice adopted by many countries is to create large or medium taxpayer offices dedicated to segments of taxpayers with large amounts of potential tax liability. In addition to compliance monitoring, these units also often have an explicit customer service orientation to reduce compliance costs to taxpayers and promote productive engagement. A study from Indonesia demonstrates that tax revenues can be highly responsive to such focused attention: A reform that created medium taxpayer offices tripled the staff-to-taxpayer ratio in that segment and led to tax revenues more than doubling (Basri et al. 2021).

Besides the formal tax system, there is also emerging, but mixed, evidence on the ability of states to leverage information flows and trust between citizens and nonstate actors, such as traditional and religious leaders, to improve tax compliance. For example, in a field experiment in the Democratic Republic of Congo, engaging local chiefs in property tax collection led to a 44 percent increase in revenues (Balán et al. 2022). A lab-in-the-field experiment in Tanzania finds that giving market traders information about tax benefits increases voluntary tax compliance but only when a religious leader, rather than a tax official, delivers the information (Vietz and Hoem Sjursen 2025). These effects are strongest among less educated or Muslim respondents.

Contrary evidence comes from a study in Nigeria that randomly assigned market vendors to tax appeals delivered by either tax officials or representatives of marketplace associations, an important social intermediary in this context. Appeals delivered by the marketplace association representatives were ineffective, even with higher levels of trust and message credibility (Gottlieb et al. 2025). Further, among those with greater trust in nonstate actors, the appeals by state actors were less successful. These divergent results and heterogeneity of impacts indicate the need for further research to understand the conditions under which trust in state and nonstate actors acts as a complement or substitute in promoting tax collection.

Promote inclusion

An important area of trust building between tax officials and taxpayers is ensuring that tax systems leave no one behind. From providing tax information in local languages to having a gender- and ethnically diverse workforce, tax systems must be designed to be inclusive of traditionally underserved groups such as women, minorities, small businesses, and the less educated.

Digital tax reforms are a particular area of attention. For example, a survey of taxpayers in Pakistan (Komatsu and Touqeer 2023) found that women, particularly those with lower education, faced important barriers to benefiting from digitalization reforms because they are less likely to own mobile devices or use digital banking—40 percent of women own a phone

compared to 95 percent of men (World Bank 2025b). The women also face restricted mobility and rely on personal networks for tax information. Similar patterns in other contexts suggest that governments should adopt a variety of taxpayer information dissemination strategies to reach different types of taxpayers. For example, social media may be effective among more educated men and women, while grassroots campaigns with nongovernmental organizations and radio may be better able to reach less educated women.

Another inclusion strategy is to offer more flexible, low-cost digital products that adapt to the realities of lower-tech users, such as small and micro businesses. For example, as an alternative to its web-based e-Tax platform, Rwanda's tax administration introduced the short code-based M-declaration app. M-declaration allows presumptive taxpayers to declare and pay taxes without internet connectivity using basic mobile phones connected to mobile money services (Santoro et al. 2023). Likewise, emerging technologies such as AI offer new opportunities to lower linguistic and cognitive hurdles by making digital tax systems more accessible and user-friendly for all taxpayers, particularly those who might otherwise struggle to interact with government platforms in dominant national languages. These types of inclusion strategies are especially important in fragile, conflict, and violent contexts.

Policy lessons for property tax reform

Property taxation provides a useful context for synthesizing the lessons on trust and the political economy of taxation discussed in this chapter. Unlike income and consumption taxes, where revenues are typically pooled through national budgets, property tax revenues are meant to finance local services that taxpayers directly experience. Property taxation also involves considerable administrative discretion in property identification, valuation, and enforcement. This means it is especially vulnerable to uneven taxpayer treatment and collusion between taxpayers and officials. The technical tools for reform are well understood. The harder challenge is political: Reforms can threaten groups that benefit from the existing system. Four lessons follow:

- **Prioritize reforms that are feasible and high-impact.** EMDEs should marshal existing administrative capacity to improve compliance, revenue, and fairness. This can be done by leveraging technological tools for property identification and valuation (refer to chapter 3), reducing discretionary interactions, and targeting enforcement toward high-value taxpayers. These reforms allow governments to work with the grain, increasing property tax capacity without attempting to overhaul the entire system. This is a necessary approach where political resistance to reform is strong.

- **Use political windows to tackle harder reforms.** Property tax reform can threaten the groups that benefit from undervaluation, exemptions, and weak enforcement. Political windows created by fiscal pressures and electoral mandates open pathways to overcome this resistance and pursue reforms that are difficult to implement under normal conditions (Orgeira et al. 2024; see also box 5.4). High-return reforms include updating valuation systems and removing exemptions. Importantly, reforms taken during favorable times go hand-in-hand with the steady building of property tax capacity as discussed in the preceding section.
- **Sequence reforms to build trust over time.** Where major reforms are not immediately feasible, governments can begin with taxpayer-facing improvements that demonstrate that the system is becoming effective and fair. Better taxpayer services and visible improvements in local services, for example, can create trust for a broader tax base or higher tax rates. Property taxes are particularly well-suited to this approach because taxpayers can observe local services and, with effective communication by politicians, attribute them to tax revenues.
- **Evaluate reform by the tax system it creates, not just the revenue it raises.** A reform that generates short-term revenue through aggressive or arbitrary enforcement may weaken trust and compliance over time. The objective should instead be a self-reinforcing system in which accurate assessments, fair enforcement, visible public benefits, and greater willingness to comply strengthen one another. This means the success of property tax reform should be judged not only by revenue gains but also by whether it creates a more predictable, equitable, and trusted tax system.

Table 5.1 provides a guide for building trust for taxation more generally depending on a country's fundamentals (refer to chapter 1). Where administrative capacity is weak or entrenched interests are particularly strong, governments may need to begin with smaller, more gradual reforms to build capacity and support for subsequent changes. Where fundamentals are stronger, governments may be able to move more quickly toward ambitious reforms.

Table 5.1 Trust and taxation

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming:* Low trust–low tax–low services equilibrium** **Current situation** • Citizens widely evade taxes. • Tax administration is considered ineffective and corrupt. • Service delivery is poor and misaligned with citizen priorities. **Actions** • Establish basic accountability mechanisms to reduce corruption. • Pilot small reforms to improve service delivery and attribute to tax revenues. • Launch education and outreach initiatives to build awareness and compliance.	***Constrained but functional:* Emerging trust, limited capacity** **Current situation** • Moderate levels of trust exist. • Citizens may perceive the state as responsive in some areas but inconsistent in others. • Tax systems are somewhat fair and efficient, but capacity constraints limit improvement. **Actions** • Leverage basic digital tools to improve tax administration, and reduce discretion-based corruption. • Allocate existing staff resources by strategic assignment of high performers to high-revenue taxpayers. • Recruit skilled tax officials, and provide training and upskilling opportunities for existing tax officials.
Strong fundamentals	***Capable but underperforming:* Weak trust and political constraints** **Current situation** • Trust is uneven across citizens. • Policy decisions are often influenced by special interests. • Bureaucrats are capable but not accountable. **Actions** • Introduce reforms to reduce exemptions for special-interest groups, considering strategic timing and messaging. • Establish transparent platforms to gather feedback and input on reforms from a diverse set of citizens. • Strengthen evaluation systems for bureaucrats.	***Capable and high-performing:* Durable trust and performance** **Current situation** • High trust exists. • Institutions are strong, and corruption is low. • Service delivery is effective. **Actions** • Align political messaging, bureaucratic performance, and citizen engagement. • Maintain high transparency in tax administration and service delivery. • Continue to invest in good governance to protect tax systems from political shocks.

Source: Original table for this publication.

Notes

1. A long tradition in political philosophy considers trust central to state effectiveness (Levi 1997; Putnam et al. 1994). *Trustworthiness,* or the belief that most people can be trusted, may also matter for tax compliance. Slemrod (2002), for example, finds tax cheating is lower in countries with higher levels of trustworthiness.
2. There are other nonpecuniary motivations for tax compliance beyond reciprocity. For example, individuals may comply due to intrinsic motivation or peer effects, with cultural and social norms mediating the strength of these motivations (Luttmer and Singhal 2014).
3. Electoral competition can push political parties toward the center. In Chile and Mexico, for example, competition led right-leaning parties to adopt more progressive tax policies (Fairfield and Garay 2017).
4. Tax protests are as old as taxation itself. Burg (2004) documents 4,300 years of protests, riots, rebellions, and wars triggered by tax systems around the world. Famous examples include the Boston Tea Party before the American Revolution (Gould 2023) and tax revolts before the French Revolution (Davoine et al. 2025; Giommoni et al. 2026; Giommoni and Loumeau 2025).
5. Bombardini and Trebbi (2020) review these challenges, including difficulties in measuring what organized interests obtain from lobbying or campaign contributions, which may take the form of blocking unfavorable policies rather than securing active policy changes.
6. As box 5.1 discusses, large accelerations in economic growth have been shown to increase trust in the state (Besley et al. 2026). Incremental improvements may be insufficient to move societies out of a low-performance equilibrium.
7. Refer to Box 5.6 for discussion of a Uganda experiment comparing enforcement reminders with a social norms intervention.
8. Within the tax authority, different layers of delegation create additional principal–agent problems, but we abstract from this and consider the actions of individual tax officials.

References

Acemoglu, Daron, Ali Cheema, Asim I. Khwaja, and James A. Robinson. 2020. "Trust in State and Nonstate Actors: Evidence from Dispute Resolution in Pakistan." *Journal of Political Economy* 128 (8): 3090–147.

Acemoglu, Daron, Camilo García-Jimeno, and James A. Robinson. 2015a. "State Capacity and Economic Development: A Network Approach." *American Economic Review* 105 (8): 2364–409.

Acemoglu, Daron, Suresh Naidu, Pascal Restrepo, and James A. Robinson. 2015b. "Democracy, Redistribution, and Inequality." In *Handbook of Income Distribution*, vol. 2, 1885–1966. Elsevier.

ADB (Asian Development Bank), CIAT (Inter-American Center of Tax Administrations), IMF (International Monetary Fund), IOTA (Intra-European Organisation of Tax Administrations), and OECD (Organisation for Economic Co-operation and Development). 2023. "International Survey on Revenue Administration." ADB, CIAT, IMF, IOTA, and OECD.

Afonso, Santiago, and Sebastian Galiani. 2026. "Motives and Constraints in the Implementation of Argentina's 2017 Tax Reform." *Economía LACEA Journal* 25 (1): 184–227.

Ahlerup, Pelle, Thushyanthan Baskaran, and Arne Bigsten. 2015. "Tax Innovations and Public Revenues in Sub-Saharan Africa." *Journal of Development Studies* 51 (6): 689–706.

Ajzenman, Nicolas, Guillermo Cruces, Ricardo Perez-Truglia, Darío Tortarolo, and Gonzalo Vazquez-Bare. 2024. "From Flat to Fair? The Effects of a Progressive Tax Reform." NBER Working Paper 33286. National Bureau of Economic Research.

Akitoby, Bernardin, Jiro Honda, Hiroaki Miyamoto, Keyra Primus, and Mouhamadou Sy. 2019. *Case Studies in Tax Revenue Mobilization in Low-Income Countries*. International Monetary Fund.

Al-Ajlouni, Laith Fakhri, and Allison Spencer Hartnett. 2019. "Making the Economy Political in Jordan's Tax Revolts." *Middle East Report Online*. Belfer Center for Science and International Affairs.

Alatas, Vivi, Arun G. Chandrasekhar, Markus Mobius, Benjamin A. Olken, and Cindy Paladines. 2024. "Do Celebrity Endorsements Matter? A Twitter Experiment Promoting Vaccination in Indonesia." *Economic Journal* 134 (659): 913–33.

Angelopoulos, Konstantinos, George Economides, and Pantelis Kammas. 2012. "Does Cabinet Ideology Matter for the Structure of Tax Policies?" *European Journal of Political Economy* 28 (4): 620–35.

ANTARA News. 2025. "Indonesian Government Urges Careful Tax Rules after Pati Protests." August 14. https://en.antaranews.com/news/373361/indonesian-govt-urges-careful-tax-rules-after-pati-protests.

Archibong, Belinda, Chinemelu Okafor, Tom Moerenhout, and Evans Osabuohien. 2026. "Protest Matters: The Effects of Protests on Economic Redistribution." NBER Working Paper 34787. National Bureau of Economic Research.

Ashraf, Nava, Oriana Bandiera, Edward Davenport, and Scott S. Lee. 2020. "Losing Prosociality in the Quest for Talent? Sorting, Selection, and Productivity in the Delivery of Public Services." *American Economic Review* 110 (5): 1355–394.

Awasthi, Rajul 2024. "Governance Matters! Domestic Revenue Mobilization is Strongly Correlated with Good Governance." Prosperity Notes Series. World Bank.

Bachas, Pierre, Christopher Hoy, Anders Jensen, and Mahvish Shaukat. 2026. "Horizontal Equity of Taxation: Citizen Beliefs and Policy Preferences." Policy Research Working Paper 11367. World Bank.

Bak, Ane Karoline, and Ole Therkildsen. 2022. "Democratisation in Tanzania: No Elections without Tax Exemptions." *Journal of Eastern African Studies* 16 (1): 47–67.

Balán, Pablo, Augustin Bergeron, Gabriel Tourek, and Jonathan L. Weigel. 2022. "Local Elites as State Capacity: How City Chiefs Use Local Information to Increase Tax Compliance in the Democratic Republic of the Congo." *American Economic Review* 112 (3): 762–97.

Baland, Jean-Marie, and James A. Robinson. 2008. "Land and Power: Theory and Evidence from Chile." *American Economic Review* 98 (5): 1737–765.

Banerjee, Abhijit, Marcella Alsan, Emily Breza, et al. 2024. "Can a Trusted Messenger Change Behavior When Information Is Plentiful? Evidence from the First Months of the COVID-19 Pandemic in West Bengal." *Review of Economics and Statistics* 1–33.

Banerjee, Ritwik, Tushi Baul, and Tanya Rosenblat. 2015. "On Self Selection of the Corrupt into the Public Sector." *Economics Letters* 127: 43–46.

Barinas-Forero, Andrés Felipe, Mariana Blanco, Andrea López-Luzuriaga, et al. 2025. "How Tax Reform Design and Information Shape Compliance: Preliminary Results." Discussion Paper IDB-DP-1097. Inter-American Development Bank.

Basri, M. Chatib, Mayara Felix, Rema Hanna, and Benjamin A. Olken. 2021. "Tax Administration versus Tax Rates: Evidence from Corporate Taxation in Indonesia." *American Economic Review* 111 (12): 3827–871.

Bazzi, Samuel, Masyhur Hilmy, Benjamin Marx, Mahvish Shaukat, and Andreas Stegmann. 2024. *It Takes a Village Election: Turnover and Performance in Local Bureaucracies.* Policy Research Working Paper 10920. World Bank.

Beetsma, Roel, Alex Cukierman, and Massimo Giuliodori. 2016. "Political Economy of Redistribution in the United States in the Aftermath of World War II—Evidence and Theory." *American Economic Journal: Economic Policy* 8 (4): 1–40.

Benitez, Juan Carlos, Mario Mansour, Miguel Pecho, and Charles Vellutini. 2023. "Building Tax Capacity in Developing Countries." Staff Discussion Note 2023/006. International Monetary Fund.

Bergeron, Augustin, Pedro Bessone, John Kabeya Kabeya, Gabriel Z. Tourek, and Jonathan L. Weigel. 2022. "Optimal Assignment of Bureaucrats: Evidence from Randomly Assigned Tax Collectors in the DRC." NBER Working 30413. National Bureau of Economic Research.

Bergeron, Augustin, Elie Kabue Ngindu, Gabriel Tourek, and Jonathan L. Weigel. 2024. "Does Collecting Taxes Erode the Accountability of Informal Leaders? Evidence from the DRC." ICTD Working Paper 193. Institute of Development Studies.

Bergolo, Marcelo, Martin Leites, Ricardo Perez-Truglia, and Matias Strehl. 2020. "What Makes a Tax Evader?" NBER Working Paper 28235. National Bureau of Economic Research.

Besley, Timothy, Chris Dann, and Sacha Dray. 2026. "Growth Experiences and Trust in Government." *Quarterly Journal of Economics* 141 (2): 1761–822.

Besley, Timothy, and Sacha Dray. 2024. "Trust and State Effectiveness: The Political Economy of Compliance." *Economic Journal* 134 (662): 2225–251.

Besley, Timothy, Anders Jensen, and Torsten Persson. 2023. "Norms, Enforcement, and Tax Evasion." *Review of Economics and Statistics* 105 (4): 998–1007.

Besley, Timothy, and Torsten Persson. 2009. "The Origins of State Capacity: Property Rights, Taxation, and Politics." *American Economic Review* 99 (4): 1218–244.

Besley, Timothy, and Torsten Persson. 2010. "State Capacity, Conflict, and Development." *Econometrica* 78 (1): 1–34.

Besley, Timothy, and Torsten Persson. 2011. "Pillars of Prosperity: The Political Economics of Development Clusters." In *Pillars of Prosperity*. Princeton university Press.

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

Best, Michael Carlos, Anne Brockmeyer, Henrik Jacobsen Kleven, Johannes Spinnewijn, and Mazhar Waseem. 2015. "Production Versus Revenue Efficiency with Limited Tax Capacity: Theory and Evidence from Pakistan." *Journal of Political Economy* 123 (6): 1311–355.

Best, Michael Carlos, Luigi Caloi, Francois Gerard, Evan Plous Kresch, Joana Naritomi, and Laura Zoratto. 2025. "Greener on the Other Side: Inequity and Tax Compliance." NBER Working Paper 34062. National Bureau of Economic Research.

Best, Michael Carlos, Jonas Hjort, and David Szakonyi. 2023. "Individuals and Organizations as Sources of State Effectiveness." *American Economic Review* 113 (8): 2121–167.

Bierbrauer, Felix J., Pierre C. Boyer, and Andreas Peichl. 2021. "Politically Feasible Reforms of Nonlinear Tax Systems." *American Economic Review* 111 (1): 153–91.

Bombardini, Matilde, and Francesco Trebbi. 2020. "Empirical Models of Lobbying." *Annual Review of Economics* 12 (1): 391–413.

Boskin, Michael J., Alexander Kleiner, and Ian T. Whiton. 2025. "A Note on Factors Influencing Trust in Government." NBER Working Paper 34472. National Bureau of Economic Research.

Briscese, Guglielmo, and Maddalena Grignani. 2025. "Information Acquisition and Trust in Public Institutions: Experimental Evidence." SSRN. https://dx.doi.org/10.2139/ssrn.5636664.

Brockmeyer, Anne, Francisco Garfias, and Juan Carlos Suárez Serrato. 2024. "The Fiscal Contract up Close: Experimental Evidence from Mexico City." NBER Working Paper 32776. National Bureau of Economic Research.

Broockman, David E., and Christopher Skovron. 2018. "Bias in Perceptions of Public Opinion among Political Elites." *American Political Science Review* 112 (3): 542–63.

Burg, David F. 2004. *A World History of Tax Rebellions: An Encyclopedia of Tax Rebels, Revolts, and Riots from Antiquity to the Present*. Routledge.

Campos-Vazquez, Raymundo M., Alice Krozer, and Aurora A. Ramírez-Álvarez. 2023. "Preferred Tax Rates Depend on the Rates Paid by the Rich." *Journal of Behavioral and Experimental Economics* 104: 102025.

Capozza, Francesco, Krishna Srinivasan, and Mattie Toma. 2025. "Science by Consensus: Eliciting Citizens' and Experts' R&D Spending Priorities." SSRN. https://dx.doi.org/10.2139/ssrn.5352530.

Carattini, Stefano, Maria Carvalho, and Sam Fankhauser. 2018. "Overcoming Public Resistance to Carbon Taxes." *Wiley Interdisciplinary Reviews: Climate Change* 9 (6).

Carrillo, Paul E., Edgar Castro, and Carlos Scartascini. 2021. "Public Good Provision and Property Tax Compliance: Evidence from a Natural Experiment." *Journal of Public Economics* 198: 104422.

Casey, Katherine. 2015. "Crossing Party Lines: The Effects of Information on Redistributive Politics." *American Economic Review* 105 (8): 2410–448.

Castañeda, Néstor. 2024. "Fairness and Tax Morale in Developing Countries." *Studies in Comparative International Development* 59: 113–37.

Castanheira, Micael, Gaëtan Nicodème, and Paola Profeta. 2012. "On the Political Economics of Tax Reforms: Survey and Empirical Assessment." *International Tax and Public Finance* 19 (4): 598–624.

Chalendard, Cyril, Ana M. Fernandes, Gael Raballand, and Bob Rijkers. 2023. "Corruption in Customs." *Quarterly Journal of Economics* 138 (1): 575–636.

Chenoweth, Erica, Barton H. Hamilton, Hedwig Lee, Nicholas W. Papageorge, Stephen P. Roll, and Matthew V. Zahn. 2022. "Who Protests, What Do They Protest, and Why?" NBER Working Paper 29987. National Bureau of Economic Research.

Chirinko, Robert S., and Daniel J. Wilson. 2010. "Can Lower Tax Rates Be Bought? Business Rent-Seeking and Tax Competition among US States." *National Tax Journal* 63 (4): 967–93.

Christensen, Darin, and Francisco Garfias. 2021. "The Politics of Property Taxation: Fiscal Infrastructure and Electoral Incentives in Brazil." *Journal of Politics* 83 (4): 1399–1416.

Cowley, Edd, and Sarah Smith. 2014. "Motivation and Mission in the Public Sector: Evidence from the World Values Survey." *Theory and Decision* 76 (2): 241–63.

Crandall, William Joseph, Elizabeth Gavin, Maureen Kidd, and Andrew Masters. 2024. "Revenue Authorities and Their Boards of Management." *Technical Notes and Manuals.*

Dal Bó, Ernesto, Frederico Finan, and Martín A. Rossi. 2013. "Strengthening State Capabilities: The Role of Financial Incentives in the Call to Public Service." *Quarterly Journal of Economics* 128 (3): 1169–218.

David, Antonio C., and Can Sever. 2024. "Electoral Cycles in Tax Reforms." *Empirical Economics* 67 (2): 495–529.

Davoine, Eva, Joseph Enguehard, and Igor Kolesnikov. 2025. "The Political Costs of Taxation." CESifo Working Paper 11945. CESifo.

Dechezleprêtre, Antoine, Adrien Fabre, Tobias Kruse, et al. 2025. "Fighting Climate Change: International Attitudes toward Climate Policies." *American Economic Review* 115 (4): 1258–300.

De la Cuesta, Brandon, Lucy Martin, Helen V. Milner, and Daniel L. Nielson. 2023. "Do Indirect Taxes Bite? How Hiding Taxes Erases Accountability Demands from Citizens." *Journal of Politics* 85 (4): 1305–320.

Dodge, Eric, Yusuf Neggers, Rohini Pande, and Charity M. Troyer Moore. 2025. "From Delay to Pay-Day: Easing Bureaucrat Access to Implementation Information Strengthens Social Protection Delivery." NBER Working Paper 33756. National Bureau of Economic Research.

Dom, Roel. 2019. "Semi-Autonomous Revenue Authorities in Sub-Saharan Africa: Silver Bullet or White Elephant." *Journal of Development Studies* 55 (7): 1418–435.

Dom, Roel, Anna Custers, Stephen Davenport, and Wilson Prichard. 2022. *Innovations in Tax Compliance: Building Trust, Navigating Politics, and Tailoring Reform*. World Bank.

Downs, Anthony. 1957. *An Economic Theory of Democracy.* Harper and Row.

Dur, Robert, Arjan Non, Paul Prottung, and Benedetta Ricci. 2025. "Who's Afraid of Policy Experiments?" *Economic Journal* 135 (666): 538–55.

Fairfield, Tasha. 2010. "Business Power and Tax Reform: Taxing Income and Profits in Chile and Argentina." *Latin American Politics and Society* 52 (2): 37–71.

Fairfield, Tasha. 2013. "Going Where the Money Is: Strategies for Taxing Economic Elites in Unequal Democracies." *World Development* 47: 42–57.

Fairfield, Tasha, and Candelaria Garay. 2017. "Redistribution under the Right in Latin America: Electoral Competition and Organized Actors in Policymaking." *Comparative Political Studies* 50 (14): 1871–1906.

Finan, Frederico, Benjamin A. Olken, and Rohini Pande. 2015. "The Personnel Economics of the State." NBER Working Paper 21825. National Bureau of Economic Research.

Fjeldstad, Odd-Helge, and Mick Moore. 2008. *Taxation and State-Building in Developing Countries*. Cambridge University Press.

Fjeldstad, Odd-Helge, and Mick Moore. 2009. "Revenue Authorities and Public Authority in Sub-Saharan Africa." *Journal of Modern African Studies* 47 (1): 1–18.

Franzese, Robert J. 2002. *Macroeconomic Policies of Developed Democracies*. Cambridge University Press.

Frye, Timothy, and Ekaterina Borisova. 2019. "Elections, Protest, and Trust in Government: A Natural Experiment from Russia." *Journal of Politics* 81 (3): 820–32.

Fuest, Clemens, Klaus Gründler, Niklas Potrafke, and Fabian Ruthardt. 2024. "Read My Lips? Taxes and Elections." *Journal of Public Economics* 236: 105149.

Fujiwara, Thomas. 2015. "Voting Technology, Political Responsiveness, and Infant Health: Evidence from Brazil." *Econometrica* 83 (2): 423–64.

Gadenne, Lucie. 2017. "Tax Me, But Spend Wisely? Sources of Public Finance and Government Accountability." *American Economic Journal: Applied Economics* 9 (1): 274–314.

Gauri, Varun, Julian C. Jamison, Nina Mazar, and Owen Ozier. 2021. "Motivating Bureaucrats through Social Recognition: External Validity—A Tale of Two States." *Organizational Behavior and Human Decision Processes* 163: 117–31.

Gawande, Kishore, Pravin Krishna, and Marcelo Olarreaga. 2012. "Lobbying Competition over Trade Policy." *International Economic Review* 53 (1): 115–32.

Giaccobasso, Matias, Brad Nathan, Ricardo Perez-Truglia, and Alejandro Zentner. 2025. "Where Do My Tax Dollars Go? Tax Morale Effects of Perceived Government Spending." *American Economic Journal: Applied Economics* 17 (4): 223–59.

Giommoni, Tommaso, and Gabriel Loumeau. 2025. "Taxation with a Grain of Salt: The Long-Term Effect of Extractive Fiscal Institutions on Development." *Review of Economics and Statistics:* 1–45.

Giommoni, Tommaso, Gabriel Loumeau, and Marco Tabellini. 2026. "Extractive Taxation and the French Revolution." NBER Working Paper 34816. National Bureau of Economic Research.

Gonzalez-Navarro, Marco, and Climent Quintana-Domeque. 2022. *Local Public Goods and Property Tax Compliance: Evidence from Residential Street Pavement*. Lincoln Institute of Land Policy.

Gottlieb, Jessica, Adrienne LeBas, and Janica Magat. 2025. "Taxation and Social Intermediaries: Experimental Evidence from Lagos, Nigeria." *British Journal of Political Science* 55: e99.

Gould, Eliga. 2023. "How the Boston Tea Party's 'Destruction of the Tea' Changed American History." *SC Daily Gazette*, December 18, 2023.

Grieco, Kevin, Abou Bakarr Kamara, Niccolo F. Meriggi, Julian Michel, and Wilson Prichard. 2025. "Participation, Legitimacy and Fiscal Capacity in Weak States: Evidence from Participatory Budgeting." Working Paper 1. University of Toronto, Local Government Revenue Initiative.

Grossman, Gene M., and Elhanan Helpman. 1994. "Protection for Sale." *American Economic Review* 84 (4): 833–50.

Hanna, Rema, and Shing-Yi Wang. 2017. "Dishonesty and Selection into Public Service: Evidence from India." *American Economic Journal: Economic Policy* 9 (3): 262–90.

Harris, Donna, Oana Borcan, Danila Serra, Henry Telli, Bruno Schettini, and Stefan Dercon. 2024. "Proud to Belong: The Impact of Ethics Training on Police Officers in Ghana." CEPR Discussion Paper 19141. Centre for Economic Policy Research.

Hassan, Mirza, and Wilson Prichard. 2016. "The Political Economy of Domestic Tax Reform in Bangladesh: Political Settlements, Informal Institutions and the Negotiation of Reform." *Journal of Development Studies* 52 (12): 1704–721.

Heilbrun, Guy. 2025. "Perceived Inequality as an Impediment to Mass Taxation: Evidence from Latin America." *Comparative Political Studies* 59 (2): 370–409.

Hoy, Christopher. 2025. "How Does Progressivity Impact Tax Morale? Experimental Evidence across Developing Countries." *Journal of Development Economics* 172: 103398.

Hoy, Christopher, Filip Jolevski, and Anthony Obeyesekere. 2024. "Revealing Tax Evasion: Experimental Evidence from a Representative Survey of Indonesian Firms." Working Paper 9. Tax and Transfer Policy Institute.

Hug, Simon, Frédéric Varone, Luzia Helfer, Stefaan Walgrave, Karolin Soontjens, and Lior Sheffer. 2025. "The Role of Politicians' Perceptual Accuracy of Voter Opinions in Their Reelection." *Legislative Studies Quarterly* 50 (1): 107–22.

Independent Evaluation Group. 2023. "World Bank Support for Domestic Revenue Mobilization." Independent Evaluation Report. World Bank.

Jablonski, Ryan, and Brigitte Seim. 2024. "What Politicians Do Not Know Can Hurt You: The Effects of Information on Politicians' Spending Decisions." *American Political Science Review* 118 (3): 1497–517.

Jensen, Anders. 2022. "Employment Structure and the Rise of the Modern Tax System." *American Economic Review* 112 (1): 213–34.

Jensen, Anders D., and Jonathan L. Weigel. 2026. "No Taxation without Administration: Bringing the State Back into the Public Finance of Developing Countries." *Journal of Economic Literature* 64 (1): 246–80.

Khan, Adnan Q., Asim I. Khwaja, and Benjamin A. Olken. 2015. "Tax Farming Redux: Experimental Evidence on Performance Pay for Tax Collectors." *Quarterly Journal of Economics* 131 (1): 219–71.

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

Khan, Adnan, Asim Khwaja, Benjamin Olken, and Mahvish Shaukat. 2022. "Rebuilding the Social Compact: Urban Service Delivery and Property Taxes in Pakistan." Final Report PAK-22003. International Growth Centre.

Khan, Adnan, Sanval Nasim, Mahvish Shaukat, and Andreas Stegmann. 2021. "Building Trust in the State with Information: Evidence from Urban Punjab." *Journal of Public Economics* 202: 104494.

Khemani, Stuti. 2004. "Political Cycles in a Developing Economy: Effect of Elections in the Indian States." *Journal of Development Economics* 73 (1): 125–54.

Khemani, Stuti. 2015. "Buying Votes versus Supplying Public Services: Political incentives to under-invest in Pro-Poor Policies." *Journal of Development Economics* 117: 84–93.

Knebelmann, Justine, Victor Pouliquen, and Bassirou Sarr. 2026. "Discretion versus Algorithms: Bureaucrats, Tax Equity, and Acceptability." IFS Working Paper 26/34. Institute for Fiscal Studies.

Komatsu, Hitomi, and Irum Touqeer. 2023. "Gender and Taxpayer Study in Khyber Pakhtunkhwa, Pakistan." *EFI Insight—Macroeconomics, Trade and Investment*. World Bank.

Krueger, Anne. 1974. "The Political Economy of the Rent-Seeking Society." *American Economic Review* 64 (3): 291–303.

Larcinese, Valentino. 2007. "Voting over Redistribution and the Size of the Welfare State: The Role of Turnout." *Political Studies* 55 (3): 568–85.

Lees, Adrienne. 2024. "Selected Issues for Tax Administration in Low-Income Countries." Literature Review. International Centre for Tax and Development.

Levi, Margaret. 1997. *Consent, Dissent, and Patriotism*. Cambridge University Press.

Liaqat, Asad. 2023. "Politician Responsiveness to Citizen Preferences." SSRN. http://dx.doi.org/10.2139/ssrn.4462695.

Lucas, Jack, Lior Sheffer, Peter John Loewen, et al. 2025. "Politicians' Theories of Voting Behavior." *American Political Science Review* 119 (3): 1304–321.

Luttmer, Erzo F. P., and Monica Singhal. 2014. "Tax Morale." *Journal of Economic Perspectives* 28 (4): 149–68.

Manwaring, Priya, and Tanner Regan. 2025. "No Shame in My Name: Public Disclosure and Tax Compliance in a Low-Capacity State." Working Paper 10. Center for Economic Research, Department of Economics, George Washington University.

Martin, Lucy. E. S. 2023. *Strategic Taxation: Fiscal Capacity and Accountability in African States*. Oxford University Press.

Martinez, Luis. 2025. "Natural Resource Rents, Local Taxes, and Government Performance: Evidence from Colombia." *Review of Economics and Statistics* 107 (5): 1460–469.

Martinez-Bravo, Monica, Gerard Padró i Miquel, and Nancy Qian. 2012. "The Effects of Democratization on Public Goods and Redistribution: Evidence from China." CEPR Discussion Paper DP8975. Center for Economic and Policy Research.

Mayega, Jova, Robert Ssuuna, Muhammad Mubajje, Milly Nalukwago, and Lawrence Muwonge. 2019. "How Clean Is Our Taxpayer Register? Data Management in the Uganda Revenue Authority." ICTD African Tax Administration Paper 12. Institute of Development Studies.

Ministerio de Hacienda, Gobierno de Chile. 2025. "Diálogos Sociales: Conclusiones para la Reforma Tributaria - 5. Encuentros Ciudadanos." https://biblio.hacienda.cl/dialogos-sociales-conclusiones-para-la-reforma-tributaria/-5-encuentros-ciudadanos.

Montenbruck, Laura. 2023. "Fiscal Exchange and Tax Compliance: Strengthening the Social Contract under Low State Capacity." Working Paper SLE-22083. International Growth Centre.

Moore, Mick, Wilson Prichard, and Odd-Helge Fjeldstad. 2018. *Taxing Africa: Coercion, Reform and Development*. Zed Books.

Nathan, Brad C., Ricardo Perez-Truglia, and Alejandro Zentner. 2024. "Paying Your Fair Share: Perceived Fairness and Tax Compliance." NBER Working Paper 32588. National Bureau of Economic Research.

Nichelatti, Enrico, and Heikki Hiilamo. 2024. "The Effect of Citizens' Perception of Governance on Tax Compliance: A Cross-Country Analysis Study for 32 Sub-Saharan African Countries." *European Journal of Development Research* 36: 1198–226.

OECD (Organisation for Economic Co-operation and Development). 2024. *OECD Survey on Drivers of Trust in Public Institutions—2024 Results.* OECD Publishing.

Okunogbe, Oyebola, and Habtamu Edjigu. n.d. "Citizens' Support for Taxation in Africa: The Role of Ethnicity and the Social Contract." Unpublished paper.

Okunogbe, Oyebola, and Victor Pouliquen. 2022. "Technology, Taxation, and Corruption: Evidence from the Introduction of Electronic Tax Filing." *American Economic Journal: Economic Policy* 14 (1): 341–72.

Okunogbe, Oyebola, and Fabrizio Santoro. 2023. "The Promise and Limitations of Information Technology for Tax Mobilization." *World Bank Research Observer* 38 (2): 295–324.

Okunogbe, Oyebola, and Gabriel 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.

Orgeira, Nicolas, Vanessa van den Boogaard, and Wilson Prichard. 2024. "The Politics of Taxation and Tax Reform in Times of Crisis: COVID-19 and Attitudes Towards Taxation in Sierra Leone." *Journal of Development Studies* 60 (2): 196–216.

Passarelli, Francesco, and Guido Tabellini. 2017. "Emotions and Political Unrest." *Journal of Political Economy* 125 (3): 903–46.

Pereira, Miguel M. 2021. "Understanding and Reducing Biases in Elite Beliefs about the Electorate." *American Political Science Review* 115 (4): 1308–324.

Pilet, Jean-Benoit, Lior Sheffer, Luzia Helfer, Frederic Varone, Rens Vliegenthart, and Stefaan Walgrave. 2024. "Do Politicians outside the United States Also Think Voters Are More Conservative Than They Really Are?" *American Political Science Review* 118 (2): 1037–45.

Prichard, Wilson. 2019. "Tax, Politics, and the Social Contract in Africa." In *Oxford Research Encyclopedia of Politics*. Oxford University Press.

Putnam, Robert D., Raffaella Y. Nanetti, and Robert Leonardi. 1994. *Making Democracy Work: Civic Traditions in Modern Italy.* Princeton University Press.

Raffler, Pia J. 2022. "Does Political Oversight of the Bureaucracy Increase Accountability? Field Experimental Evidence from a Dominant Party Regime." *American Political Science Review* 116 (4): 1443–459.

Rahman, Shaela, and Ka Ying Yang. 2011. "VAT Media Campaign in Lao PDR Results in a Big Bang for the Buck." IFC Smart Lessons Brief. World Bank.

Richter, Brian Kelleher, Krislert Samphantharak, and Jeffrey F. Timmons. 2009. "Lobbying and Taxes." *American Journal of Political Science* 53 (4): 893–909.

Robinson, James A. 2023. "Tax Aversion and the Social Contract in Africa." *Journal of African Economies* 32 (Suppl. 1): i33–i56.

Sandholtz, Wayne, Pedro Vicente, and Marta Silveira Botelho. 2025. "Property Rights and Tax Compliance." Final Report MOZ-23094. International Growth Centre.

Sarr, Babacar. 2016. "Assessing Revenue Authority Performance in Developing Countries: A Synthetic Control Approach." *International Journal of Public Administration* 39 (2): 146–56.

Scarpini, Celeste, Fabrizio Santoro, Ronald Waiswa, Moyo Arewa, and Jane Nabuyondo. 2025. "Enhancing Taxpayer Registration with Inter-Institutional Data Sharing: Evidence from Uganda." *Data and Policy* 7 (81).

Scheuer, Florian, and Alexander Wolitzky. 2016. "Capital Taxation under Political Constraints." *American Economic Review* 106 (8): 2304–328.

Shimeles, Abebe, Daniel Zerfu Gurara, and Firew Woldeye. 2017. "Taxman's Dilemma: Coercion or Persuasion? Evidence from a Randomized Field Experiment in Ethiopia." *American Economic Review* 107 (5): 420–24.

Slemrod, Joel. 2002. "Trust in Public Finance." NBER Working Paper 9187. National Bureau of Economic Research.

Slemrod, Joel, Obeid Ur Rehman, and Mazhar Waseem. 2022. "How Do Taxpayers Respond to Public Disclosure and Social Recognition Programs? Evidence from Pakistan." *Review of Economics and Statistics* 104 (1): 116–32.

Stantcheva, Stefanie. 2021. "Understanding Tax Policy: How Do People Reason?" *Quarterly Journal of Economics* 136 (4): 2309–369.

TADAT Secretariat. 2025. *Tax Administration Diagnostic and Assessment Tool: Field Guide.* TADAT Secretariat.

Tendler, Judith. 2002. "Small Firms, the Informal Sector, and the Devil's Deal." *IDS Bulletin* 33 (3): 1–15.

Vannutelli, Silvia. 2022. "From Lapdogs to Watchdogs: Random Auditor Assignment and Municipal Fiscal Performance." NBER Working Paper 30644. National Bureau of Economic Research.

Vietz, Jasmin, and Ingrid Hoem Sjursen. 2025. "Leveraging Religious Leaders to Increase Voluntary Tax Compliance: Experimental Evidence from Tanzania." Working Paper Series 415. ifo Institute–Leibniz Institute for Economic Research, University of Munich.

Walgrave, Stefaan, Arno Jansen, Julie Sevenans, et al. 2023. "Inaccurate Politicians: Elected Representatives' Estimations of Public Opinion in Four Countries." *Journal of Politics* 85 (1): 209–22.

Weigel, Jonathan L. 2020. "The Participation Dividend of Taxation: How Citizens in Congo Engage More with the State When It Tries to Tax Them." *Quarterly Journal of Economics* 135 (4): 1849–903.

World Bank. 2010. *Using Strategic Communications to Engage Stakeholders in Tax Reform.* Investment Climate in Practice Note 15. World Bank.

World Bank. 2024. *Toward Building Somalia's Social Contract: State Affordability, Revenue Mobilization, and Service Delivery in a Nascent Federal State.* World Bank.

World Bank. 2025a. *Behavioral Insights to Improve Tax Compliance: A Practitioner's Guide.* World Bank.

World Bank. 2025b. *The Global Findex Database 2025: Connectivity and Financial Inclusion in the Digital Economy.* World Bank.

Part III
Toolkit and Applications

CHAPTER 6

Taxation for Environmental and Industrial Goals

Prepared by Anne Brockmeyer and Mahvish Shaukat

Introduction

Governments use taxes not only to raise revenue but also to influence economic behavior. This second role places governments in the difficult position of using the tax system to pursue policy objectives without undermining revenue, efficiency, or fairness. Two objectives are especially common: addressing environmental externalities and promoting investment and other industrial policy objectives. Environmental taxes are implemented so that firms and households account for environmental costs that markets leave unpriced. Investment tax incentives are implemented to encourage investment, innovation, and job creation.

These two applications raise a common question: How can governments pursue policy objectives beyond revenue raising without weakening the tax system? For both environmental taxation and taxation for industrial goals, governments must decide whether taxation is the right tool, how to design it to achieve the intended goal, and how to minimize distortions and unintended consequences without compromising revenue.

Technology, transparency, and trust—the 3*T*s—can help governments meet this challenge. Technology can help governments measure environmental costs, identify eligible investments, administer tax policies, and track their results (refer to chapter 3). Transparency can reveal the location and ownership of economic activities, the extent to which they are affected by environmental and investment tax policies, and firms' and individuals' responses to those policies (refer to chapter 4). Trust can help governments build support for taxation and sustain policies that serve broad social and economic goals (refer to chapter 5).

The chapter is organized in two parts. The first examines environmental taxation, including carbon taxes, fuel excises, and other taxes that affect environmental behavior. It also considers emissions trading systems (ETSs) and how they interact with taxes. Environmental taxes, particularly carbon taxes, are often criticized for hurting growth and productivity or for being inflationary and regressive. The empirical evidence provides limited support for these concerns. When designed well, environmental taxes can reduce pollution while improving economic efficiency. In many lower-income countries, these policies may even have progressive distributional effects. The section also examines the case for and against earmarking environmental tax revenues, the role of international cooperation, and the choice between tax and nontax instruments. It concludes with practical lessons on using the 3*T*s to improve environmental tax policy and administration.

The second part turns to industrial policy and tax incentives for investment. It examines how widely these incentives are used, what the evidence says about their effectiveness, and their broader economic and distributional effects. The evidence shows that incentives work in some settings but not others. Much depends on how they are designed and used. They are most effective when they address clear market failures, are well targeted, and include safeguards such as sunset clauses. The chapter concludes by examining how the 3Ts can improve the design and implementation of investment incentives.

Environmental taxes

This section examines the role of environmental taxes in the tax policy toolkit, considering their importance, efficiency and equity impacts, political economy, international spillovers, and key implementation considerations.

What are environmental taxes, and how important are they?

We define *environmental taxes* as tax instruments with significant environmental incentive effects. This is a broad definition, consistent with the Organisation for Economic Co-operation and Development's (OECD's) Policy Instruments for the Environment (PINE) database, which defines *environmentally related taxes* as taxes levied on the following bases: energy products, including vehicle fuels; motor vehicles and transport services; pollutant emissions to air and water, ozone-depleting substances, certain nonpoint sources of water pollution, waste management, and noise; and management of resources, such as water, land, soil, forests, biodiversity, wildlife, and fish stocks. Unlike our definition, which focuses on tax instruments and does not include market-based instruments, the PINE data include revenue from emissions permit auctions, but only European Union (EU) countries report this information.[1,2]

Carbon taxes and other pollution taxes are the most-obvious environmental instruments in the tax policy toolkit. Carbon taxes and market-based carbon-pricing mechanisms such as ETSs originated in high-income countries (HICs) seeking to control pollutants (for example, Germany adopted the first nationwide effluent tax, and the United States pioneered emissions trading for SO_2) and have since expanded widely for use in incentivizing greenhouse gas reductions (Banzhaf 2020). While carbon pricing is still more prominent in HICs (for example, Canada, Chile, and the European Union), many lower-income countries have now introduced carbon taxes (for example, Colombia and South Africa), and others have introduced or are planning to introduce ETSs (for example, China, India, and Türkiye) (World Bank 2025b).

Fuel taxes are also important tax instruments with strong environmental incentive effects, although their raison d'être is often not primarily environmental. Fuel excise taxes are common around the world and often constitute a substantial source of revenue, particularly in lower-middle-income countries (LMICs). These are a second-best policy tool for internalizing the cost of emissions, as they would generally lead to varying carbon pricing across types of fuel, but they price combustion-related emissions, nonetheless. Fuel excise taxes are a particularly convenient revenue instrument in countries with large informal sectors, as they can be imposed upstream, for example, at the production or import stage, where there are fewer points of compliance, facilitating collection and enforcement. Increased compliance and, hence, tax revenue would allow governments to reduce labor taxation, holding revenue constant and thereby reducing distortions and discouraging informality. In contrast to downstream emissions pricing, upstream carbon or fuel taxes do not require any reporting or monitoring of emissions and, thus, could be a more suitable policy tool in lower-income or less technologically advanced countries. However, upstream carbon or fuel taxes would typically not capture noncombustion emissions, such as those from industrial processes or land use changes.

The preceding discussion illustrates a useful distinction between explicit and implicit environmental taxes. *Explicit environmental taxes,* such as carbon taxes and pollution levies, are designed primarily to price environmental externalities. *Implicit environmental taxes,* by contrast, are introduced mainly for fiscal or other policy objectives but nonetheless generate meaningful environmental incentive effects, with fuel excise taxes being one of the most-prominent examples.

LMICs may also have less conventional tax instruments whose environmental incentive effects are even more indirect and that fall outside our definition of environmental taxes. Specific taxes on resource extraction or commodity exports can influence land use–related emissions, deforestation, and effluents. For instance, Guinea-Bissau imposes a tax on cashew

exports, which constitute 90 percent of the country's total exports. Similarly, Madagascar imposes a tax on vanilla exports. In both countries, cash crops are key drivers of deforestation. However, while fuel taxes are fairly proportional to the combustion that leads to emissions, commodity production or export taxes are less directly associated with emitting behavior, because they do not distinguish among producers or processes, which can vary widely in their emissions intensity. Hence, we do not consider these export taxes as environmental taxes but highlight them as good examples for how revenue-focused commodity taxes could be used, in conjunction with rebates, to incentivize pro-environmental behavior.

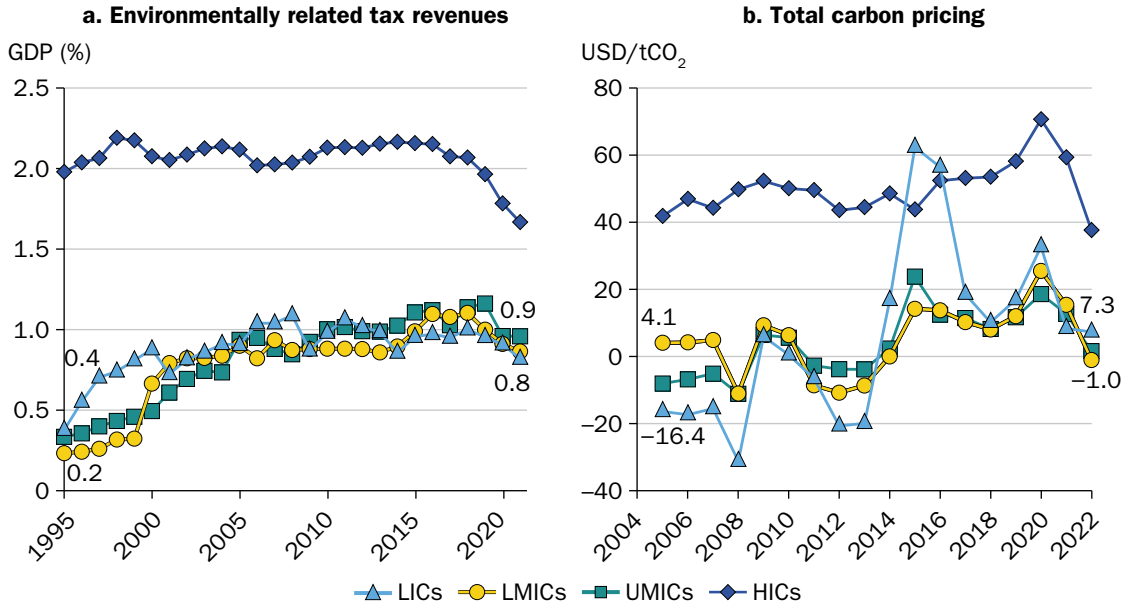
Gross revenue from environmental tax instruments constitutes 1–2 percent of gross domestic product (GDP), depending on the country income level, and has been growing in LMICs. Revenue data on environmental taxes are unfortunately limited.[3] We rely on the OECD PINE data, which track environmental tax collections for 1990–2022 and—while focused on HICs—include information for 75 LMICs (of which 10 are LICs). These data represent gross revenues, not accounting for the cost of potential fossil fuel subsidies (which we discuss further later).

Figure 6.1, panel a, shows that environmentally related tax revenue constitutes about 1.5–2 percent of GDP in HICs and reaches close to 1 percent in LMICs.[4] Hence, the revenue gap between HICs and LMICs is smaller for environmentally related taxes than for some other taxes, for example, the income tax. In addition, while environmentally related tax revenue has been fairly constant in HICs between 1995 and 2015 and then dropped in the most-recent years, revenue has been growing in LMICs over most of the period shown, with a smaller drop in recent years. Thus, environmental taxes are all but irrelevant in LMICs.

To obtain a more complete picture of price incentives, one needs to simultaneously consider the effect of taxes, fossil fuel subsidies, and ETSs. Indeed, environmental taxes often co-exist with fossil fuel consumption subsidies, which undo part of the incentive effect of taxing carbon. This practice is relatively common in LMICs and among fossil fuel exporters. Many countries, particularly HICs, also use taxes and ETSs simultaneously to price emissions. Some attempts have been made to calculate the net price effects for carbon, accounting for both *explicit carbon pricing* via carbon taxes and ETSs and *implicit carbon pricing* via fuel subsidies and excise taxes. OECD publishes "net effective carbon rates" every few years, with expanding coverage, based on detailed desk reviews of policies (OECD 2025). Agnolucci et al. (2023) have estimated a time series for a large set of countries of their similarly defined "total carbon price" (TCP), using an indirect approach for implicit carbon pricing that relies on fuel consumption, emissions data, and information on direct and indirect carbon pricing via various tax instruments and market-based instruments.

The TCP, which captures the intensity of carbon price incentives at the economywide level, remains negative in LMICs on average, although it is high in some countries. Figure 6.1, panel b, shows that many LMICs, and especially lower-income countries, started out with a *negative* TCP in the mid-2000s. After a crisis-related drop in 2008, the TCP has then gradually increased and reached US$7.3/tCO$_2$ in 2022, although it is still negative for LMICs. Overall, given the low and sometimes negative TCPs, average price incentives for a move away from fossil fuels are weak in lower-income countries. However, there is substantial heterogeneity across countries, with both high and low TCPs observed across all income levels (Agnolucci et al. 2023).

Figure 6.1 Environmentally related tax revenues and total carbon pricing over time, by income group



Sources: Original figure for this publication using the Organisation for Economic Co-operation and Development's Policy Instruments for the Environment database, the World Development Indicators, and the World Bank Group's Total Carbon Pricing Dashboard.

Note: In panel a, environmentally related tax revenues are calculated as the sum of revenue from all environmental taxes in each country. Taxes with zero or missing revenue across all years were excluded from the sample, as well as 13 taxes that exhibited unusually high revenue volatility. Missing revenue observations were treated as zeros. The sample includes 51 HICs, 35 UMICs, 30 LMICs, and 10 LICs. Sierra Leone (an LIC) was excluded from the sample because it appeared as an extreme outlier. GDP data are from the World Development Indicators. Panel b uses data from Agnolucci et al. (2023). The sample includes 78 HICs, 53 UMICs, 51 LMICs, and 26 LICs. GDP = gross domestic product; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries; USD = US dollars.

Efficiency and equity of environmental taxes

Conventional criticisms of environmental taxes in general and carbon taxes in particular are that they hamper firm growth and productivity, they fuel inflation, and they are regressive. However, the empirical evidence contradicts both criticisms. The evidence is quite comprehensive, as we can learn about distributional effects of carbon pricing not just from carbon tax reforms but also from fuel tax and fossil fuel subsidy reforms.

Efficiency impacts

Contrasting with the concern that environmental taxes may put a brake on growth is the optimistic notion of a double dividend. Critics allege that a tax on carbon—a key input into many production processes—may harm firm growth and productivity. However, it is now generally recognized that environmental taxation in LMICs more often has the potential to generate a double dividend by reducing pollution while simultaneously reducing distortions in the economy and, hence, promoting economic activity (Bento 2024). The idea is that environmental tax reforms tax "bads" (like pollution) and not "goods" (like productive inputs).

The broader theoretical and empirical literature suggests that realizing the double dividend depends critically on policy design. Timilsina (2022) provides a comprehensive review of this literature, synthesizing evidence on the efficiency, competitiveness, and distributional impacts of carbon taxes across a wide range of country contexts, highlighting the importance of policy design—particularly revenue recycling—in shaping these outcomes. Recycling carbon tax revenues through reductions in existing distortionary taxes, such as corporate or personal income taxes, can generate larger efficiency gains, whereas recycling revenues through lump-sum transfers to households generally places greater emphasis on equity objectives. Environmental tax design, therefore, often requires balancing efficiency and equity objectives through the choice of revenue recycling mechanisms.

Several characteristics of LMIC economies facilitate the rise of the double dividend. The presence of large informal sectors, tax system inefficiencies, and large cobenefits of emissions reductions would all imply a larger double dividend. In contrast to conventional income taxes, taxes on emissions or fossil fuels are levied on entities that cannot easily escape taxation through informality and are passed through to both formal and informal sectors. Upstream, economywide carbon taxes can even have a broader tax base than income taxes in high-informality settings, adding to their relative efficiency. Bento et al. (2018) show how a revenue-neutral shift toward energy taxation reduces labor taxes on formal services while indirectly taxing informal services, as the latter consume energy and manufactured goods. This reform can broaden the tax base and reduce informality.

Empirical evidence supports the presence of no or positive output effects of emissions taxes in LMIC contexts. Simple model-based studies that do not account for preexisting tax distortions or informality have found negative output effects. However, when the informal sector is accounted for, studies using a range of methods (panel estimations, macro-structural models, and computable general equilibrium [CGE] models) all suggest that carbon taxes can raise revenue at a lower cost than conventional taxes. Metcalf and Stock (2020) use panel regressions to show that, in European countries, carbon taxes are not associated with a reduction in GDP, the GDP growth rate, or employment and may have small positive effects. Schoder (2023) uses an open-economy macro model to estimate tax multipliers for 75 countries at different income levels, showing that energy tax multipliers are smaller in absolute value than personal income tax multipliers, and energy taxes do not exhibit the adverse employment effects that income taxes exhibit. Timilsina, Dissou, et al. (2024) use a CGE model calibrated to the economy of Côte d'Ivoire to show that a carbon tax can increase GDP and reduce informality, if the carbon tax revenue is used to reduce labor taxation. Similarly, Timilsina, Chang, and Pang (2024) show that using a carbon tax to achieve China's Nationally Determined Contribution (NDC) target entails only modest GDP losses, which are substantially smaller than those associated with regulatory approaches and can be nearly eliminated when revenues are recycled through reductions in distortionary taxes. For further case study examples, refer to Burns et al. (2021) for Pakistan, Schoder and Tercioglu (2024) for Türkiye, and World Bank (2025a) for a synthesis of 93 Country Climate and Development Reports (CCDRs).[5]

The double dividend is further bolstered by positive impacts of carbon taxation on labor intensity and employment. Indeed, as economies become less carbon intensive, they use more labor in production, so the labor share of output increases relative to the capital share. This shift toward labor inputs also enhances the positive equity impact of carbon taxation, discussed in more detail in the next section. The macro-level results in Metcalf and Stock (2020) and Schoder (2023) are consistent with increases in labor intensity after carbon tax reforms. Similar changes occur after fuel price reforms. Reform-related increases in the return to labor relative to capital have been documented for Côte d'Ivoire (Timilsina, Dissou, et al. 2024), the United States (Goulder et al. 2019; Metcalf 2019), and Viet Nam (Vigani and Dudu 2021).

While empirical evidence on the causal employment effects of carbon pricing in lower-income countries is scarce, rigorous analyses from HICs suggest that carbon pricing reduces emissions without hurting firms. Martin et al. (2014) showed a decade ago that the UK carbon tax had no detectable effect on revenue, employment, or survival of UK manufacturing plants but reduced firms' energy intensity and electricity use substantially. Colmer et al. (2024) document similar results for the effect of the EU ETS on French firms. They rationalize the results in a model where the policy induces firms to invest in energy-saving capital that reduces marginal variable costs.[6]

Finally, carbon taxation produces important health and transportation cobenefits. The reduction of air and water pollution that carbon taxation generates reduces mortality, morbidity, traffic congestion, and fatalities. Heine and Black (2019) argue that the size of these benefits could justify raising taxes regardless of climate considerations. Timilsina (2022) reviews extensive evidence showing that carbon taxes generate substantial health cobenefits by reducing local air pollutants such as particulate matter (PM), sulfur oxides (SO_x), and nitrogen oxides (NO_x). Across a wide range of country settings, these health gains can be large enough to offset a substantial share of the costs of carbon taxation. A growing empirical literature has documented the harmful effects of air pollution on productivity and student test scores (for example, Adhvaryu et al. 2022; Ebenstein et al. 2016). The health effects of polluted drinking water have also been documented, for example, in Burlig et al. (2026). Linking pollution to GDP, Behrer et al. (2023) exploit variation in air pollution across Indian states to estimate that the median annual increase in fine-particulate pollution is associated with a reduction in yearly GDP growth by 0.56 percentage points.

Equity impacts

The idea that carbon pricing could be regressive was motivated by the structure of consumption profiles in HICs. In HICs, where carbon taxes were first introduced, the share of fuel (and other carbon-intensive goods and services) in total consumption is higher for the poor than for the rich populations. In LICs and LMICs, however, consumption profiles are inverted: The relative carbon content of consumption is lower among the poor (Dorband et al. 2019).

In lower-income countries, carbon pricing tends to have progressive effects, as has been shown in analyses with various research designs. Mylonas et al. (forthcoming) document the likely progressivity of carbon pricing in LICs and LMICs drawing on microsimulations for more than 115 countries. Sterner (2012) assembled case studies from countries around the globe to make the same point qualitatively. Ohlendorf et al. (2021) conduct a meta-analysis of 53 empirical studies on the distributional impact of carbon pricing and fossil fuel subsidy reforms, showing that studies in lower-income countries are more likely to find progressive distributional effects.[7] Other studies focusing on individual countries confirm the cross-country findings. Timilsina, Dissou, et al. (2024); Timilsina and Sebsibie (2025); and Timilsina and Sebsibie (2026) use CGE models to document progressive impacts of carbon pricing for Côte d'Ivoire, Ethiopia, and Egypt, respectively. Mercer-Blackman et al. (2023) use the Climate Policy Assessment Tool to simulate several positive distributional impacts of carbon taxation for South Asia.

A progressive use of carbon-pricing revenue can further improve the equity impacts. Even if the imposition of the carbon tax itself were not a progressive policy change, nonregressive use of

the revenue should make the policy at least distributionally neutral or (most likely) progressive. Indeed, even in the United States, revenue recycling through uniform per capita cash grants would make environmental taxation progressive (Horowitz et al. 2017).

Political economy of environmental taxes

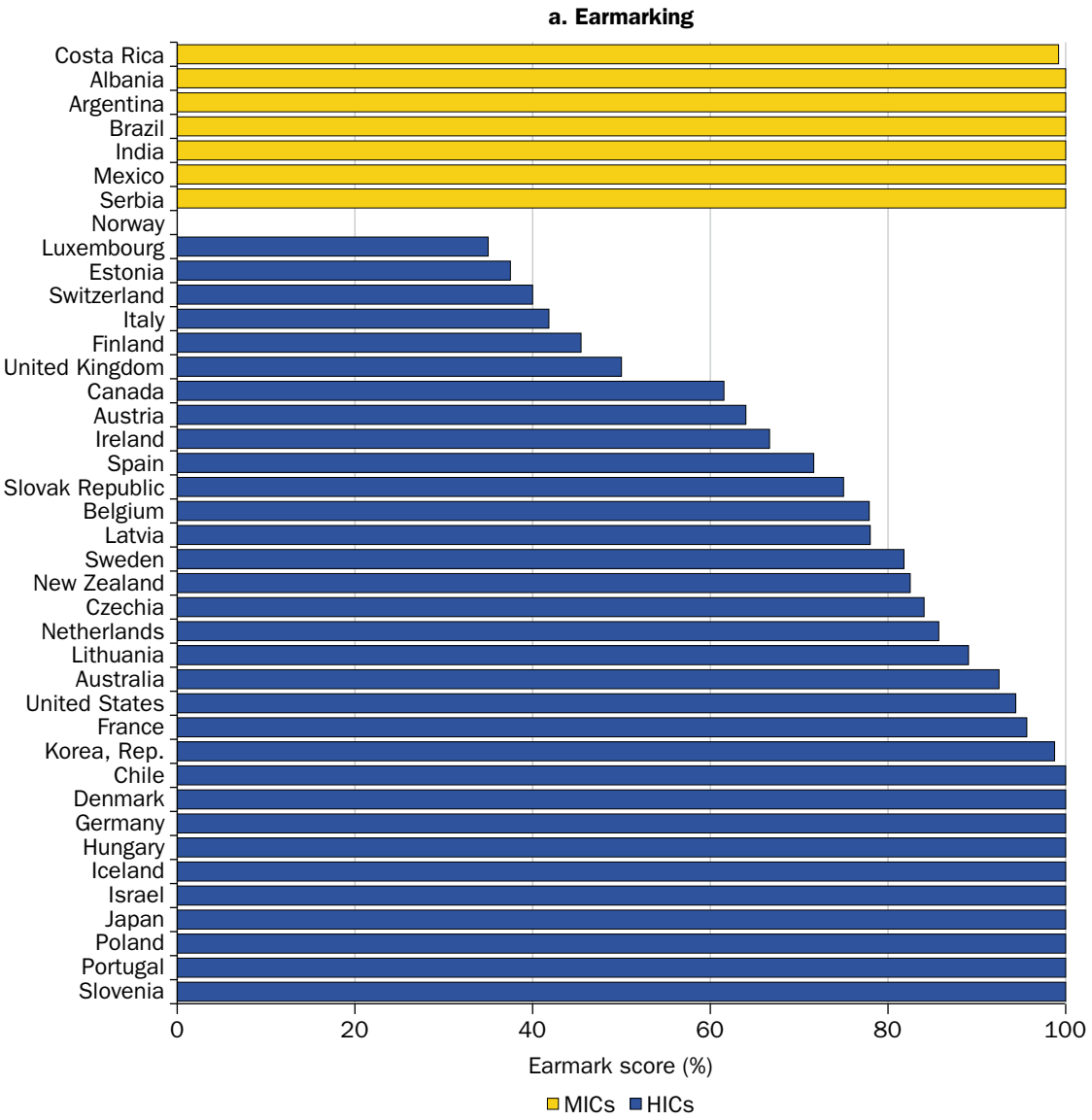
A common perception is that environmental taxes often run outside of the general government budget, and revenues are earmarked for environmental programs. This may happen if environmental goals are sidelined in general budget allocations, pushing the relevant line ministry (for example, the Ministry of the Environment) to preserve some budgetary autonomy through off-budget instruments that are earmarked for specific uses it controls.[8] In addition, ETS approaches to emissions pricing often featured two types of earmarking: embedded earmarking to covered entities through free allocation and earmarking of permit auction revenues. External partners and international organizations have generally advised LMIC governments against earmarking revenue sources to ensure transparency and efficient budget allocation (Marten and Van Dender 2019).

Earmarking appears to be more common in LMICs, and earmarked tax instruments yield lower revenue. A systematic, global analysis of earmarking would require collecting new data, but the OECD PINE data at least provide information on earmarking and tax revenue by tax instrument for 33 HICs and 7 LMICs. Figure 6.2, panel a, shows that earmarking is more pronounced in LMICs, where all but one country earmarks all of their environmental tax revenue, and even Costa Rica earmarks 99.2 percent of its environmental revenues. Figure 6.2, panel b, shows that earmarked tax instruments exhibit consistently lower revenue as a share of GDP. The average earmarked environmental tax instrument raises about 0.05 percent of GDP, while the average nonearmarked instrument raises 0.15 percent of GDP.[9,10]

Earmarking is linked to stronger political support for environmental taxation. Whether this should be the case is a priori ambiguous. On the one hand, it should be more challenging to build a broad coalition of interests to support an increase in environmental taxation if only one line ministry would benefit from the revenue. On the other hand, citizens may be more willing to support and pay environmental taxes if they know the revenue will be used for environmental causes. Several studies indeed confirm that citizens prefer earmarking. Most importantly, Dechezleprêtre et al. (2025) leverage large-scale surveys across 20 countries to show that respondents are more supportive of carbon taxation when revenues are earmarked for environmental causes. Woerner et al. (2024) conduct an incentivized experiment in Germany showing that voter support for carbon pricing is larger when revenue is earmarked than when revenue enters the general government budget. Reviewing the earlier literature, Carattini et al.

(2018) suggest that policy makers can generate support for carbon taxation by earmarking revenues, at least initially, and potentially phase out earmarking over time as support for carbon taxation grows with experience (refer to chapter 5).

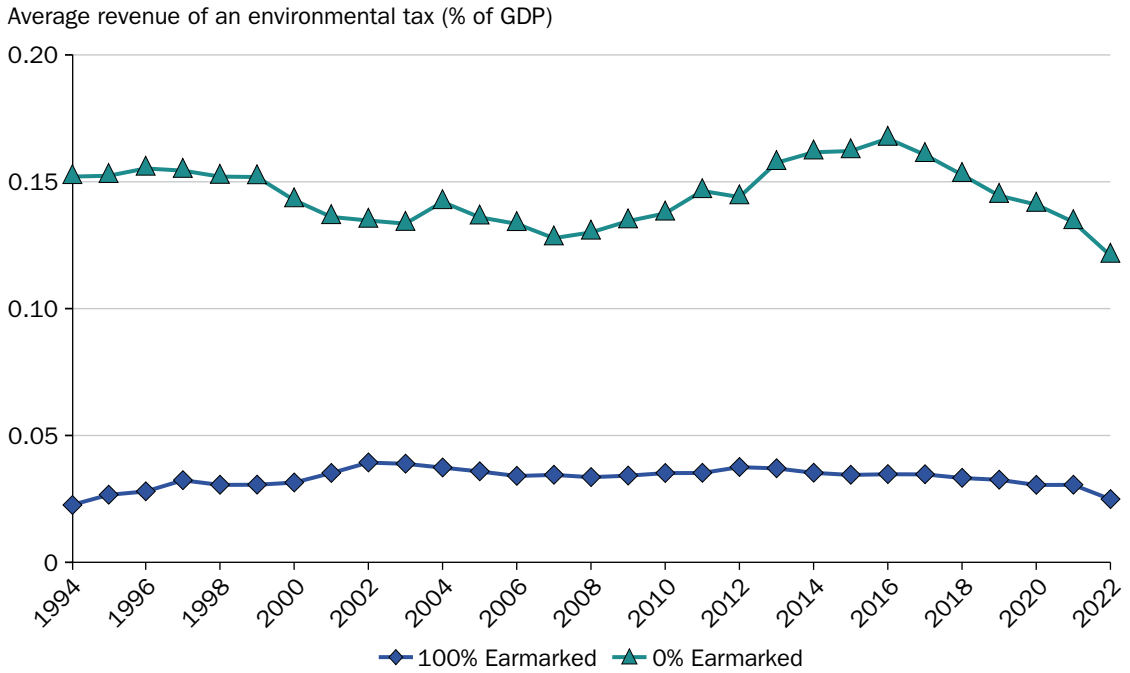
Figure 6.2 Earmarking of environmentally related taxes



(Continued)

Figure 6.2 Earmarking of environmentally related taxes *(continued)*

b. Earmarking and revenue trends



Sources: Original figure for this publication using data from the Organisation for Economic Co-operation and Development's Policy Instruments for the Environment database and the World Development Indicators.

Note: In panel a, the "Earmark score" is an unweighted average across environmental taxes of the share of revenue earmarked, calculated using all environmental taxes implemented by a country at any point between 1994 and the present, based on available data. The sample includes 33 HICs, 6 UMICs, and 1 LMIC (India). These are the only countries for which earmarking data are available. Panel b shows the evolution of the average revenue of an environmental tax as a share of GDP, according to the percentage of earmarked revenues (100 percent or 0 percent). Taxes with zero or missing revenue across all years were excluded from the sample, as well as were 13 taxes that exhibited unusually high revenue volatility. Missing revenue observations were treated as zeros. The sample includes 253 fully earmarked taxes from 29 HICs and 3 UMICs and 32 nonearmarked taxes from 12 HICs. GDP data are from the World Development Indicators. GDP = gross domestic product; HICs = high-income countries; LMICs = lower-middle-income countries; MICs = middle-income countries; UMICs = upper-middle-income countries.

Another factor that may impact support for carbon taxation is the extent to which revenues are recycled to firms or households. Revenues can be recycled through cash transfers to households (which can be uniform or pro-poor), output-based rebates to firms (for example, power stations can be taxed on fuel but subsidized for each unit of electricity produced), or subsidies to abatement or technologies that allow emissions to be avoided (for example, energy efficiency upgrades or public transit infrastructure).

The evidence on voter preferences over revenue recycling schemes is somewhat mixed. Dechezleprêtre et al. (2025) show that respondents are generally more supportive of climate policies that are progressive and do not harm the self-interest of the respondent. Woerner et al. (2024) show that respondents are more supportive of carbon taxation with uniform cash transfers compared to pro-poor transfers. However, Mildenberger et al. (2022) provide evidence from Canada and Switzerland suggesting that citizens' awareness of climate rebates (that is, carbon-tax-financed cash transfers) is limited, and support of the carbon tax is not very responsive to information about the rebates. Thus, policy attitudes may be shaped more strongly by traditional partisan leanings. Consistent with this, Carattini et al. (2018) advise governments to make redistributive schemes salient and to invest in strong communication campaigns around the introduction of carbon taxation to counteract misperceptions and misinformation about the policy (refer to chapter 5).

Policy makers should also consider citizens' intrinsic motivation to reduce emissions and design price incentives to complement rather than substitute intrinsic motivation. For instance, if the transport sector is covered by an emissions cap, citizens switching to commute by bike would not help lower emissions, as their reduction in demand would simply reduce the ETS price for other polluters.[11] Therefore, it is advisable to use tax instruments to price emissions in sectors where citizens can reduce carbon emissions directly (for example, transport and heating), and focus an ETS on commercial sectors (Heine and Black 2019).

Limitations of unilateral carbon taxation and corrective measures

As with many other public policies, environmental taxation can generate spillover effects on other jurisdictions, affecting, for instance, the location choice of firms or workers as well as government policy.[12] Unlike other tax instruments, however, carbon taxation aims to support a global public good—climate change mitigation. Hence, international cooperation is particularly relevant for optimal policy design.

Carbon pricing can incentivize firms to relocate carbon-emitting production activities to countries with lower or no carbon pricing, a phenomenon referred to as *carbon leakage*. Using finely grained data on multinational firms' production sites in Africa, matched with emissions data, Känzig et al. (2024) provide novel evidence that the introduction of carbon taxes in Europe and the increase in carbon prices have indeed led multinationals to relocate carbon-intensive production to African subsidiaries. This is consistent with compelling evidence from China documenting that multi-unit firms shift production and emissions within China in response to regulation (Chen et al. 2025) and in response to ETS pilots (Cui et al. 2024).[13]

Addressing carbon leakage increasingly requires greater transparency over multinational production networks. More information and transparency over multinational production networks

will help target international efforts to address carbon leakage. As multinational firms organize production through complex cross-border value chains, territorial emissions measures alone may provide an incomplete picture of where emissions arise and of the firms and ultimate owners controlling the underlying economic activity (Ortiz et al., 2020; Chancel and Rehm, 2026). More granular and comparable information on product- and firm-level emissions across supply chains can help identify carbon-leakage risks and support the design of policies to address them (Stenzel and Waichman, 2023; OECD, 2024). International cooperation on the exchange and interoperability of emissions data can further improve transparency and facilitate the implementation of cross-border climate policies (OECD, 2025b, 2026). Analogous to the role played by international tax transparency in improving governments' ability to identify cross-border profit shifting (see chapter 4), greater transparency over firms' carbon footprints across jurisdictions could, therefore, strengthen international cooperation to limit carbon leakage.

Carbon border adjustment mechanisms (CBAMs) aim to prevent carbon leakage while leveling the playing field for domestic producers in countries that price carbon through a tax or market-based instruments. The European Union is pioneering this policy tool, with the EU CBAM entering into effect in 2027. The United Kingdom will also implement its CBAM starting in 2027, and Canada is considering a similar policy. The EU CBAM will oblige exporters of CBAM-covered goods (such as cement, iron and steel, aluminum, fertilizers, hydrogen, and electricity) into the European Union to purchase emissions permits for the carbon content of their goods, with permit prices matching those in the EU ETS. This would eliminate incentives for carbon leakage and address competitiveness concerns among EU-based producers, although it does not level the playing field for EU exporters (Clausing and Wolfram 2023).

Box 6.1 discusses climate clubs and coalitions as broader approaches to international cooperation for addressing carbon leakage and advancing industrial decarbonization.

Box 6.1 Climate clubs and coalitions

What are climate clubs, and do they exist? The idea for *climate clubs* was originally proposed by Nordhaus (2015) to encourage international coordination and address free-riding on climate mitigation efforts. Nordhaus conceived of a climate club as imposing a tariff on all imports from nonparticipating countries. Hence, this is a much-more-radical policy lever than a border carbon adjustment (BCA), which targets the carbon content of imports. As a result, this kind of club would face more substantive practical and political hurdles than carbon border adjustment mechanisms (for example, defining membership and determining an appropriate tariff level).

(Continued)

Box 6.1 Climate clubs and coalitions *(continued)*

What does exist is a climate club as a forum for dialogue and exchange. This club is a group of 46 countries, united by their view that "an inclusive approach [to industrial decarbonization] is needed—one that brings together countries at different stages of industrial development and decarbonization, incentivizes the development and adoption of deep decarbonization technologies, and enables all countries and industries to join in" (Climate Club 2025, 18). This club facilitates high-level strategic political dialogue, for example, on the sidelines of major climate conventions, to build a common understanding among countries on how to advance industrial decarbonization. A major achievement of this club was the launch at the 29th Conference of the Parties in Baku of the Global Matchmaking Platform, which connects government requests with financial and technical assistance providers. Club members have also engaged in articulating a shared understanding of carbon leakage, adopting voluntary principles to address carbon leakage, and affirming principles for definitions of near-zero and low-emission steel and cement. In addition, the club's working group published a report featuring new ideas from leading experts on how to build international coalitions and cooperation to advance industrial decarbonization (Climate Club 2025).

More ambitiously, the Global Climate Policy Project, a joint initiative between Harvard University and the Massachusetts Institute of Technology, bringing together leading academics from around the world, has suggested the creation of a climate coalition (Global Climate Policy Project 2025). Membership in this coalition would require countries to implement a minimum domestic carbon price for select carbon-intensive industries (although the coalition would not impose a specific instrument for achieving this carbon price) and apply a BCA to imports from nonmember countries. To incentivize the participation of lower-income countries, the coalition would offer support through increased access to low-carbon technologies, climate finance, institutional capacity building, and preferential market access. The working group's modeling suggests that such a coalition could achieve a seven times higher reduction in emissions than the baseline and significant revenue generation, with a minimal reduction in output among affected industries and limited price increases.

CBAMs may create incentives and the required political leverage for LMICs to introduce carbon pricing domestically. Domestic carbon pricing, if designed well, would allow countries to capture the payments which their emitting exporters would otherwise make to the jurisdiction imposing the CBAM. Türkiye is an example case in which the EU CBAM, together with high exposure to trade with the European Union, and potentially a desire to keep the door to EU accession open, has led the government to announce a carbon tax and the introduction of an ETS pilot in 2026.[14] Clausing et al. (2026) show in a quantitative trade model that

Table 6.1 Concentration of carbon emissions in South Africa

Firm emission rank	Top 10	Top 20	Top 50	Top 100
CO_2 share of 315 firms	0.609	0.964	0.986	0.995

Source: Moreau-Kastler et al. (2025).

Note: CO_2 emissions share of firms in South Africa based on firm-level carbon tax declarations accessed in South Africa's Tax Data Lab.

CBAMs can spur collective climate action without disproportionately burdening lower-income countries. This is because emissions intensity is not correlated with country income levels or production costs.

The effect of CBAMs on firms will depend on the carbon content of their production, their markets, and their supply chains. Carbon emissions are typically highly concentrated among few firms within a country (for example, refer to table 6.1 for evidence from South Africa). Hence, the CBAM impact will be quite heterogeneous across firms with heterogeneous emissions intensity. Early evidence from iron and steel producers in India suggests that producers with high emissions intensity have reduced prices and sales to the European Union, while low-emission producers might have benefited by increasing prices, during the CBAM reporting phase (Vriz et al. 2025).

While emissions are concentrated, the carbon content of CBAM sales (and even more so of overall sales) is widely dispersed across firms.[15] In Türkiye, many firms are partially exposed to CBAM, but few firms are fully or strongly exposed. For instance, manufacturers that export CBAM-covered goods to the European Union also sell a substantial share of their production to the domestic market (and, in some cases, other export markets). Hence, non-EU sales might increase, potentially mitigating the effect of CBAM on emissions. In addition, a substantial fraction of Türkiye's exports to the European Union is done by wholesale firms that export a variety of products, including CBAM-covered and noncovered goods. Unlike manufacturers, these wholesalers typically specialize in a particular destination market but sell a broader range of goods. They could respond by adjusting the mix of products they sell.

Policy interactions and implementation considerations

Most countries use a combination of taxes, regulation, and ETSs to achieve their climate goals, so understanding the specific market failures and distortions at play is key to determining the right policy mix. While a carbon price internalizes the social cost of emissions, progress toward climate goals is also hampered by spillovers from innovations, economies of scale, network economies, and information frictions. Where economies of scale are present, the government may need to lead investments, for example, in public transport infrastructure.

Where consumers exhibit biases, inertia, or cognitive bandwidth limitations, they may need nudges toward the adoption of energy efficiency improvements. Where price incentives are not sufficient to incentivize an industry to abate pollution (for example, if investment horizons are long and fixed costs are high), regulation may be needed to achieve the desired level of abatement. In general, however, carbon pricing through a tax or ETS is considered a more cost-effective tool to reduce emissions than non-market-based regulation (Metcalf 2021).

Administrative capacity constraints are also a key consideration when choosing the policy tools to deploy. Carbon taxes are often recommended as a go-to tool for carbon pricing in contexts with limited administrative capacity, because they can leverage existing experience with fuel excise taxes. If levied upstream, a carbon tax is relatively simple to implement and can cover most emissions from fossil fuel combustion, although it does not cover downstream process emissions. However, downstream carbon-pricing policies require systems for monitoring, reporting, and verifying (MRV) emissions that can be costly and time-consuming to set up, although they can cover emissions from industrial processes and allow crediting for end-of-pipe abatement options like carbon capture and sequestration. MRV systems are required to access some of the benefits of carbon pricing, such as crediting under CBAM.

When using multiple policy instruments, it is also important to consider potential interaction effects. On the one hand, carbon pricing can render other policies more impactful. Clean technology research and development (R&D) subsidies or renewable-energy support will have more take-up when carbon pricing generates demand for clean alternatives. Consider also the risk of a rebound effect—the potential increase in energy demand induced by efficiency improvements from green investments. Carbon pricing provides a buffer against the rebound effect, as the price incentive counteracts the effect of simultaneous energy efficiency improvements. The price signal also complements green public investments by incentivizing the private sector to make its own green investments (referred to as the *green-spending multiplier*). Governments need to account for interaction effects in their revenue projections. For instance, investments in public transportation infrastructure can reduce fuel tax revenue.

On the other hand, unhelpful interactions between different carbon-pricing tools can arise when the market price for emissions adjusts to demand or supply changes, a phenomenon referred to as the *waterbed effect.* For example, under a cap-and-trade system, when public investments or other interventions reduce emissions among facilities anywhere under the cap, demand for emissions permits falls and the market price of allowances falls accordingly. The lower price, in turn, allows other covered entities to increase their emissions (Fischer and Preonas 2010). This scenario can be averted if ETS authorities revise the emissions cap in response to other climate policies to ensure appropriate pricing or introduce flexibility mechanisms to limit price

adjustments (Perino et al. 2025). Several emerging ETSs are rate-based (intensity-based) systems, which can interact differently with overlapping policies, rendering the waterbed inflatable or deflatable; careful analysis is required to understand and design effective overlapping policies (Fischer et al. 2024).

Even before introducing direct carbon-pricing tools, many countries have scope to improve incentives toward the green transition by rationalizing their existing transfer, tax, and tariff systems. First and foremost, countries should phase out any remaining subsidies for fossil fuels (for example, by replacing them with direct cash transfers), as subsidies are inefficient and regressive. In addition, countries should review their tariff structure and trade regulation to remove advantageous treatments for dirty industries, which have been found to be large and costly (Shapiro 2021).[16] Finally, existing taxes such as the corporate income tax (CIT) and the value-added tax (VAT) may also provide incentives (such as tax credits and holidays) that disproportionately benefit dirty industries (Moreau-Kastler et al. 2025) and, hence, should be rationalized. Besides, before introducing a full-fledged carbon tax, countries can reform their existing fuel excise taxes to better reflect the full external costs of fuel consumption and pave the way for a harmonized carbon price component that can easily be maintained and adjusted gradually.[17]

Environmental taxation on the fiscal frontier

Technology, transparency, and trust enable countries to leverage tax policy tools toward environmental goals while improving the efficiency, equity, and revenue adequacy of their tax systems. The empirical and theoretical research discussed in the previous sections has contradicted some prior concerns about environmental taxation and demonstrated the benefits of good environmental policy design and international cooperation. Four lessons follow.

Lesson 1: Focus on the many benefits of carbon pricing.

While governments may worry about potential adverse effects of carbon pricing on growth, investment, and the poor, the empirical evidence instead demonstrates that the many benefits of carbon pricing typically outweigh the costs, often by far. The characteristics of lower-income economies facilitate the realization of double dividends, whereby carbon taxation reduces pollution, while productive use of its revenues reduces distortions in the economy and increases economic activity (Bento 2024). Carbon taxation may also increase labor intensity and employment and generate important health and transportation cobenefits (Timilsina 2022). In lower-income countries, the distributional impact of carbon taxation is likely progressive, given the structure of consumption profiles (Mylonas et al. 2025). Government should seize these many benefits and communicate strategically to build coalitions of support for carbon pricing.

Lesson 2: Use tax emissions where emitting activity can be monitored effectively, and use technology to expand the range of policy instruments over time.

When countries aim to use tax instruments to reduce emissions and incentivize decarbonization, the tax should be as closely related as possible to the source of emissions. At the same time, environmental taxes in lower-income countries and MICs need to work in a world of imperfect compliance and limited data on emissions (refer to chapter 3 for a discussion on the role of technology and data in shaping tax systems). Before thinking of positive carbon pricing, countries should make sure to remove fossil fuel subsidies and review the bias of the existing tariff and tax system for dirty industries.

As a next step, countries should work on optimizing existing fuel excise taxes to link them as closely as possible to the external costs of the fuels. Countries can also apply carbon taxation upstream, relying on the fact that there are few compliance points, which helps ensure adequate enforcement. Countries may need to review any distortions that inhibit the pass-through of upstream taxes, such as price controls or state ownership, and design reforms to increase the pass-through of the price signal. Once MRV systems are in place, countries can implement downstream carbon pricing (including via emissions trading systems) for large point source emitters, often as a complement to upstream carbon taxation. Türkiye, for instance, established a mandatory MRV system in 2014–15, then began in 2021 to design an emissions-trading scheme, and is now piloting this scheme, with the first full implementation period planned for 2028.

Lesson 3: Engage in international collaboration, data exchange, and transparency initiatives to address policy spillovers.

Engagement in international fora ensures that that the voices of lower-income countries are present and that their interests are taken into account where possible in policy design. Initiatives to improve the interoperability, exchange, and comparability of emissions data, especially with a focus on global value chains, have a high potential to improve policy design to reduce emissions and limit leakage (OECD 2025b, 2026). Similar data transparency and exchange initiatives, for example, the common reporting standard, have already shown potential to reduce profit shifting by multinational companies (refer to chapter 4).

At the same time, efforts by small groups of countries such as the EU CBAM can have positive spillover effects on nonparticipating countries, reducing the political costs of adopting carbon-pricing instruments (Clausing et al. 2025). The Open Coalition on Compliance Carbon Markets, announced at Conference of the Parties 30 in November 2025 and formally constituted in May 2026, offers a platform for cooperation on the development and strengthening of domestic carbon markets and carbon-pricing policies.

Lesson 4: Build trust through careful design of redistribution schemes and communication.

How revenues from carbon taxation, emissions-trading schemes, and related instruments are spent is fundamental for the policies' efficiency and equity effects. Using revenues to reduce other, distortionary forms of taxation can improve the efficiency of taxation, reduce informality (Bento et al. 2018), and increase overall trust in the tax system and in government. However, redistributing revenues via cash transfers ensures greater equity improvements, which also builds trust, possibly among a different part of the population (refer to chapter 5).

Where there is a tradeoff between efficiency and equity objectives, governments need to be clear about their priorities and design policy accordingly. They should also invest in targeted communication campaigns to make the benefits for carbon pricing salient, as existing evidence suggests that citizens are often unaware of revenue recycling schemes. From the perspective of overall public financial management, governments also need to consider the costs and benefits of earmarking revenues. While earmarking can increase public support for a revenue-raising measure (Dechezleprêtre et al. 2025), it also constraints governments' use of the revenue.

Table 6.2 places the main lessons from this section within the fiscal frontier framework, illustrating how the current state of environmental taxation and priority actions vary based on countries' fundamentals and proximity to the fiscal frontier.

Table 6.2 Best practices for efficient and equitable environmental taxation

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming:*** **Remove distortions and harmful subsidies.** **Current situation** • No explicit carbon price exists; the policy mix may include ad hoc regulations, price controls, and untargeted subsidies. • Fossil fuel subsidies and preferential tax treatments for energy-intensive or polluting sectors remain large and regressive. **Actions** • Phase out fossil fuel subsidies, replacing them with targeted cash transfers as needed. • Remove preferential tax treatments for dirty activities.	***Constrained but functional:*** **Build on existing taxes to introduce carbon pricing.** **Current situation** • Energy taxes are relatively simple and easy to administer. • Informality and limited data constrain enforcement and distributional analysis. **Actions** • Invest in basic data systems to support evaluation of emissions, revenues, and distributional impacts.

(Continued)

Table 6.2 Best practices for efficient and equitable environmental taxation *(continued)*

	Far from Fiscal Frontier	Close to Fiscal Frontier
Strong fundamentals	***Capable but underperforming:* Align fragmented policies and price signals.** **Current situation** • Administrative and technical capacity are sufficient to support complex instruments, including ETSs and detailed regulations. • Overlapping taxes, subsidies, regulations, and sector-specific exemptions dilute incentives and counteract each other. **Actions** • Harmonize existing excise tax rates to a single carbon tax rate, and phase in the carbon tax. • Improve coordination among carbon pricing, regulation, and public investment.	***Capable and high-performing:* Broaden and deepen carbon pricing.** **Current situation** • A carbon-pricing strategy, including taxes and potentially partial or pilot ETSs, is in place. **Actions** • Broaden coverage of the carbon tax or the ETS, and roll back residual concessions while protecting vulnerable households through targeted transfers. • Gradually increase the carbon price by jointly leveraging the different policy instruments.

Source: Original table for this publication.

Note: ETSs = emissions trading systems.

Tax policy for industrial goals

Industrial policy has returned to the forefront of academic and policy discussions in recent years (Fernandes and Reed 2026). State-led efforts to influence economic outcomes are not new: Nearly every government in history with a basic level of institutional capacity has utilized some form or other of industrial policy (Juhász et al. 2022; Rodrik 2022).[18] The renewed interest can be attributed to at least two main factors. First, a persistent productivity puzzle continues to challenge developing countries. Despite high potential gains from technological catch-up, productivity levels in emerging market and developing economies (EMDEs) have largely failed to converge with those in advanced economies (AEs), raising concerns that many countries are stuck in low- and middle-income growth traps (Andrews et al. 2016; Dieppe 2021; World Bank 2024b).[19] Second, there is the push to accelerate the transition to low-carbon technologies as part of the response to climate change. Firms may require additional incentives or support to invest in these technologies, as the private returns may not fully capture broader social and environmental benefits. In this context, the question "What should the state do?" has taken on new urgency.

This section focuses on one of the most widely used instruments in the state's industrial policy toolkit: tax incentives for investment. Taxation influences the decisions of firms and

individuals, including where and how much they invest, hire, and produce (refer to chapter 2). This, in turn, means taxation can be a powerful tool to support—or hinder—productivity and economic growth. Investment incentives use tax benefits to encourage firms to invest in particular activities or types of capital (Kronfol and Steenbergen 2020). They differ from more general tax policies in both purpose and scope. Whereas general tax policies are designed to generate revenue or redistribute income and typically apply across the entire economy, investment incentives represent a form of preferential tax policy that grants exemptions from general tax policies to targeted sectors, regions, or activities (Akcigit and Stantcheva 2020). Their explicit goal is to stimulate investment, innovation, and job creation, often as part of a broader industrial strategy.

Whether tax incentives work in practice—and at what cost—are open questions. Their effectiveness is context specific, depending not only on their design but also on complementary factors such as institutions, infrastructure, and human capital. For LMICs with limited fiscal space (refer to chapter 2), investment incentives must demonstrably increase investment while minimizing distortions to efficiency and equity to justify the associated revenue loss. In practice, these conditions are often difficult to meet. Poor targeting, political capture, and unintended market distortions can undermine even well-designed incentive schemes. Advances in technology, transparency, and trust offer new opportunities for more effective tax incentives, as well as complementary industrial policies within the fiscal system and beyond.

Tax incentives in the industrial policy toolkit

Tax incentives for investment are a common tool of industrial policy. They lower taxes for firms or projects that meet specified criteria, with the aim of encouraging capital formation, R&D and innovation, and investment in particular regions or sectors (IMF et al. 2015). By reducing the cost of capital, they can make some investments viable that would otherwise not take place.

Governments may also use tax incentives to attract mobile investment from abroad. While this can make sense for an individual country, it can lead to a global "race to the bottom" as countries compete by lowering taxes. Countries may lose tax revenue without generating much additional investment overall (Knoll et al. 2021; refer also to chapter 4).

How prevalent are tax incentives for investment?

Measuring industrial policy activity in general is challenging. Industrial policy includes any "government action expected to increase a strategic business activity" (Fernandes and Reed 2026). The challenge is that the goal of a government action may be implicit, ambiguously defined, or not publicly disclosed (Juhász et al. 2025; Warwick 2013). Moreover, a single policy may serve multiple purposes—for example, an import tariff may be introduced to raise revenue *and* to

support a particular domestic industry (Juhász et al. 2025). Despite these complexities, ongoing efforts to systematically track the use of industrial policy (for example, Evenett et al. 2024; Juhász et al. 2025) show that, in many countries, tax policy is a core instrument of industrial strategy.

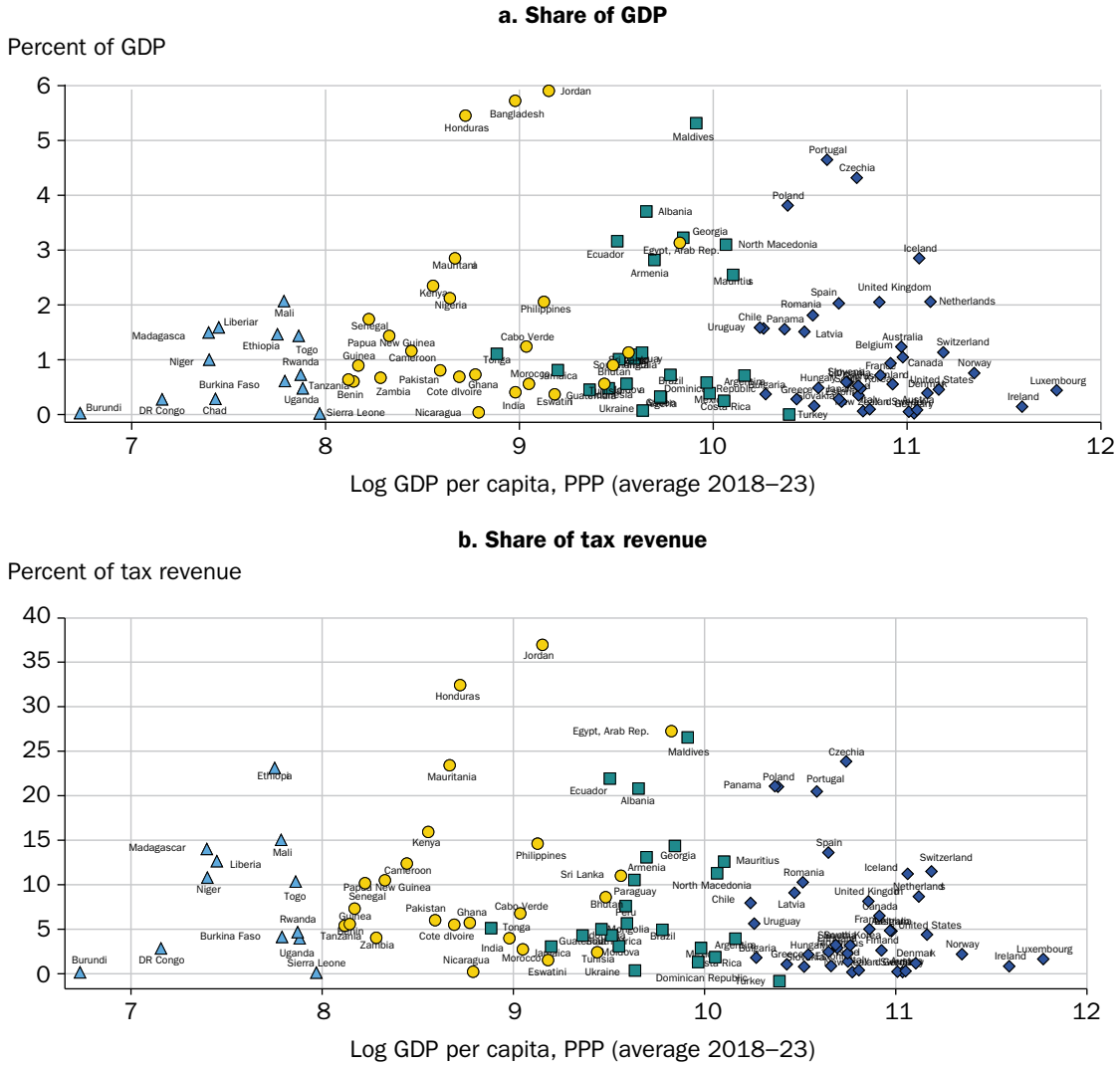
Tax expenditure data can be used to estimate the fiscal cost of investment-related tax incentives. *Tax expenditures* refer to any exemptions, deductions, credits, deferrals, or reduced rates that lower the tax liability of specific segments of the economy (Redonda et al. 2022). As discussed in chapter 2, tax expenditure estimates are subject to their own measurement challenges. First, these estimates depend on the definition of the benchmark tax system and the reporting of preferential tax provisions, both of which can vary across countries and over time, complicating cross-country and longitudinal comparisons. Second, the most commonly used method—the *revenue forgone approach*—calculates the reduction in tax liabilities based on taxpayers' observed behavior (Redonda et al. 2022). This approach typically does not account for behavioral responses, such as changes in investment or firm location, which could reduce the tax base if the incentive were withdrawn, potentially leading to an overstatement of revenue losses. At the same time, the revenue forgone approach does not measure leakages or spillovers to unintended beneficiaries, resulting in an understatement of revenue losses.

Investment-related tax incentives can entail sizable fiscal costs, although their magnitude varies widely across countries. Keeping the measurement challenges in mind, figure 6.3, panel a, presents tax expenditures for investment as a share of GDP across 106 countries that report at least one investment-related tax expenditure in recent years.[20] Tax expenditures for investment are substantial, corresponding to 1.47 percent of GDP on average.[21] While HICs tend to report slightly larger investment-related tax expenditures as a share of GDP, there is considerable variation within income groups. Many LMICs—Honduras is one example—report higher relative expenditure levels for investment than certain HICs.

Investment-related tax incentives can account for a significant share of total tax revenue and total tax expenditures, underscoring their fiscal importance even in resource-constrained settings. Figure 6.3, panel b and panel c, provides further context by benchmarking investment-related tax expenditures against tax revenue and total tax expenditures, respectively. Figure 6.3, panel b, shows that the magnitude of these expenditures relative to total tax revenue can be substantial—even in some lower-income countries and LMICs—highlighting the fiscal significance of investment incentives in countries with constrained budgets.[22] Figure 6.3, panel c, examines the share of total tax expenditures devoted specifically to investment-related measures. Cross-country variation is wide, suggesting that governments prioritize investment incentives to differing degrees. In some LMICs and lower-income countries, these incentives constitute a

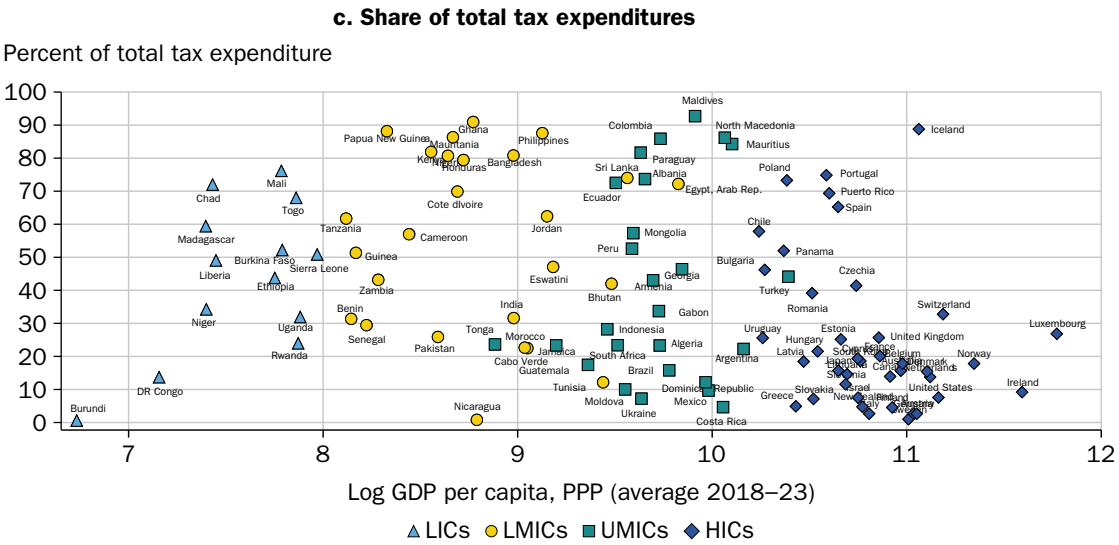
significant portion of overall tax expenditures. The most commonly reported objective for tax expenditures in LMICs and lower-income countries is to develop a priority economic sector or activity, followed by various other social and economic objectives.

Figure 6.3 Tax expenditures for investment, 2018–23



(Continued)

Figure 6.3 Tax expenditures for investment, 2018–23 *(continued)*



Sources: Original figure for this publication based on the Global Tax Expenditures Database and the World Development Indicators.

Note: This figure shows average tax expenditures for investment as a share of GDP (panel a), total tax revenue (panel b), and total tax expenditures (panel c) against the logarithm of GDP per capita in current PPP by country. Tax expenditures for investment are defined as those in which beneficiaries are businesses; tax types are CIT, VAT, sales tax, or multiple taxes on goods and services (usually combinations of VAT and customs duties); and policy objectives are to "attract/promote investment," "develop a priority economic sector or activity," "develop a specific region of the country," "multiple policy objectives," "not stated/unclear," or some policy objectives classified under "other social/economic objective." Due to potential overlaps and interactions between measures, totals may not represent actual revenue recoverable. Averages were taken from 2018 to 2023. The following countries have been dropped from one or more samples, as they appeared as outliers: Bangladesh (panel b), Colombia (panels a and b), and Puerto Rico (panel a, missing in panel b due to lack of tax revenue data). CIT = corporate income tax; GDP = gross domestic product; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; PPP = purchasing power parity; UMICs = upper-middle-income countries; VAT = value-added tax.

What are the different types of investment tax incentives?

Investment tax incentives can take a wide range of forms. Box 6.2 presents the most-common types of CIT-based incentives and provides country-specific examples for each type. For CIT-based incentives, design elements include the following (Cirera et al. 2020; Kronfol and Steenbergen 2020; OECD 2026; World Bank 2025c).

Eligibility

- *Firm eligibility.* Incentives may target firms based on size (for example, small and medium enterprises [SMEs]), sector, ownership status (foreign versus domestic), or geographic location.
- *Activity eligibility.* Incentives may be targeted toward certain types of investment—such as machinery, R&D, digital technologies, or lower-carbon production—or toward specific priority sectors such as manufacturing or renewable energy.

Incentive type

- *Profit-based incentives* are tax provisions that reduce a firm's tax burden by lowering the effective tax rate or total tax liability on taxable profits, typically through full or partial exemptions of taxable income or through reduced statutory tax rates. By design, these incentives are not quantified with reference to actual costs incurred by the firm. Instead, the value of the benefit depends on the level of profits generated.
- *Cost-based incentives* are tax provisions that reduce a firm's taxable income or tax liability in proportion to specific, verifiable costs incurred by the firm in undertaking a targeted activity or investment. These incentives operate through mechanisms such as targeted deductions, accelerated depreciation, or tax credits, where the magnitude of the tax benefit is explicitly linked to an underlying expenditure.
- *Hybrid incentives* combine features of cost-based and profit-based incentives. Eligibility or the size of the benefit is linked to qualifying investment or expenditure, but the benefit is provided through a reduction in taxable profits or tax liability that is not strictly proportional to the underlying costs incurred. For example, an incentive may be triggered by capital investment or R&D spending but provide a tax benefit that can be used against taxes on profits.

Incentive base

- *Incremental incentives* target new investment beyond a baseline.
- *Volume-based incentives* reward all qualifying investment, regardless of past levels.

Duration

- The duration of investment tax incentives can vary from short-term measures to permanent features of the tax code. Short-term incentives are often introduced to stimulate immediate investment in response to economic slowdowns or crises.[23] In contrast, incentives can also be designed as long-term or permanent policies, offering ongoing benefits to specific types of investments or sectors.

Investment incentives can also be delivered through the VAT system, although they are less common than CIT-based incentives. VAT exemptions and zero-rating generally aim to lower consumer prices or address distributional concerns. Where VAT refunds are poorly implemented, however, exempting or zero-rating imported capital goods can reduce the upfront cost of investment. Because a well-functioning VAT should otherwise be neutral for investment, such measures are a second-best solution that can create distortions.

Box 6.2 Taxonomy of CIT investment incentives

Drawing on the World Bank Corporate Income Tax Incentives Database (2025), we distinguish among the following types of CIT investment incentives:

Profit-based incentives

Exemptions (including tax holidays): Temporarily or permanently exempt income from qualifying investments—often for priority sectors or special economic zones (SEZs).

Example: Indonesia's current tax holiday allows companies with investments of at least 500 billion rupiah in eligible sectors to benefit from a 0 percent corporate income tax (CIT) rate for up to 20 years, compared to the standard 22 percent CIT rate. Eligible sectors include upstream basic metals, oil and gas refining, and chemicals (Sulaiman 2024).a

Reduced rates: Apply lower CIT rates to specific sectors, activities, or regions to attract investment.

Example: South Africa provides a reduced CIT rate of 15 percent for qualifying companies operating within designated SEZs, compared to the standard CIT rate of 28 percent (BusinessTech 2019).

Patent boxes: Tax income derived from intellectual property at a preferential rate to encourage innovation and research and development (R&D)–based investment.

Example: Colombia's Software Regime, introduced in 2013, provides a 0 percent CIT rate on income derived from the licensing or sale of software developed by qualifying companies (Shehaj and Weichenrieder 2024).

Cost-based incentives

Accelerated depreciation or immediate expensing: Permit firms to deduct the cost of capital assets more quickly than under standard depreciation rules, reducing taxable income in early years of investment.

Example: In Thailand, small businesses can initially depreciate computer hardware and software at 40 percent of their cost. The remaining balance can then be depreciated over the next three accounting periods (PwC 2025b).

(Continued)

Box 6.2 Taxonomy of CIT investment incentives *(continued)*

Enhanced deductions (above 100 percent): Allow firms to deduct more than the actual value of qualifying expenditures such as R&D, training, or reinvested profits, thereby lowering their effective tax burden.

Example: India offers a 200 percent tax deduction for in-house R&D facilities in the biotechnology sector (KPMG 2014).

Investment tax credits: Enable firms to directly offset a portion of qualifying investment expenditures against their tax liability.

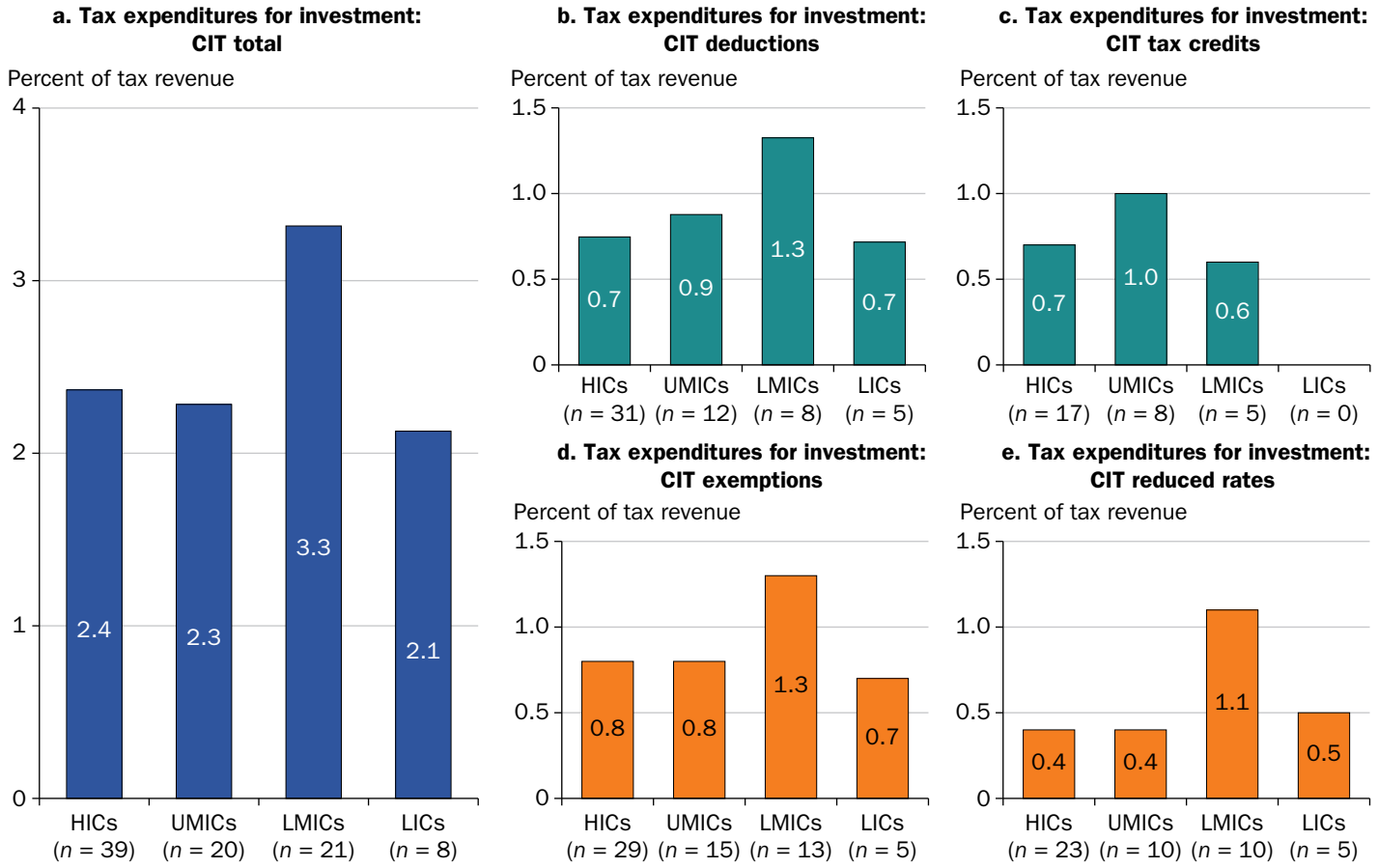
Example: Mozambique offers a carry-forwardable investment tax credit of 5 percent to 10 percent of qualifying production assets, depending on the business location, which can be used to reduce CIT liabilities over 5 years (PwC 2025a).

a. This policy is currently being revised in light of the GMT, or Pillar II of the OECD/G20 Inclusive Framework (refer to chapter 4).

The composition of investment tax incentives differs across income groups, with notable variation in the use of CIT and VAT measures (refer to figure 6.4). Overall, the share of CIT-related investment incentives is broadly similar across income groups, with LMICs showing the highest average share at 3.3 percent. This pattern is consistent with figure 6.3, panel b, which showed considerable variation in the share of tax incentives within country income groups. However, when the data are further disaggregated by policy instrument, clear differences emerge. LMICs rely more heavily on reduced rates, exemptions, and deductions and make relatively limited use of tax credits. In contrast, HICs and UMICs are far less likely to use reduced rates and more likely to use tax credits.

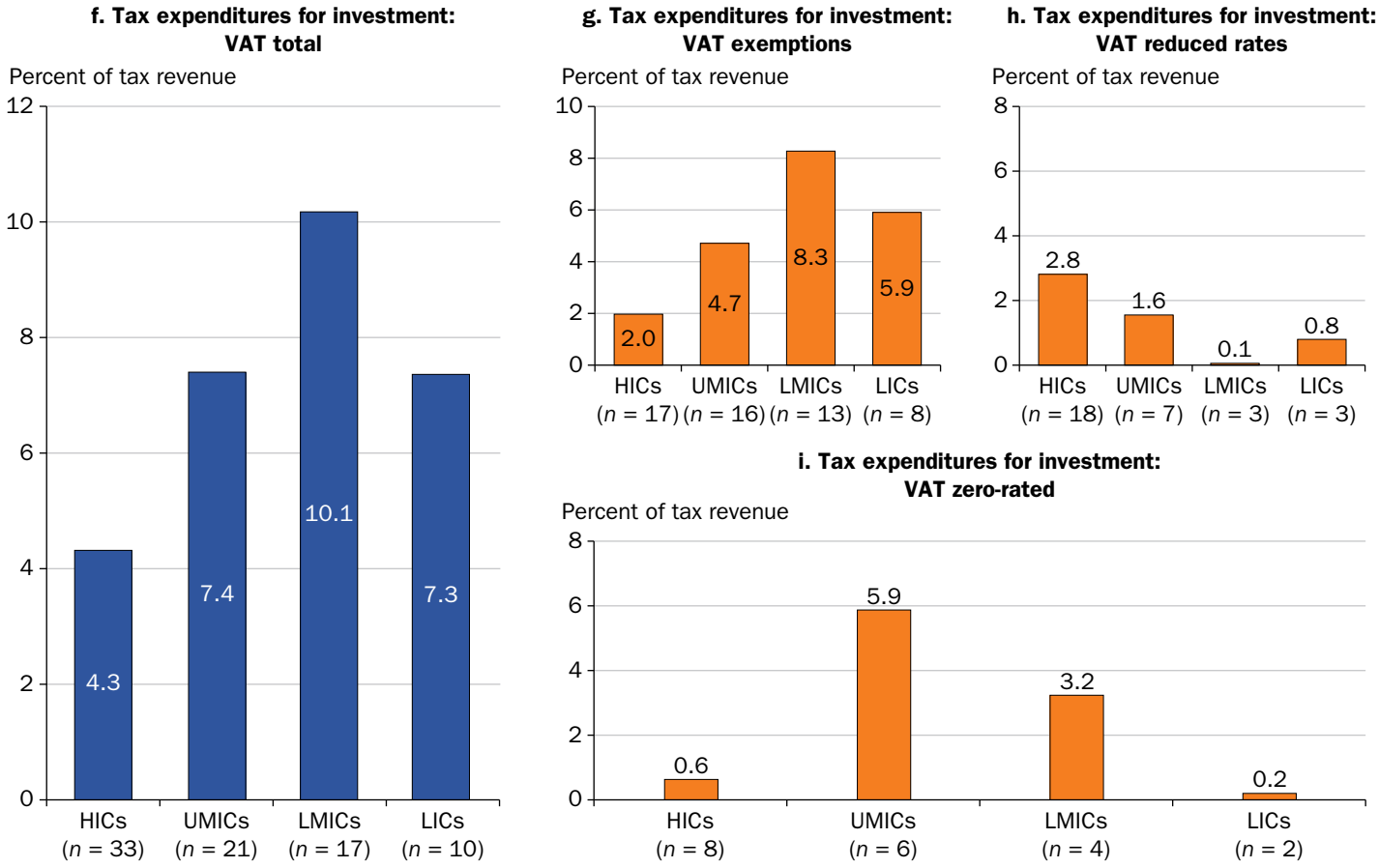
HICs make relatively limited use of VAT-based investment incentives, while UMICs rely on them more frequently, primarily through exemptions and zero ratings. These figures likely overstate the true fiscal impact of VAT-based investment incentives. Firms often pay more VAT on inputs than they owe on outputs—particularly for large investments—making them theoretically eligible for refunds. In practice, many countries have incomplete or slow refund systems, so exemptions are often used instead as a workaround (Forstater 2017; IMF et al. 2015). As a result, the reported forgone revenue from VAT-based incentives may overstate the actual cost to the government. Consequently, the actual VAT subsidy—the reduction in firms' tax liabilities relative to what would occur under a fully functional refund system—is likely smaller than suggested.

Figure 6.4 Tax incentives for investment, by tax and policy type, 2018–23



(Continued)

Figure 6.4 Tax incentives for investment, by tax and policy type, 2018–23 *(continued)*



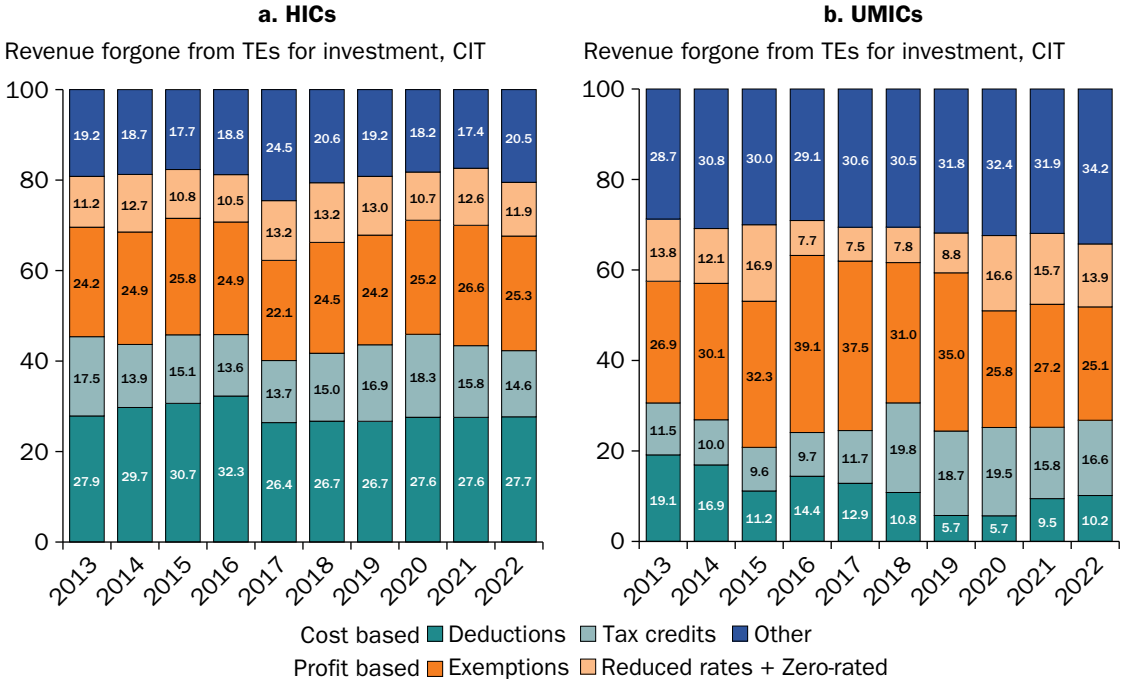
Source: Original figure for this publication using data from the Global Tax Expenditure Database.

Note: Country group sample sizes vary across tax types and tax expenditure types depending on data availability. Data by tax and tax expenditure type represents country averages from 2018 to 2023. CIT = corporate income tax; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries; VAT = value-added tax.

The composition of CIT-based investment incentives has remained broadly stable over time across income groups (refer to figure 6.5). While LMICs have reduced their reliance on exemptions over time, their relative share remains substantially larger than that in HICs and UMICs. Profit-based incentives as a whole (exemptions plus reduced rates) continue to account for a sizable portion of total incentives, with the decline in exemptions in LMICs largely offset by greater use of reduced rates. Strikingly, the relative share of cost-based incentives such as deductions and tax credits in LMICs has remained almost unchanged over the nine-year period.[24]

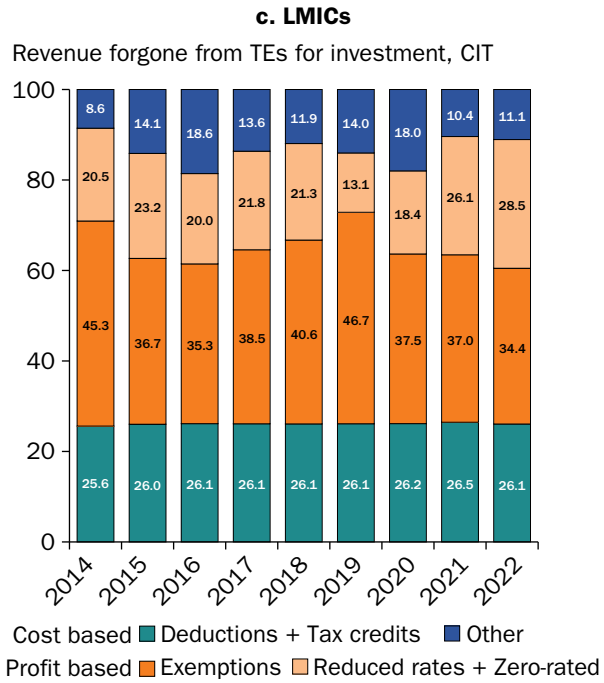
Tax incentives are often deployed alongside nontax policy instruments as part of broader industrial strategies. Many countries and economies combine tax incentives with complementary nontax policies to provide both direct and indirect support for targeted sectors or activities. Historical examples suggest that there is no "one-size-fits-all" approach: For example, the Republic of Korea and Taiwan, China, both representative cases of the East Asian Miracle, followed different paths, with Korea relying more on credit subsidies and Taiwan favoring tax incentives (Juhász et al. 2023). The choice of policy instruments often reflects country or economy context, institutional capacity, and development priorities. Box 6.3 presents a taxonomy of complementary nontax instruments, illustrating how tax incentives fit within a broader toolkit for promoting investment and innovation.

Figure 6.5 Revenue forgone from CIT tax expenditures for investment, by tax incentive and income group



(Continued)

Figure 6.5 Revenue forgone from CIT tax expenditures for investment, by tax incentive and income group *(continued)*



Sources: Original figure for this publication using data from the Global Tax Expenditures Database.

Note: Each year shows the average composition for a fixed sample of countries with consistent data over time from 2013 to 2018: 25 HICs, 11 UMICs, and 4 LMICs. "Cost-based incentives" are deductions and tax credits. "Profit-based incentives" are exemptions, reduced rates, and zero rates. "Other incentives" comprise deferrals and categories "Other," "Multiple," and "Unclear." CIT = corporate income tax; HICs = high-income countries; LMICs = lower-middle-income countries; TEs = tax expenditures; UMICs = upper-middle-income countries.

Box 6.3 Taxonomy of complementary nontax instruments

Many emerging market and developing economies (EMDEs) use a combination of tax and nontax policy instruments as part of their broader industrial policy mix. Argentina, Chile, Colombia, India, Malaysia, and South Africa, for example, all provide direct support in the form of grants or matching grants to firms alongside investment tax incentives (World Bank 2026).

Objectives. Direct support policies share similar objectives with investment tax incentives—stimulating business activity, innovation, and technological upgrading—but rely on different

(Continued)

Box 6.3 Taxonomy of complementary nontax instruments *(continued)*

mechanisms.[a] An important distinction between direct and indirect support lies in project selection: With direct support, the government typically chooses the specific projects, whereas with indirect support, firms make the decisions. Consequently, direct support often requires greater administrative capacity for targeting, selection, disbursement, and monitoring activities. Drawing on Cirera et al. (2020), we distinguish among the following types of direct support instruments:

- *Grants and matching grants.* Direct financial support for projects. For matching grants, public agencies match a percentage contribution of the project made by the firm.
- *Loans and guarantees.* Financial instruments to reduce risk and improve access to finance.
- *Vouchers for innovation and collaboration.* Small-scale support to encourage collaboration between firms and knowledge institutions.
- *Demand-pull instruments.* Mechanisms such as precommercial procurement and public procurement to create market demand.
- *Technology adoption and generation instruments.* Support services such as business advisory programs, technology centers, and extension services.
- *Early-stage support for innovation ventures.* Assistance for startups and early-stage firms, including incubators, accelerators, and equity finance.

Empirical evidence. Several studies suggest direct support can be highly effective in both low- and middle-income contexts. In Yemen, a matching grant program significantly increased small firms' capital investment and innovation (McKenzie et al. 2017). In Brazil, the Funding Authority for Studies and Projects, which awards grants and subsidized credit for projects meeting technical criteria, promoted firm growth—particularly among financially constrained firms—by facilitating entry into high-tariff markets (De Souza and Garber 2024). The authors estimate that, for every US$1 of innovation subsidy, the government collected US$2.2 in payroll taxes.

Soft industrial policies. Beyond direct and indirect support, "soft" industrial policies—such as public-private dialogues, investment promotion agencies, and business advisory services—can serve as complements. These soft policies often require fewer public resources and, unlike direct and indirect interventions, do not create price distortions (World Bank 2026). Recent evidence suggests that some soft industrial policies may be highly effective. For example, investment promotion agencies have been shown to increase foreign direct investment flows in EMDEs by alleviating information frictions (Carballo et al. 2025; Harding and Javorcik 2011).

a. Refer to Cirera et al. (2020) for a full taxonomy and description of policies for innovation and technology adoption.

Efficiency and equity of tax incentives

This section synthesizes the empirical evidence on investment tax incentives. While most research comes from AEs, evidence from EMDEs is steadily growing. Recent studies highlight important conceptual considerations often overlooked in simple cost–benefit analyses. These include potential spillovers—both positive and negative—to unintended beneficiaries, market distortions, and the risk of political capture, all of which can affect the net effectiveness of incentives. Overall, the key lesson is that investment tax incentives are not universally effective. Success requires careful targeting and design, as well as alignment with broader fiscal and industrial policies.

Efficiency impacts

This section examines whether investment tax incentives achieve their intended objective of increasing investment, considering both general investment incentives and those specifically targeted at R&D.

Do investment tax incentives boost investment?

Investment tax incentives often have limited effects on overall investment. The most-consistent positive impacts arise from cost-based incentives that directly reduce the cost of capital.

Measuring the effect of investment tax incentives on investment presents several empirical challenges. First, firms that receive incentives are not randomly selected—they may be larger, more profitable, or already planning to invest—making it difficult to establish causal effects.[25] Second, incentives are often implemented alongside other programs, complicating attribution to a single policy.[26] Third, reported investment may increase through "relabeling" mechanisms—such as changes in ownership structure or asset reclassification—rather than through the creation of new capital. Fourth, incentives may not raise overall investment but instead only shift its timing or location. Finally, investment responses vary by country, sector, and firm characteristics, limiting the generalization of results.

These caveats aside, empirical studies provide some insights.[27] As shown in figure 6.5, a sizable share of investment incentives in EMDEs takes the form of exemptions and reduced rates, often explicitly designed to attract foreign direct investment (FDI). Evidence on the effectiveness of these policies is mixed, with several studies suggesting that they have limited impact. A cross-country study covering more than 40 African, Caribbean, and Latin American countries over 1985–2004 finds that, while CIT reductions and tax holidays attracted FDI, they did not lead to higher levels of overall private investment (Klemm and Van Parys 2012). This may be because

these instruments affected ownership structures—such as through mergers and acquisitions—more than the amount of capital in the economy. Alternatively, higher FDI may have crowded out domestically financed investment, resulting in no net increase.

More recent evidence reinforces the importance of distinguishing real investment effects from relabeling effects. Damgaard et al. (2024) find that "phantom investment" into empty corporate shells—unconnected to the local economy—makes up nearly 40 percent of global FDI and is more common in EMDEs with higher CIT rates. Similarly, a study of China's InnoCom program, which gives large tax cuts to firms reporting R&D above a given threshold, finds that part of the reported R&D increase (approximately 24 percent) comes from relabeling existing expenses rather than new investment (Chen et al. 2021).[28]

Investors themselves rarely cite tax systems as the primary reason for investing. When selecting FDI locations, they tend to prioritize political stability and a predictable regulatory environment over low taxes or input costs (World Bank 2018, 2020; refer also to chapter 4). Consequently, despite the widespread use of investment incentives by developing countries in sectors such as manufacturing, information technology, and machinery or equipment, most FDI projects in these industries remain concentrated in a relatively small number of host countries (World Bank 2018).

When investment tax incentives do have real effects, they tend to be cost based rather than profit based. *Cost-based incentives*—such as accelerated depreciation and investment tax credits—can be more effective at stimulating additional investment because they directly lower the cost of capital (OECD 2021). In contrast, *profit-based incentives* provide benefits tied to a firm's profitability and, therefore, often accrue to companies that would have invested regardless. Profit-based incentives also create opportunities for base erosion through profit shifting, as firms may manipulate reported profits or route investments through foreign affiliates to maximize tax benefits (refer to chapter 4). Empirical evidence, largely from AEs, supports the view that cost-based incentives encourage additional investment. In the United Kingdom and the United States, accelerated depreciation provisions have been shown to increase investment, particularly among small firms (Maffini et al. 2019; Ohrn 2018; Zwick and Mahon 2017).

VAT-based measures are also a form of cost-based incentives. Two studies of China's 2009 VAT reform provide useful insights. This reform allowed firms to deduct the purchase of fixed assets from taxable sales, effectively lowering the user cost of capital in a manner similar to accelerated depreciation under the CIT. Liu and Mao (2019) analyze the pilot phase of the reform and find that it increased both investment and productivity, with stronger effects among financially constrained firms. Chen et al. (2023) study the full-scale reform and confirm its positive impact on investment, highlighting its role in triggering investment surges among previously inactive firms.

Investment incentives can influence not just the *amount* of investment but also its *type* and *quality*. Evidence from German manufacturing firms between 1995 and 2008 shows that bonus depreciation increased investment quantity while reducing investment quality, as measured by the responsiveness of future revenues and cash flows to current investment (Eichfelder et al. 2023). These adverse effects were particularly pronounced for larger and lower-productivity firms. Similarly, China's InnoCom program led firms to file and purchase low-quality patents in order to qualify for subsidies (Wei et al. 2021). Together, these studies suggest that incentive design can inadvertently undermine investment quality even while aiming to boost investment levels.

Do R&D tax incentives boost R&D investment?

R&D tax incentives are generally effective at increasing investment, especially when they lower the cost of R&D and target financially constrained firms.

R&D tax incentives are the most widely used instrument in OECD countries and are becoming increasingly common in some EMDEs, particularly in East Asia and Latin America (Appelt et al. 2025). While countries often use different criteria to determine what qualifies as R&D, such activities are typically expected to be "novel, creative, uncertain, systematic, and transferable" (OECD 2015).

In HICs, reducing the cost of R&D through tax incentives is generally associated with higher R&D investment. Certain types of firms may respond particularly strongly to these incentives. For instance, in the United Kingdom, a scheme allowing SMEs to deduct a larger share of R&D expenses from taxable income led to substantial increases in both R&D spending and patenting, likely because the measure targeted firms that were credit constrained (Dechezleprêtre et al. 2023). Evidence from EMDEs is also promising, although effect sizes are typically lower than those estimated in HICs (Zuniga 2024). R&D tax credits and innovation incentives increased investment in Argentina (Crespi et al. 2016), Colombia (Mercer-Blackman 2008), and Mexico (Calderón-Madrid 2011), with smaller, financially constrained firms typically responding most strongly. These findings suggest that R&D incentives can be effective, with their success likely depending on complementary conditions such as access to skilled labor and adequate infrastructure.

Do investment tax incentives have spillover effects?

Investment tax incentives may generate positive and negative spillovers, but these effects are rarely measured.

Spillovers to other firms are rarely measured, despite being a key justification for investment tax incentives, because they are difficult to quantify. Indirect effects across firms, industries, or regions

may take years to materialize and require detailed data to estimate. A recent study of an investment tax credit in the German manufacturing sector found that lowering a firm's investment cost not only increased the firm's capital stock and employment but also generated positive local spillovers by creating jobs in firms connected to the recipients through input–output linkages (Lerche 2025).

Investment incentives may also generate negative spillovers. This is because incentives create a wedge between the perceived cost of investment activities for recipient firms and the underlying economic cost (Pop et al. 2021). As a result, recipient and nonrecipient firms may make investment decisions—such as whether to invest, the scale of investment, and the type of activity—under different parameters, potentially allowing some firms to gain market share at the expense of others and distorting competition. Empirical evidence on such market distortions is limited. Studies of direct support programs, including small-firm subsidies (Rotemberg 2019) and subsidized loans (Cai and Szeidl 2024), suggest that beneficiary firm growth may occur at the expense of competitors. More research is needed to determine the extent to which investment tax incentives may distort markets and under what conditions.

Do investment tax incentives affect the capital–labor mix?

Cost-based investment incentives may alter the capital–labor mix, but evidence from AEs thus far shows limited substitution between labor and capital.

One concern with cost-based investment incentives is that, by directly lowering the effective price of capital, they may encourage firms to "replace workers with machines" (Garrett et al. 2020, para. 1), potentially reducing employment.[29] The magnitude of this effect depends on the elasticity of substitution between capital and labor: In sectors where the two are highly substitutable, employment impacts are likely to be larger, whereas in sectors where they are complements, the effect may be more muted.

The handful of studies on this issue thus far come from AEs and have not found clear evidence of capital–labor substitution. Accelerated depreciation *increased* employment in the US manufacturing sector, although these effects were short-lived (Curtis et al. 2021; Garrett et al. 2020). Investment tax credits in the German manufacturing sector also increased employment (Lerche 2025). These findings suggest that, at least in advanced manufacturing, capital and labor act as complementary inputs. However, this pattern may not hold in other sectors, particularly in EMDEs or in more labor-intensive industries, where substitution between capital and labor may be more pronounced. Further research across diverse contexts is needed to better understand how investment incentives influence firms' capital–labor allocation.[30]

Do investment tax incentives generate real economic gains?

Even when investment tax incentives raise firm-level investment, evidence for broader productivity or growth effects is limited.

Ultimately, investment tax incentives are intended to boost productivity and growth. However, evidence of these effects has proven—as one study notes—elusive (Calì et al. 2025). A reform phasing out a large CIT exemption scheme for export-oriented firms in Tunisia reduced entry of new firms in the previously incentivized sector but had no measurable impact on revenue from exports, employment, or wages (Calì et al. 2025). This is because incumbent firms—which account for most economic activity—remained largely unaffected. Similarly, temporary accelerated depreciation in the United States, which allowed firms to immediately deduct a larger share of investment expenses, increased investment in eligible capital but had only limited effects on overall output (House and Shapiro 2008).

Market structure and firm characteristics likely influence how tax incentives affect investment, productivity, and growth. For example, industrial policies in China—including subsidies and tax holidays—increased productivity growth between 1998 and 2007 but only when targeted toward competitive industries (Aghion et al. 2015).

Overall, even in instances where investment tax incentives succeed in increasing firm-level investment, evidence of their aggregate effects remains limited. Conceptually, it is possible for these aggregate effects to be modest due to low additionality, the small scale of the incentives compared with the economy, or policies that primarily shift the timing of investment rather than increasing its overall level.

Distributional impacts

This section examines the distributional impacts of investment tax incentives, considering both who benefits from them and how their allocation shapes perceptions of fairness and trust in the tax system.

Who benefits from investment tax incentives, and who is left out?

Investment tax incentives are disproportionately captured by large, profitable, and well-connected firms, while smaller and financially constrained firms are often excluded.

Administrative micro data from Brazil reveal tax provisions, including investment tax incentives, are concentrated among a narrow group of firms (Palomo et al. 2025). The authors find that nearly all provisions—totaling R$110 billion in 2019, 40 percent of which reduce corporate

taxable income—benefit the top 1 percent of the largest firms in the country. The combined effect of these provisions is to create an inverse U-shaped relationship between firm size and effective tax rates (ETRs): low or zero ETRs for small firms, higher ETRs for medium-size firms, and declining ETRs for the largest firms.

This inverse U-shaped relationship between firm size and ETRs has been observed in many countries. Cross-country analyses of CIT returns in 13 other LICs and middle-income countries (MICs) across Africa, Eastern Europe, and Latin America indicate that, as in Brazil, this relationship is primarily driven by large firms claiming a disproportionate share of investment tax incentives such as exemptions and tax credits rather than by differential statutory rates (Bachas et al. 2026).

One policy response to inequitable access is to target SMEs. However, even this type of targeting may not guarantee a broad distribution of benefits on its own. For example, evidence on profit-based tax relief for R&D and innovation shows that, although SMEs form the most recipients in many AEs, fewer than 100 firms benefited from this support in half of the countries surveyed (OECD 2023). In Colombia, the only MIC with relevant data, large firms were significantly more likely to receive benefits.

Several factors likely contribute to the uneven distribution of benefits. First, profit-based tax incentives such as tax holidays disproportionately benefit already profitable firms. Second, administrative costs can prevent smaller firms from applying for benefits. While some incentives are automatically applied through the tax code, many require an application and approval process as well as documentation demonstrating that criteria have been met. This favors firms with the administrative capacity to manage these burdens. Third, information about incentives may be difficult to access. These informational barriers may originate from the government's side—if incentives are not transparent or widely communicated—or from the firm's side, if some firms have better networks and channels to access relevant information. Finally, investment decisions often require predictability over long time horizons. Smaller, financially constrained firms may lack the capacity to absorb risks associated with uncertain or unstable incentives.

The upshot is that larger, more profitable, and better-connected firms often capture the majority of investment tax incentives, while smaller, financially constrained firms are effectively excluded. Yet, as discussed in the previous section, these smaller firms are precisely the ones that are more likely to respond to incentives and generate additional investment. Their exclusion reduces the equity *and* efficiency of investment tax incentives. At the same time, directing benefits to larger firms can be particularly costly and may even crowd out private investment. Improving the

targeting of investment tax incentives, therefore, offers an opportunity to enhance both equity and efficiency.

How do investment tax incentives affect perceptions of equity?

Nontransparent allocation of investment tax incentives can undermine perceptions of fairness and trust in the tax system. Investment tax incentives may also affect equity through an often-overlooked channel: taxpayers' perceptions. When incentives are granted through nontransparent negotiations or lobbying, they can undermine these perceptions and erode trust in the tax system. For example, a review of the political process for approving tax incentives in Uganda finds that tax holidays and exemptions have been applied "in a discriminatory manner and generally lack transparency" (Waiswa and Rukundo 2023, 3). Such perceptions can create ripple effects, making it harder to build support for reforms in other areas of the tax system (refer to chapter 5).

Industrial policy on the fiscal frontier

Technology, transparency, and trust offer countries the opportunity to design investment tax incentives that are more efficient, equitable, and sustainable. The empirical evidence and country experiences discussed in the preceding sections provide guidance on what works and, more importantly, what does not. Six lessons follow.

Lesson 1: Use technology to get the basics right.

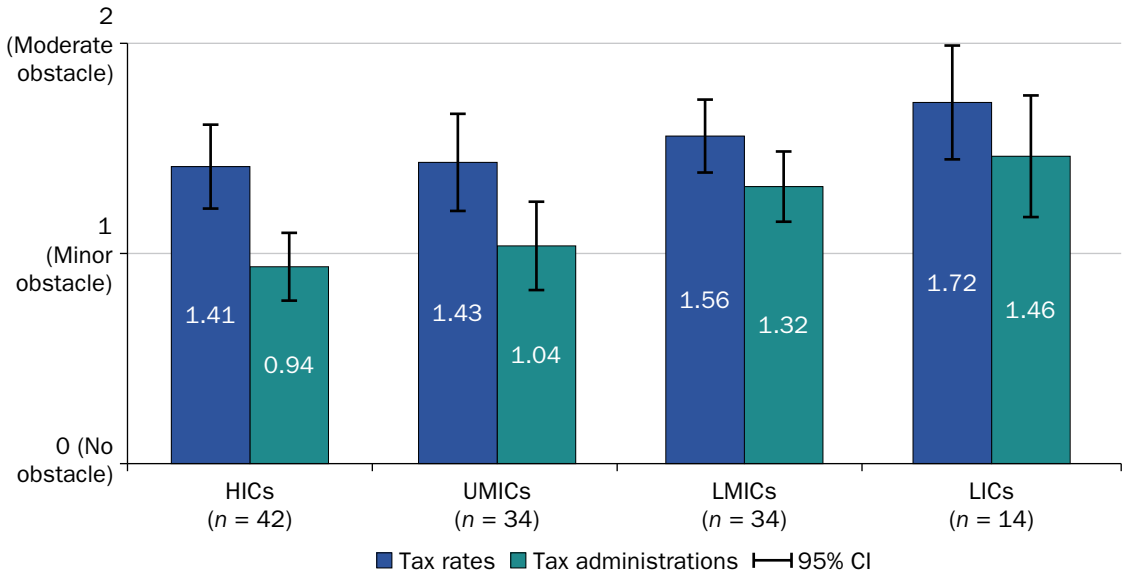
Governments seeking to boost investment can achieve significant progress simply by getting the basics right—starting with improvements in tax administration. Figure 6.6 presents businesses' self-reported assessments of the extent to which tax rates and tax administration pose obstacles to business activity across different country income groups. In LICs and LMICs, tax administration is perceived to be nearly as great an obstacle to business activity as tax rates.[31]

The reforms discussed in chapter 3 on improving tax administration through technological advances can facilitate investment and innovation. One illustrative case is South Africa, where reducing wait times for VAT refunds increased investment by 31 percent and output by 24 percent (Brusco et al. 2024).

Lesson 2: Use technology to monitor, evaluate, and adjust.

Industrial policy is a trial-and-error process, which means monitoring, evaluation, and adjustment are critical. Without it, government intervention may be ineffective, or worse, result in unintended harm. Technology can make monitoring, evaluation, and adjustment more effective.

Figure 6.6 Tax-related obstacles to business activity, 2018–25



Source: Original figure for this publication using data from the World Bank Enterprise Surveys.

Note: The figure shows average responses by income group to questions "To what degree are tax rates an obstacle to the current operations of this establishment?" and "To what degree are tax administrations an obstacle to the current operations of this establishment?" Answers can take values of 0 *(no obstacle),* 1 *(minor obstacle),* 2 *(moderate obstacle),* 3 *(major obstacle),* or 4 *(very severe obstacle)*. Respondents include medium and large firms (with 20 or more employees). Countries with a small sample of responding firms (41 or fewer) were excluded from the sample. CI = confidence interval; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; UMICs = upper-middle-income countries.

Monitoring should define clear objectives to guide program assessment (for example, investment inputs, innovation outcomes, technology adoption, and job creation), and implement the following mechanisms:

- *Regular reporting.* Ensure that recipients submit regular returns or reports to enable systematic monitoring (Granger et al. 2024).
- *Data collection and analysis.* Collect and analyze firm-level data on investment, employment, innovation, and productivity. Facilitate data sharing among tax authorities, statistical offices, and investment promotion agencies (refer to chapters 3 and 8 for examples of digital tools to track progress in real time).

Evaluation includes ex-post assessments that measure program performance and cost-effectiveness. This can be done by comparing recipient firms with similar nonrecipient firms. Qualitative feedback from firms should also be incorporated to capture implementation experiences and contextual insights.

Adjustment is necessary: A monitoring and evaluation system matters only if governments are willing to correct course. In principle, subsidies should be removed both when they fail to achieve their objectives *and* when they are no longer needed, that is, when the underlying market failure has been resolved. Failing to do so can create market distortions by slowing firm exit and preventing the entry and expansion of more productive firms.

One barrier to adjustment is administrative rigidity: Investment incentives embedded in the tax code can be difficult to amend (Cirera et al. 2020). *Sunset clauses,* which set an expiration date for an incentive unless it is renewed, can help facilitate periodic reassessment and ensure incentives remain effective and necessary (Rodrik 2004).

Lesson 3: Use greater transparency in the international tax system to improve incentives.

The evolving international tax landscape can serve as a catalyst for reform. As discussed in chapter 4, the Global Anti-Base Erosion Rules establish a 15 percent minimum ETR for multinational enterprises (MNEs) with annual revenues exceeding €750 million (OECD 2022). The reform aims to protect countries' tax bases from Base Erosion and Profit Shifting practices and prevent a "race-to-the-bottom" on CIT rates. Recent OECD country-by-country reporting data indicate that a significant number of jurisdictions have average ETRs for MNEs below 15 percent, reflecting, in part, the widespread use of investment tax incentives (OECD 2022). This presents an opportunity for countries to phase out ineffective, overly generous, or poorly targeted incentives and shift toward more efficient and equitable forms of support.

For LICs and LMICs, where profit-based incentives such as tax holidays remain prevalent (refer to figure 6.5, panel c), the case for reform is particularly strong. The evidence indicates that tax holidays are largely ineffective, are less important for investment than other factors, and carry substantial fiscal costs. Accordingly, "subsidizing foreign investors is a particularly silly policy, as it serves to transfer income from poor-country taxpayers to the pockets of shareholders in rich countries, with no compensating benefit" (Rodrik 2004, 30).

For UMICs and HICs, the priority is to continue the transition toward cost-based and hybrid incentives, which are less likely to conflict with the global minimum tax.[32] Successful implementation of these incentives will require investments in administrative capacity.

Lesson 4: Build trust through open engagement.

Industrial policy is delicate because it requires balancing collaboration with the private sector with the need to maintain trust and integrity. Dani Rodrik notes that "the task of industrial policy is as much about *eliciting information from the private sector on significant externalities and their remedies* as it is about implementing appropriate policies" (Rodrik 2004, 3). Public-private dialogues can

provide this crucial information, but to maintain trust, they must themselves be conducted transparently and openly. The erosion of trust can undermine perceptions of fairness, reduce tax morale, and weaken public support for fiscal reforms (refer to chapter 5).

Lesson 5: Build trust through fair and simple incentives.

There are at least two "low-hanging fruits" to improve the design of investment incentives:

- **Enhance access for smaller and financially constrained firms.** Efficiency and equity can be improved by simplifying application procedures and reporting requirements, providing support through dedicated agencies, and ensuring transparency and stability in incentive rules. Lessons from other contexts show that awareness and participation of smaller firms can also be increased through "proven methods of advertising and promotion," such as word of mouth, social media, and business associations (Cirera et al. 2020).
- **Reduce complexity and duplication.** Excessive or overlapping incentives can reduce effectiveness, create administrative burdens, and increase opportunities for rent-seeking (Ghazanchyan et al. 2018). Consolidating tax expenditures under the Ministry of Finance can improve coherence and fiscal management (World Bank 2024a).

Lesson 6: Weigh tradeoffs carefully.

Policy makers face three main considerations in designing incentives:

- **Fiscal cost and alternative forms of support.** Tax incentives reduce government revenue that could instead finance direct support to firms or other public investments such as infrastructure, education, and health. In some cases, direct support may be more effective at addressing firms' specific constraints and, if it spurs growth, can generate additional tax revenue over time (Juhász et al. 2023; McKenzie 2025).[33]
- **Broad-based and targeted policies.** While targeted incentives can focus support on strategic sectors or firms, they often require more administrative capacity and may be less efficient or equitable than broad-based instruments.
- **Direct and indirect costs.** Incentives can impose costs beyond their immediate fiscal cost. For example, they can shift investment toward less productive activities, distort firms' input choices, or encourage rent-seeking, reducing their overall economic benefits.

Careful attention to these issues is essential to ensure incentives are effective and fiscally sustainable. The Marginal Value of Public Funds framework provides a structured approach for assessing tradeoffs by comparing the welfare benefits generated per dollar of public spending with the economic costs of raising that revenue (refer to chapter 7).

Table 6.3 summarizes these lessons and illustrates how priorities for improving the efficiency and equity of investment tax incentives vary with countries' fundamentals and proximity to the fiscal frontier.

Table 6.3 Best practices for efficient and equitable investment tax incentives

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming:*** **Rationalize incentives, and build basic capacity.** **Current situation** • Tax holidays and incentives are widespread, poorly targeted, and costly. • Monitoring and evaluation are minimal. **Actions** • Phase out blanket tax holidays and overly generous incentives. • Invest in basic tax administration to improve the business environment. • Begin minimal monitoring and evaluation to track incentive usage and immediate outcomes.	***Capable but functional:*** **Strengthen evaluation and strategic targeting.** **Current situation** • Incentives are targeted toward specific firms and sectors and are partially monitored. • Basic evaluation mechanisms exist, but coverage may be incomplete. **Actions** • Invest heavily in monitoring and evaluation capacity. • Establish clear reporting and accountability requirements for incentive recipients. • Engage in public-private dialogues to identify sectors or firms where incentives are most needed.
Strong fundamentals	***Capable but underperforming:*** **Consolidate and sharpen incentive design.** **Current situation** • Tax incentives are targeted to some extent but often are fragmented across schemes. • Monitoring and evaluation exist in some sectors but are inconsistent. **Actions** • Introduce sunset clauses and tighter targeting criteria. • Reduce overlapping schemes, simplify rules, and improve communication to make incentives easier to access and administer. • Link incentives to measurable outcomes.	***Capable and high-performing:*** **Optimize incentives for measurable impact.** **Current situation** • Most incentives are highly targeted and integrated with broader industrial policy. • Administration of incentives is efficient, with robust monitoring and evaluation systems. **Actions** • Expand R&D-linked incentives to boost innovation. • Design incentive rules to prevent evasion, misclassification, and other forms of misuse. • Evaluate policy tradeoffs using rigorous frameworks such as the MVPF.

Source: Original table for this publication.

Note: MVPF = Marginal Value of Public Funds; R&D = research and development.

Notes

1. The IMF Environmental Taxes dataset aggregates the OECD PINE database from the tax instrument level to the country level (losing the ability to, for example, filter out taxes with inconsistent revenue reporting or highly volatile revenue) and covers slightly fewer countries.
2. Similarly, one can also define *environmental taxes* as levies on sources of environmental externalities. These can be imposed (1) upstream on the sources of pollution or inputs based on their pollution contents (for example, fossil fuels used for intermediate or final consumption), such as carbon contents of fuels; (2) downstream, directly on the pollutants or effluents, such as intensity of effluents or wastes per unit of output; and (3) on outputs or products based on their emission intensity (for example, SO_2 emissions per unit of output). This is broadly consistent with the definition for the OECD PINE database.
3. This is partly because environmental taxes are often held off-budget, which makes it more difficult to collect revenue data in a harmonized way. The political economy of off-budget policy instruments is discussed further later.
4. We do not include revenue from emissions permit auctions in this analysis. The dataset includes revenues from permit auctions only for countries under the EU ETS. For these countries, revenue from permit auctions as a share of total environmentally related revenue increases over time from 0.16 percent in 2005 to 8.43 percent in 2021.
5. While the aforementioned methods implicitly or explicitly assume exogenous technology, Acemoglu et al. (2012) consider endogenous technological change, finding that optimal policy involves a combination of carbon taxation and research subsidies to direct innovation to clean energy.
6. There are other studies with direct relevance for lower-income countries, although they do not evaluate the effect of carbon-pricing policies causally. For instance, Moszoro (2021) uses firm-level panel data spanning 19 years and 41 countries to estimate the association of public investment with job creation, finding a larger job dividend for green investments and public investments in lower-income countries. Relatedly, Montt et al. (2018) simulate local and global scenarios using a multiregion input–output database, finding that most economies would experience growth in the number of jobs, driven by the construction, manufacturing, and renewable-energy sectors. Saget et al. (2020) provide numerical simulations of the labor market effects of a transition to a net-zero economy for Latin America and the Caribbean, suggesting that 7.5 million jobs would be destroyed in the fossil fuel industry and animal-based food production, while 22.5 million new jobs would be created in agriculture, plant-based food production, renewable electricity, construction, and manufacturing. The largest driver of job creation would be the agribusiness sector.
7. Ohlendorf et al. (2021) also show that studies on the transport sector and those that consider indirect effects, demand-side adjustments of consumers, or use of lifetime income proxies are more likely to find progressive effects.
8. This means that environmental taxes may be hard to find in the central government budget statistics, but the OECD PINE data we use in this chapter would likely include them.
9. While figure 6.1 uses revenue data for 1,709 taxes in 126 countries, the earmarking information used in figure 6.2 is available for only 317 taxes in 36 countries.

10. Our findings—that LMICs earmark more and that earmarked taxes have lower revenue—are consistent with a negative correlation between earmarking and tax revenue observed across states in the United States (De Mooij and Keen 2012) and with the fact that the reliance on earmarked sources of revenue has decreased over time in today's HICs, while their revenue has increased (Bird and Jun 2005; Cashin et al. 2017; Deran 1965). We think that it is unlikely that revenue yield influences pressure to earmark rather than the other way around. Indeed, we assume that earmarking is most often part of a tax instrument from the start rather than being introduced later, but we cannot test this with the data at hand.
11. We discuss this so-called "waterbed effect," whereby incentives or regulation to reduce emissions lower the ETS price for other polluters; more information follows.
12. In addition, carbon pricing can have transboundary effects (acid rain), and effluent taxes can impact shared waterways.
13. Earlier studies find less or no evidence for carbon leakage. This is likely due to methodological shortcomings—the studies relied either on aggregate macro data or on noisy survey data—and because earlier studies focused on carbon leakage out of the European Union during a period when carbon prices were very low. For instance, Dechezleprêtre et al. (2022) find no evidence for leakage using survey data from the Carbon Disclosure Project during 2007–14. Sato and Dechezleprêtre (2015) and Naegele and Zaklan (2019) arrived at a similar conclusion with a more macro-level approach, examining the imputed carbon content of trade flows. As carbon prices have increased substantially over the years, future studies may find even stronger evidence of carbon leakage than Känzig et al. (2024).
14. At the same time, China, India, Indonesia, and Thailand have argued that the CBAMs are unfair and protectionist.
15. Based on ongoing work with Gunes Asik, Cigdem Ekiz, Verena Wiedemann, and Lucas Zavala.
16. Some of these differences in effective tariff rates arise from tariff escalation, as tariffs on finished products are higher than tariffs on inputs, which have higher emissions content. To the extent that there is an economic rationale (for example, protecting domestic industries) for higher tariffs on finished products, there may be a tradeoff between trade or industrial and environmental policy.
17. Imposing a carbon tax while reducing fuel excise taxes may not increase the effective carbon tax rate. Because energy taxes are applied not only to mitigate externalities but also to ensure energy security and revenue, many argue that other forms of carbon pricing should be added to fuel taxes. For example, the European Union has minimum energy tax requirements, and carbon pricing is in addition to those.
18. The intellectual foundations of modern industrial policy can be traced to Alexander Hamilton's *Report on Manufactures* published in 1791 (Sylla 2024), but early examples of industrial policy abound. Ancient Rome, for example, offered tax exemptions to encourage land cultivation on wastelands (Sawicki 2012). Recent literature reexamines the role of the state in the development of today's AEs, arguing state-led interventions may have played a more significant role in their growth than previously thought (refer to, for example, Juhász and Steinwender [2024] and Kelly and O'Rourke [2023] for examples from the Industrial Revolution and Lane [2025] for a more recent example from the East Asian Miracle).
19. Currently, productivity in EMDEs stands at approximately 20 percent of the AE average, while in lower-income countries, it is even lower—around 2 percent of the AE average (Dieppe 2021). *Productivity* is defined here as output per input of labor.

20. Only one country in the sample (Tajikistan, not displayed in the figure) does not report even a single investment-related tax expenditure, although the absence of reported expenditures does not necessarily imply that no incentives exist—it may reflect reporting gaps or definitional differences. Taiwan, China, was excluded from figure 6.3, panel a, due to missing GDP data; Colombia and Puerto Rico were omitted as outliers.
21. If Colombia and Puerto Rico are excluded from the sample, average tax expenditures for investment amount to 1.29 percent of GDP.
22. Importantly, these figures should not be interpreted as the potential revenue gain from eliminating tax incentives. As discussed earlier, the revenue forgone approach does not account for behavioral responses such as reduced investment or relocation, which could shrink the tax base if incentives were withdrawn.
23. Many governments considered temporary tax incentives in response to COVID-19 (IMF 2020).
24. It is worth noting that other aspects of incentive design (for example, duration and incentive base) may still be changing even when overall shares appear stable. Tax holiday durations, for example, have generally shortened over time in LMICs (Abramovsky et al. 2018; Klemm and Van Parys 2012).
25. Ideally, incentives should be designed to minimize redundancy, for example, avoiding support for investments that would have occurred even without government intervention to avoid wasting public funds, and maximize additionality, for example, supporting investments that generate positive social returns (Lach et al. 2021). Even well-designed schemes likely have some redundancy, however, which can result in overstating the true impact of incentives.
26. For this reason, we exclude discussion of evidence on special economic zones (SEZs) from this review, as SEZs typically bundle multiple preferential policies and incentives. For a discussion on the efficacy of SEZs, refer to World Bank (2017).
27. For detailed literature reviews, refer to Abramovsky et al. (2018); Appelt et al. (2019); Bond and Van Reenen (2007); Cirera et al. (2020); and Harrison and Rodríguez-Clare (2010). Refer to Appelt et al. (2019) for R&D tax incentives in particular.
28. To address this challenge, input-based measures of investment can be complemented with downstream indicators of real economic activity. For instance, in the case of R&D incentives, evaluating impacts on patents, innovation outputs, or productivity—rather than R&D spending alone—can help distinguish genuine behavioral responses from accounting adjustments.
29. While profit-based incentives also raise the after-tax return on investment, the risk of labor displacement is generally smaller, as the relative price of capital is not directly affected.
30. One way to combine the advantages of both cost- and profit-based designs is through hybrid incentives that integrate cost-based triggers with profit offsets. Such instruments may encourage investment without distorting input choices.
31. The most frequently reported obstacle to business activity in most LICs and LMICs is access to finance.
32. For example, GloBE treats refundable investment tax credits as income (OECD 2022).
33. David McKenzie notes, "I do see a tax on firm profits as part of a way to sustainably finance direct support programs, since the government will collect more tax revenue if it succeeds in spurring firm growth. In addition, governments can benefit from paying lower social benefits if these firms hire additional workers...." (McKenzie 2025, 5).

References

Abramovsky, Laura, Nicolo Bird, Tom Harris, et al. 2018. "Review of Corporate Tax Incentives for Investment in Low- and Middle-Income Countries." Institute for Fiscal Studies.

Acemoglu, Daron, Philippe Aghion, Leonardo Bursztyn, and David Hemous. 2012. "The Environment and Directed Technical Change." *American Economic Review* 102 (1): 131–66.

Acemoglu, Daron, David Autor, and Christina Patterson. 2024. "Bottlenecks: Sectoral Imbalances and the US Productivity Slowdown." *NBER Macroeconomics Annual* 38 (1): 153–207.

Adhvaryu, Achyuta, Namrata Kala, and Anant Nyshadham. 2022. "Management and Shocks to Worker Productivity." *Journal of Political Economy* 130 (1): 1–47.

Aghion, Philippe, Jing Cai, Mathias Dewatripont, et al. 2015. "Industrial Policy and Competition." *American Economic Journal: Macroeconomics* 7 (4): 1–32.

Agnolucci, Paolo, Carolyn Fischer, Dirk Heine, et al. 2023. "Measuring Total Carbon Pricing." *World Bank Research Observer* 39 (2): 227–58.

Akcigit, Ufuk, and Stefanie Stantcheva 2020. "Taxation and Innovation: What Do We Know?" NBER Working Paper 27109. National Bureau of Economic Research.

Andrews, Dan, Chiara Criscuolo, and Peter N. Gal. 2016. "The Best versus the Rest: The Global Productivity Slowdown, Divergence across Firms and the Role of Public Policy." In *The Global Forum on Productivity at 10: Past and Future Perspectives on Reviving Productivity Growth.* OECD Publishing.

Appelt, Silvia, Matěj Bajgar, Chiara Criscuolo, and Fernando Galindo-Rueda. 2025. *How Effective Are R&D Tax Incentives? Reconciling the Micro and Macro Evidence*. Centre for Economic Performance, London School of Economics and Political Science.

Appelt, Silvia, Fernando Galindo-Rueda, and Ana Cinta González Cabral. 2019. "Measuring R&D Tax Support: Findings from the New OECD R&D Tax Incentives Database." OECD Science, Technology and Industry Working Papers 2019/06. Organisation for Economic Co-operation and Development.

Bachas, Pierre, Anne Brockmeyer, Roel Dom, and Camille Semelet. 2026. "Effective Tax Rates, Firm Size and the Global Minimum Tax." *Journal of Public Economics* 261: 105721.

Banzhaf, Spencer. 2020. "A History of Pricing Pollution (Or, Why Pigouvian Taxes Are Not Necessarily Pigouvian)." NBER Working Paper 27683. National Bureau of Economic Research.

Behrer, Arnold Patrick, Rishabh Choudhary, and Dhruv Sharma. 2023. "Air Pollution Reduces Economic Activity: Evidence from India." Policy Research Working Paper 10515. World Bank.

Bento, Antonio M. 2024. "Environmental Policy and the Double Dividend Hypothesis." In *Oxford Research Encyclopedia of Environmental Science,* edited by Hank Shugart. Oxford Academic.

Bento, Antonio M., Mark R. Jacobsen, and Antung A. Liu. 2018. "Environmental Policy in the Presence of an Informal Sector." *Journal of Environmental Economics and Management* 90: 61–77.

Bird, Richard M., and Joosung Jun. 2005. "Earmarking in Theory and Korean Practice." *ITP Paper* 513 (3): 1–53.

Bond, Stephen, and John Van Reenen. 2007. "Microeconometric Models of Investment and Employment." *Handbook of Econometrics* 6: 4417–498.

Brusco, Giacomo, Marlies Piek, and Tejaswi Velayudhan. 2024. "Wait No More: How the Administration of VAT Refunds Impacts Firm Behaviour." WIDER Working Paper 58. United Nations University–World Institute for Development Economics Research.

Burlig, Fiona, Amir Jina, and Anant Sudarshan. 2026. "The Value of Clean Water: Experimental Evidence from Rural India." *American Economic Review* 116 (3): 1148–87.

Burns, Andrew, Charl Jooste, and Gregor Schwerhoff. 2021. "Climate Modeling for Macroeconomic Policy: A Case Study for Pakistan." Policy Research Working Paper 9780. World Bank.

BusinessTech. 2019. "The Tax Benefits of a Special Economic Zone." https://businesstech.co.za/news/business/299640/the-tax-benefits-of-a-special-economic-zone/.

Cai, Jing, and Adam Szeidl. 2024. "Indirect Effects of Access to Finance." *American Economic Review* 114 (8): 2308–351.

Calderón-Madrid, Angel. 2011. "A Micro-econometric Analysis of the Impact of Mexico's R&D Tax Credit Program on Private R&D Expenditure." Paper presented at the International Conference "Reduciendo la brecha: de la evidencia al impacto en las políticas públicas," Cuernavaca, Mexico, 15.

Calí, Massimiliano, Giorgio Presidente, and Thiago Scot. 2025. *The Elusive Impact of Corporate Tax Incentives*. Policy Research Working Paper 11061. World Bank.

Carattini, Stefano, Maria Carvalho, and Sam Fankhauser. 2018. "Overcoming Public Resistance to Carbon Taxes." *Wiley Interdisciplinary Reviews: Climate Change* 9 (6).

Carballo, Jerónimo, Ignacio Marra de Artiñano, and Christian Volpe Martincus. 2025. "The Impact of Investment Promotion on Multinational Production: Firm-Level Evidence." *Journal of Development Economics* 180: 103666.

Cashin, Cheryl, Susan Sparkes, and Danielle Bloom. 2017. *Earmarking for Health.* World Health Organization.

Chancel, Lucas, and Yannic Rehm. 2026. "Global Inequalities in Ownership-Based Carbon Footprints." *Nature Climate Change* 16: 781–89.

Chen, Qiaoyi, Zhao Chen, Zhikuo Liu, et al. 2025. "Regulating Conglomerates: Evidence from an Energy Conservation Program in China." *American Economic Review* 115 (2): 408–47.

Chen, Zhao, Xian Jiang, Zhikuo Liu, et al. 2023. "Tax Policy and Lumpy Investment Behaviour: Evidence from China's VAT Reform." *Review of Economic Studies* 90 (2): 634–74.

Chen, Zhao, Zhikuo Liu, Juan Carlos Suárez Serrato, and Daniel Yi Xu. 2021. "Notching R&D Investment with Corporate Income Tax Cuts in China." *American Economic Review* 111 (7): 2065–100.

Cirera, Xavier, Jaime Frias, Justin Hill, and Yanchao Li. 2020. *A Practitioner's Guide to Innovation Policy*. World Bank.

Clausing, Kimberly, Jonathan Colmer, Allan Hsiao, and Catherine Wolfram. 2025. "The Global Effects of Carbon Border Adjustment Mechanisms," NBER Working Paper 33723. National Bureau of Economic Research.

Clausing, Kimberly A., and Catherine Wolfram. 2023. "Carbon Border Adjustments, Climate Clubs, and Subsidy Races When Climate Policies Vary." *Journal of Economic Perspectives* 37 (3): 137–62.

Climate Club. 2025. "Industry on the Road to 2050: A Report Prepared for the Climate Club." Technical Report. Climate Club.

Colmer, Jonathan, Ralf Martin, Mirabelle Muûls, and Ulrich J. Wagner. 2024. "Does Pricing Carbon Mitigate Climate Change? Firm-Level Evidence from the European Union Emissions Trading System." *Review of Economic Studies* 92 (3): 1625–660.

Crespi, Gustavo, David Giuliodori, Roberto Giuliodori, and Alejandro Rodriguez. 2016. "The Effectiveness of Tax Incentives for R&D+i in Developing Countries: The Case of Argentina." *Research Policy* 45 (10): 2023–35.

Cui, Jingbo, Chunhua Wang, Zhenxuan Wang, et al. 2024. "Carbon Leakage within Firm Ownership Networks." SSRN. http://dx.doi.org/10.2139/ssrn.4696426.

Curtis, E. Mark, Daniel G. Garrett, Eric C. Ohrn, et al. 2021. *Capital Investment and Labor Demand*. NBER Working Paper 29485. National Bureau of Economic Research.

Cusolito, Ana Paula, and William F. Maloney. 2018. *Productivity Revisited: Shifting Paradigms in Analysis and Policy*. World Bank.

Damgaard, Jannick, Thomas Elkjaer, and Niels Johannesen. 2024. "What Is Real and What Is Not in the Global FDI Network?" *Journal of International Money and Finance* 140: 102971.

Dechezleprêtre, Antoine, Elias Einiö, Ralf Martin, Kieu-Trang Nguyen, and John Van Reenen. 2023. "Do Tax Incentives Increase Firm Innovation? An RD Design for R&D, Patents, and Spillovers." *American Economic Journal: Economic Policy* 15 (4): 486–521.

Dechezleprêtre, Antoine, Adrien Fabre, Tobias Kruse, et al. 2025. "Fighting Climate Change: International Attitudes toward Climate Policies." *American Economic Review* 115 (4): 1258–300.

Dechezleprêtre, Antoine, Caterina Gennaioli, Ralf Martin, et al. 2022. "Searching for Carbon Leaks in Multinational Companies." *Journal of Environmental Economics and Management* 112: 102601.

De Mooij, Ruud, and Michael Keen. 2012. "'Fiscal Devaluation' and Fiscal Consolidation: The VAT in Troubled Times." In *Fiscal Policy After the Financial Crisis*, 443–85. University of Chicago Press.

Deran, Elizabeth. 1965. "Earmarking and Expenditures: A Survey and a New Test." *National Tax Journal* 18 (4): 354–61.

De Souza, Gustavo, and Gabriel Garber. 2024. "R&D Subsidy and Import Substitution: Growing in the Shadow of Protection." Working Paper. Initiative for Policy Dialogue.

Dieppe, Alistair. 2021. *Global Productivity: Trends, Drivers, and Policies*. World Bank.

Dorband, Ira I., Michael Jakob, Matthias Kalkuhl, and Jan C. Steckel. 2019. "Poverty and Distributional Effects of Carbon Pricing in Low- and Middle-Income Countries—A Global Comparative Analysis." *World Development* 115: 246–57.

Ebenstein, Avraham, Victor Lavy, and Sefi Roth. 2016. "The Long-Run Economic Consequences of High-Stakes Examinations: Evidence from Transitory Variation in Pollution." *American Economic Journal: Applied Economics* 8 (4): 36–65.

Eichfelder, Sebastian, Martin Jacob, and Kerstin Schneider. 2023. "Do Tax Incentives Affect Investment Quality?" *Journal of Corporate Finance* 80: 102403.

Evenett, Simon, Adam Jakubik, Fernando Martín, and Michele Ruta. 2024. "The Return of Industrial Policy in Data." *World Economy* 47 (7): 2762–788.

Fernandes, Ana, and Tristan Reed. 2026. *Industrial Policy for Development: Approaches in the 21st Century.* Policy Research Reports. World Bank.

Fischer, Carolyn, and Louis Preonas. 2010. "Combining Policies for Renewable Energy: Is the Whole Less than the Sum of Its Parts?" Resources for the Future Discussion Paper 10-19.

Fischer, Carolyn, Chenfei Qu, and Lawrence H. Goulder. 2024. "Rate-Based Emissions Trading with Overlapping Policies: Insights from Theory and an Application to China." Policy Research Working Paper 10872. World Bank.

Forstater, Maya. 2017. "The Good, the Bad, and the Ugly: How Do Tax Incentives Impact Investment." https://www.cgdev.org/blog/good-bad-and-ugly-how-do-tax-incentives-impact-investment.

Garrett, Daniel G., Eric C. Ohrn, and Juan Carlos Suárez Serrato. 2020. "Tax Policy and Local Labor Market Behavior." *American Economic Review: Insights* 2 (1): 83–100.

Ghazanchyan, Manuk, Alexander D. Klemm, and Yong Sarah Zhou. 2018. "Tax Incentives in Cambodia." IMF Working Papers 71. International Monetary Fund.

Global Climate Policy Project. 2025. "Building a Climate Coalition: Aligning Carbon Pricing, Trade and Development." GCPP Working Group on Climate Coalitions.

Goulder, Lawrence H., Marc A. C. Hafstead, GyuRim Kim, and Xianling Long. 2019. "Impacts of a Carbon Tax across US Household Income Groups: What Are the Equity–Efficiency Trade-Offs?" *Journal of Public Economics* 175: 44–64.

Granger, H., K. McNabb, and D. Phillips. 2024. "Reform or Replace? Three Country Perspectives on the Use of Tax incentives for Structural Transformation." Comment. ODI Global.

Harding, Torfinn, and Beata S. Javorcik. 2011. "Roll Out the Red Carpet and They Will Come: Investment Promotion and FDI Inflows." *Economic Journal* 121 (557): 1445–476.

Harrison, Ann, and Andrès Rodríguez-Clare. 2010. "Trade, Foreign Investment, and Industrial Policy for Developing Countries." *Handbook of Development Economics* 5: 4039–214.

Heine, Dirk, and Simon Black. 2019. "Benefits Beyond Climate: Environmental Tax Reform." In *Fiscal Policies for Development and Climate Action*, edited by Miria A. Pigato. World Bank.

Horowitz, John Keith, Julie-Anne Cronin, Hannah Hawkins, et al. 2017. *Methodology for Analyzing a Carbon Tax*. US Department of the Treasury.

House, Christopher L., and Matthew D. Shapiro. 2008. "Temporary Investment Tax Incentives: Theory with Evidence from Bonus Depreciation." *American Economic Review* 98 (3): 737–68.

IMF (International Monetary Fund). 2020. "Temporary Investment Incentives." International Monetary Fund.

IMF (International Monetary Fund), OECD (Organisation for Economic Co-operation and Development), United Nations, and World Bank. 2015. "Options for Low-Income Countries' Effective and Efficient Use of Tax Incentives for Investment." A Background Paper to the Report Prepared for the G-20 Development Working Group by the IMF, OECD, United Nations, and World Bank.

IRAS (Inland Revenue Authority Singapore). 2024. "Refundable Investment Credit (RIC)." IRAS.

Juhász, Rèka, Nathan Lane, Emily Oehlsen, and Verónica C. Pèrez. 2022. "The Who, What, When, and How of Industrial Policy: A Text-Based Approach." SSRN. http://dx.doi.org/10.2139/ssrn.4198209.

Juhász, Rèka, Nathan Lane, Emily Oehlsen, and Veronica C. Perez. 2025. "Measuring Industrial Policy: A Text-Based Approach." NBER Working Paper 33895. National Bureau of Economic Research.

Juhász, Rèka, Nathan Lane, and Dani Rodrik. 2023. "The New Economics of Industrial Policy." *Annual Review of Economics* 16: 213–42.

Juhász, Rèka, and Claudia Steinwender. 2024. "Industrial Policy and the Great Divergence." *Annual Review of Economics* 16 (1): 27–54.

Känzig, Diego R., Julian Marenz, and Marcel Olbert. 2024. "Carbon Leakage to Developing Countries." SSRN. http://dx.doi.org/10.2139/ssrn.4833343.

Kelly, Morgan, and Kevin H. O'Rourke. 2023. "Industrial Policy on the Frontier: Lessons from the First Two Industrial Revolutions." UCD Centre for Economic Research Working Paper WP23/25. University College Dublin, School of Economics.

Klemm, Alexander, and Stefan Van Parys. 2012. "Empirical Evidence on the Effects of Tax Incentives." *International Tax and Public Finance* 19 (3): 393–423.

Knoll, Bodo, Nadine Riedel, Thomas Schwab, Maximilian Todtenhaupt, and Johannes Voget. 2021. "Cross-Border Effects of R&D Tax Incentives." *Research Policy* 50 (9): 104326.

KPMG. 2014. "R&D Incentives: Adding Value across ASPAC." https://assets.kpmg.com/content/dam/kpmg/pdf/2014/11/RD-incentives-adding-value-across-ASPAC-O-201410.pdf.

Kronfol, Hania, and Victor Steenbergen. 2020. *Evaluating the Costs and Benefits of Corporate Tax Incentives: Methodological Approaches and Policy Considerations.* Finance, Competitiveness and Innovation in Focus. World Bank.

Lach, Saul, Zvika Neeman, and Mark Schankerman. 2021. "Government Financing of R&D: A Mechanism Design Approach." *American Economic Journal: Microeconomics* 13 (3): 238–72.

Lane, Nathan. 2025. "Manufacturing Revolutions: Industrial Policy and Industrialization in South Korea." *Quarterly Journal of Economics* 140 (3): 1683–741.

Lerche, Adrian. 2025. "Direct and Indirect Effects of Investment Tax Incentives." *American Economic Review* 115 (8): 2781–818.

Liu, Yongzheng, and Jie Mao. 2019. "How Do Tax Incentives Affect Investment and Productivity? Firm-Level Evidence from China." *American Economic Journal: Economic Policy* 11 (3): 261–91.

Maffini, Giorgia, Jing Xing, and Michael P. Devereux. 2019. "The Impact of Investment Incentives: Evidence from UK Corporation Tax Returns." *American Economic Journal: Economic Policy* 11 (3): 361–89.

Marten, Melanie, and Kurt Van Dender. 2019. "The Use of Revenues from Carbon Pricing." *OECD Taxation Working Papers* 43: 1–67.

Martin, Ralf, Laure B. De Preux, and Ulrich J. Wagner. 2014. "The Impact of a Carbon Tax on Manufacturing: Evidence from Microdata." *Journal of Public Economics* 117: 1–14.

McKenzie, David. 2025. "Is There Still a Role for Direct Government Support to Firms in Developing Countries?" *New Zealand Economic Papers* 59 (1): 24–29.

McKenzie, David, Nabila Assaf, and Ana Paula Cusolito. 2017. "The Additionality Impact of a Matching Grant Programme for Small Firms: Experimental Evidence from Yemen." *Journal of Development Effectiveness* 9 (1): 1–14.

Mercer-Blackman, Valerie. 2008. "The Impact of Research and Development Tax Incentives on Colombia's Manufacturing Sector: What Difference Do They Make?" IMF Working Papers 178. International Monetary Fund.

Mercer-Blackman, Valerie, Lazar Milivojevic, and Victor Mylonas. 2023. "Are Carbon Taxes Good for South Asia?" Policy Research Working Paper 10462. World Bank.

Metcalf, Gilbert E. 2019. "On the Economics of a Carbon Tax for the United States." *Brookings Papers on Economic Activity* 2019 (1): 405–84.

Metcalf, Gilbert E. 2021. "Carbon Taxes in Theory and Practice." *Annual Review of Resource Economics* 13 (1): 245–65.

Metcalf, Gilbert E., and James H. Stock. 2020. "Measuring the Macroeconomic Impact of Carbon Taxes." In *AEA Papers and Proceedings*, vol. 110, 101–106. American Economic Association.

Mildenberger, Matto, Erick Lachapelle, Kathryn Harrison, and Isabelle Stadelmann-Steffen. 2022. "Limited Impacts of Carbon Tax Rebate Programmes on Public Support for Carbon Pricing." *Nature Climate Change* 12: 141–47.

Montt, Guillermo, Kirsten S. Wiebe, Marek Harsdorff, et al. 2018. "Does Climate Action Destroy Jobs? An Assessment of the Employment Implications of the 2-Degree Goal." *International Labour Review* 157 (4): 519–56.

Moreau-Kastler, Ninon, Kieran Byrne, Idann Gidron, et al. 2025. *The Corporate Taxation of Green and Brown Firms*. Working Paper.

Moszoro, Marian. 2021. "The Direct Employment Impact of Public Investment." IMF Working Papers 131. International Monetary Fund.

Mylonas, Victor, Daniele Malerba, Alexandra Campmas, et al. Forthcoming. "Distributional Impacts of Energy Excise Reform: Evidence from Around the World." Policy Notes. World Bank.

Naegele, Helene, and Aleksandar Zaklan. 2019. "Does the EU ETS Cause Carbon Leakage in European Manufacturing?" *Journal of Environmental Economics and Management* 93: 125–47.

Nordhaus, William. 2015. "Climate Clubs: Overcoming Free-Riding in International Climate Policy." *American Economic Review* 105 (4): 1339–370.

OECD (Organisation for Economic Co-operation and Development). 2015. *Frascati Manual 2015: Guidelines for Collecting and Reporting Data on Research and Experimental Development. The Measurement of Scientific, Technological and Innovation Activities*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2021. *Tax and Fiscal Policies after the COVID-19 Crisis*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2022. *Tax Incentives and the Global Minimum Corporate Tax: Reconsidering Tax Incentives after the GloBE Rules*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2023. "Income-Based Tax Relief for R&D and Innovation: An Integrated View." OECD Science, Technology and Industry Policy Papers No. 161. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2025a. "Effective Carbon Rates 2025: Recent Trends in Taxes on Energy Use and Carbon Pricing." OECD Series on Carbon Pricing and Energy Taxation. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2025b. *Towards Interoperable Carbon Intensity Metrics*. OECD Publishing.

OECD (Organisation for Economic Co-operation and Development). 2026. *Enhancing the Interoperability of Policy-Mandated Emission Monitoring, Reporting and Verification Systems.* OECD Publishing.

OECD (Organisation for Economic Co-operation and Development) and Climate Club. 2024. "Summary Report of the Strategic Dialogues on Causes and Relevance of Spillovers from Mitigation Policies." Climate Club.

Ohlendorf, Nils, Michael Jakob, Jan Christoph Minx, and Carsten Schröder. 2021. "Distributional Impacts of Carbon Pricing: A Meta-Analysis." *Environmental and Resource Economics* 78: 1–42.

Ohrn, Eric. 2018. "The Effect of Corporate Taxation on Investment and Financial Policy: Evidence from the DPAD." *American Economic Journal: Economic Policy* 10 (2): 272–301.

Ortiz, Marta, Luis Antonio López, and María Ángeles Cadarso. 2020. "EU Carbon Emissions by Multinational Enterprises under Control-Based Accounting." *Resources, Conservation and Recycling* 163: 105104.

Palomo, Theo, Davi Bhering, Thiago Scot, et al. 2025. *Tax Progressivity and Inequality in Brazil: Evidence from Integrated Administrative Data.* Report 9. EU Tax Observatory.

Perino, Grischa, Robert A. Ritz, and Arthur A. van Benthem. 2025. "Overlapping Climate Policies." *Economic Journal* 135 (671): 2122–160.

Pop, Georgiana, Mariana Iootty, Miriam Bruhn, and Claudia Ruiz Ortega. 2021. *Design for Impact: A State Aid Evaluation for Romania*. World Bank.

PwC (PricewaterhouseCoopers). 2025a. "Mozambique—Corporate—Tax Credits and Incentives." PwC.

PwC (PricewaterhouseCoopers). 2025b. "Thailand—Corporate—Deductions." PwC.

Redonda, Agustin, Christian von Haldenwang, and Flurim Aliu. 2022. "Global Tax Expenditures Database (GTED)." *Zenodo*.

Rodrik, Dani. 2004. "Industrial Policy for the Twenty-First Century." SSRN. http://dx.doi.org/10.2139/ssrn.617544.

Rodrik, Dani. 2022. "An Industrial Policy for Good Jobs." *Hamilton Project—Policy Proposal*. Brookings Institution.

Rotemberg, Martin. 2019. "Equilibrium Effects of Firm Subsidies." *American Economic Review* 109 (10): 3475–513.

Saget, Catherine, Adrien Vogt-Schilb, and Trang Luu. 2020. *Jobs in a Net-Zero Emissions Future in Latin America and the Caribbean*. International Labour Organization and Inter-American Development Bank.

Sato, Misato, and Antoine Dechezleprêtre. 2015. "Asymmetric Industrial Energy Prices and International Trade." *Energy Economics* 52: S130–41.

Sawicki, Piotr. 2012. "Remarks on Some Tax Exempts in Ancient Rome." *Studia Ceranea. Journal of the Waldemar Ceran Research Centre for the History and Culture of the Mediterranean Area and SouthEast Europe* 2: 61–73.

Schoder, Christian. 2023. "Regime-Dependent Environmental Tax Multipliers: Evidence from 75 Countries." *Journal of Environmental Economics and Policy* 12 (2): 124–67.

Schoder, Christian, and Remzi Baris Tercioglu. 2024. "A Climate-Fiscal Policy Mix to Achieve Türkiye's Net-Zero Ambition under Feasibility Constraints." *European Journal of Economics and Economic Policies* 21 (2): 331–59.

Shapiro, Joseph S. 2021. "The Environmental Bias of Trade Policy." *Quarterly Journal of Economics* 136 (2): 831–86.

Shehaj, Pranvera, and Alfons J. Weichenrieder. 2024. "Corporate Income Tax, IP Boxes and the Location of R&D." *International Tax and Public Finance* 31 (1): 203–42.

Stenzel, Andreas, and Israel Waichman. 2023. "Supply-Chain Data Sharing for Scope 3 Emissions." *npj Climate Action* 2 (1): 7.

Sterner, Thomas, ed. 2012. *Fuel Taxes and the Poor, the Distributional Effects of Gasoline Taxation and Their Implications for Climate Policy*. Resources for the Future Press.

Sulaiman, Stefanno. 2024. "Indonesia Seeks to Soften Impact of Global Minimum Corporate Tax." *Reuters*, October 4, 2024.

Sylla, Richard. 2024. "Alexander Hamilton's Report on Manufactures and Industrial Policy." *Journal of Economic Perspectives* 38 (4): 111–30.

Timilsina, Govinda R. 2022. "Carbon Taxes." *Journal of Economic Literature* 60 (4): 1456–502.

Timilsina, Govinda R., Yuanhua Chang, and Jun Pang. 2024. "Economic Impacts of Meeting China's NDC through Carbon Taxes with Alternative Schemes for Recycling Tax Revenues." *Resources, Conservation and Recycling* 207: 107696.

Timilsina, Govinda R., Yazid Dissou, Michael Toman, and Dirk Heine. 2024. "How Can a Carbon Tax Benefit Developing Economies with Informality? A CGE Analysis for Côte d'Ivoire." *Climate Policy* 24 (1): 71–86.

Timilsina, Govinda R., and Samuel Sebsibie. 2025. "How Can a Carbon Tax Be Designed to Benefit the Poor? An Investigation for Ethiopia." *Renewable and Sustainable Energy Reviews* 213: 115441.

Timilsina, Govinda R., and Samuel Sebsibie. 2026. "Energy Subsidy Removal and Carbon Taxation in Egypt: Economic and Distributional Impacts." *Energy Economics* 160: 109470.

Vigani, Mauro, and Hasan Dudu. 2021. "Demand Analysis of Multiple Goods and Services in Vietnam." Policy Research Working Paper 9803. World Bank.

Vriz, Gian Luca, Theodor Cojoianu, Carolyn Fischer, and Luca Taschini. 2025. "Early Signs the EU Carbon Border Adjustment Mechanism Is Reshaping EU–India Steel Trade." *Nature Climate Change* 16 (6). http://dx.doi.org/10.1038/s41558-026-02607-y.

Waiswa, Ronald, and Solomon Rukundo. 2023. "Strategic Investment Tax Incentives in Africa: The Case of Tax Holidays in Uganda." ICTD Working Paper 161. Institute of Development Studies.

Warwick, Ken. 2013. "Beyond Industrial Policy: Emerging Issues and New Trends." OECD Science, Technology and Industry Policy Paper 2. OECD Publishing.

Wei, Shang-Jin, Jianhuan Xu, Ge Yin, and Xiaobo Zhang. 2021. "Bureaucratic Bean Counting and Patent Subsidies: A Welfare Evaluation of China's Pro-Innovation Program." ABFER Working Paper AC21P4019. Asian Bureau of Finance and Economic Research.

Woerner, Andrej, Taisuke Imai, Davide D. Pace, and Klaus M. Schmidt. 2024. "How to Increase Public Support for Carbon Pricing with Revenue Recycling." *Nature Sustainability* 7: 1633–641.

World Bank. 2017. *Special Economic Zones: An Operational Review of Their Impacts.* World Bank.

World Bank. 2018. *Global Investment Competitiveness Report 2017/2018: Foreign Investor Perspectives and Policy Implications*. World Bank.

World Bank. 2020. *Global Investment Competitiveness Report 2019/2020: Rebuilding Investor Confidence in Times of Uncertainty*. World Bank.

World Bank. 2024a. *Democratic Republic of Congo Economic Update: Reassessing Tax Incentives—Falling Short of Promised Growth and Equity*. World Bank.

World Bank. 2024b. *The Middle Income Trap.* World Bank.

World Bank. 2025a. *Jobs in a Changing Climate: Insights from Country Climate and Development Reports (CCDRs) Covering 93 Economies.* World Bank.

World Bank. 2025b. *State and Trends of Carbon Pricing 2025.* World Bank.

World Bank 2025c. *World Bank Corporate Income Tax (CIT) Incentives Database Methodology and User Manual: A Guide to Understanding, Using, and Interacting with the World Bank CIT Incentives Database*. World Bank.

World Bank. 2026. *Hooked on Subsidies: Rising Fiscal Costs and Imperative for Reform.* World Bank.

Zuniga, Pluvia. 2024. "The Impact and Effectiveness of Innovation Policy: Evidence from Middle-Income Countries." World Bank.

Zwick, Eric, and James Mahon. 2017. "Tax Policy and Heterogeneous Investment Behavior." *American Economic Review* 107 (1): 217–48.

CHAPTER 7

How Much Tax Revenue to Collect and How? A Marginal Value of Public Funds Approach

Prepared by Katy Bergstrom and William Dodds

Introduction

Governments in emerging market and developing economies (EMDEs) face a fundamental challenge: how to raise additional tax revenue in ways that are both politically acceptable and minimally harmful to citizens' well-being. Should they raise value-added tax (VAT) rates? Increase top income tax rates? Raise corporate tax rates? And should they raise more revenue at all, given what it would be spent on?

This chapter presents a unified, practical framework for answering these questions. The framework relies on the Marginal Value of Public Funds (MVPF) developed in Hendren and Sprung-Keyser (2020) and the results on optimal policy reforms derived in Bergstrom et al. (2026). It is built around a single metric—the Welfare-Weighted Marginal Value of Public Funds (WMVPF)—which measures how much citizens' economic well-being declines for every additional US$1 of government revenue raised. Using this metric, policy makers can rank their tax instruments and select the one that raises additional revenue at the least cost to citizens' well-being. The framework not only speaks to the best way to raise additional revenue on the margin but also to whether a government should raise this revenue at all and, if it does, how best to spend it.

Just as the WMVPF identifies the least costly way to raise revenue, it also identifies the most-valuable way to spend it: The government should direct additional revenue to the spending policy with the highest WMVPF, which yields the greatest welfare gain per dollar spent. Raising additional revenue is worthwhile only if the WMVPF of that spending exceeds that of the tax used to finance it; otherwise, the welfare cost of taxation exceeds the welfare benefit of spending. Box 7.1 summarizes the key takeaways of the WMVPF framework and its implications for decisions about raising and spending additional revenue.

The chapter proceeds in four parts. First, it introduces the WMVPF framework and the intuition behind differences across tax instruments. Second, it applies the framework to three common reforms—raising VAT, top personal income tax (PIT), and corporate income tax (CIT) rates—using examples from Indonesia and Mexico. Third, it shows how the framework determines both *whether* governments should raise additional revenue and *how* it should be allocated. Finally, it explains why estimating a single "optimal tax-to-gross domestic product (GDP) ratio" is difficult in practice and why the WMVPF's focus on marginal reforms is more tractable and actionable.

Box 7.1 Key takeaways on the marginal value of public funds

- This chapter focuses on *marginal reforms*—how best to raise (or spend) a small amount of government revenue—rather than attempting to identify an optimal tax level.
- When raising a small amount of additional tax revenue, always choose the tax instrument with the lowest Welfare-Weighted Marginal Value of Public Funds (WMVPF): It imposes the lowest welfare cost per dollar raised.
- A tax instrument's WMVPF depends on several factors, including who bears the tax burden *(distributional incidence),* how strongly people change their behavior in response *(tax elasticities),* and the current tax rate.
- Whether to raise additional revenue depends on what it will fund: Doing so is welfare-improving only if the funded spending program has a higher WMVPF than the tax used to finance it. The same framework also identifies the best use of additional revenue.
- Estimating an optimal tax-to-gross domestic product ratio is difficult in practice, requiring many tenuous assumptions. Even if it could be estimated, the optimum would depend on country-specific factors—such as informality, preferences for redistribution, and institutional quality—so no single benchmark would apply across countries.

The WMVPF framework: Choosing how to raise revenue

This section introduces the WMVPF framework for comparing alternative ways of raising additional revenue. It first develops the intuition behind the metric and then examines the key factors that determine a tax instrument's WMVPF, providing a practical basis for identifying which tax instrument raises revenue at the lowest welfare cost.

The core idea

Raising taxes almost always reduces citizens' welfare: People prefer to keep their money rather than hand it to the government. The question is, therefore, not *whether* taxes reduce welfare but *by how much per dollar raised*. This is precisely what the WMVPF measures.

WMVPF. For a given tax instrument i, the WMVPF measures the decline in citizens' economic well-being per additional US$1 of revenue raised:

$$\text{WMVPF}_i = \frac{\text{Decline in aggregate welfare}}{\text{Increase in government revenue}} = \bar{\omega}_i \text{MVPF}_i \qquad \text{(E7.1)}.$$

A lower WMVPF means the tax raises revenue at lower welfare cost. The government should, therefore, choose the tax with the lowest WMVPF.

At its core, the WMVPF for a given tax instrument i is simply the product of an incidence-weighted welfare weight, $\bar{\omega}i$—which captures society's relative concern for those bearing the tax burden of instrument i—and the MVPF (Hendren and Sprung-Keyser 2020), which measures aggregate willingness-to-pay (WTP) to avoid the tax change relative to the revenue raised (refer to annex 7A for formal definitions).

A simple example. Suppose economists estimate that raising Mexico's VAT rate has a WMVPF of 0.77, while increasing the top income tax rate has a WMVPF of 0.02. This means that for every additional US$1 raised via the VAT, citizen welfare declines by US$0.77, but, for every US$1 raised by increasing the top income tax rate, welfare declines by only US$0.02. If the government wants to raise additional revenue, increasing the top income tax rate is superior to raising the VAT.

What determines a tax instrument's WMVPF?

Several factors drive the WMVPF of any tax instrument:

1. **Who bears the burden (distributional incidence)?** The framework assumes that governments place a higher value on improving the welfare of poorer households relative to richer ones—a normative judgment that is standard in distributional cost–benefit analysis. This distributional dimension is captured by an incidence-weighted welfare weight ($\bar{\omega}$), which is larger when the tax burden falls on lower-income groups (typically estimated from household survey data as described in annex 7A, in the section "Measuring the Change in Welfare: ΔW_i"). A tax that falls mainly on poor households, therefore, carries a *higher* welfare weight and, in turn, a *higher* WMVPF (all else equal).
2. **Behavioral responses (tax elasticities).** When taxes rise, households and firms change their behavior—for example, consuming less, reporting lower incomes, or shifting profits offshore. These behavioral responses erode the tax base, meaning the government collects less revenue than a mechanical calculation would suggest. The size of these responses can be measured using tax elasticities, which capture the percentage of change in tax-related outcomes (for example, reported labor income, formal sector consumption, or reported profits) relative to a percentage change in the tax rate (or net-of-tax rate). Larger elasticities, therefore, raise the WMVPF, making a given tax instrument more costly to use. Empirical estimates of these elasticities—from quasi-experimental research exploiting past tax reforms—are a critical input into any WMVPF calculation.
3. **The existing tax rate.** For a given elasticity, the higher the existing tax rate, the more costly behavioral responses become to the government. The reason is that a higher existing rate amplifies the revenue cost of behavioral responses: When the tax rate is already high, each unit of base erosion (for example, each dollar of consumption shifted to the informal sector) costs the government more in lost revenue, because that base was being taxed at a higher rate. This makes the net revenue gain from a further rate increase smaller, and, therefore, the welfare cost per dollar raised larger, pushing the WMVPF up. At the extreme, if a tax rate *already exceeds* its revenue-maximizing ("Laffer") rate, behavioral responses are so costly that raising the rate further actually *reduces* revenue. In this case, *lowering* the rate raises revenue while also reducing the burden on taxpayers—yielding a negative WMVPF. Lowering such a rate is, therefore, always preferable to raising any positive-WMVPF tax.

Box 7.2 translates these considerations into a practical set of steps for using the WMVPF to compare tax instruments and identify how to raise additional revenue.

Box 7.2 How to use the WMVPF in practice

1. Identify available tax instruments (for example, value-added tax rate, top income tax rate, corporate tax rate).
2. For each instrument, estimate its Welfare-Weighted Marginal Value of Public Funds (WMVPF) using household- or firm-level data to measure distributional incidence, quasi-experimental elasticity estimates from prior tax reforms, and the current tax rate from the tax code.
3. Rank instruments by WMVPF from lowest to highest.
4. Raise revenue using the instrument with the *lowest* WMVPF. If that WMVPF is negative (the rate already exceeds its Laffer peak), lower that rate to raise revenue.

Calculating WMVPFs: Three tax policy examples

This section derives the WMVPF for three core tax instruments: the VAT rate, the top income tax rate, and the CIT rate. For each, the required data inputs and key formula are summarized—with full derivations provided in annex 7A—alongside illustrative estimates for two countries. Two simplifying assumptions apply throughout: Cross-tax-base effects are set to zero (for example, raising the VAT is assumed to not affect corporate tax revenue), and the tax change's welfare and revenue impacts grow at the same rate over time, so that only *current-year* estimates are needed (refer to further discussion in annex 7A in the section "Dynamic Considerations: Permanent Tax Rate Changes").

VAT

What drives the VAT WMVPF? The *VAT* is a broad-based consumption tax on formal sector transactions. Under the assumptions made in this section, its WMVPF depends on three objects:

- **Distributional incidence ($\bar{\omega}_{VAT}$):** Who buys goods and services in the formal sector? In many low- and middle-income countries, informal sector consumption is disproportionately concentrated among poorer households (Bachas et al. 2024), meaning the VAT is borne more heavily by middle-income and upper-income households. This tends to *lower* the welfare weight—and, therefore, the WMVPF—relative to taxes that fall purely on the poor.
- **Formal sector consumption elasticity (ε_{VAT}):** When VAT rates rise, some households shift spending to the informal sector. A larger shift means a more eroded tax base and a higher WMVPF. The formal sector consumption elasticity, ε_{VAT}, captures the percentage change in average formal sector consumption when $(1 + t_{VAT})$ increases by 1 percent, where t_{VAT} denotes the VAT rate. This number is typically negative (that is, formal sector consumption

declines when the consumption tax rate increases). A larger absolute value of $\varepsilon_{VAT,}$ therefore, raises the VAT's WMVPF, making it a more costly way to raise additional revenue.

- **Existing VAT rate (t_{VAT}):** Higher existing rates amplify the revenue cost of behavioral responses—each unit of base erosion costs the government more in lost revenue when the rate is already high—leaving less room before reaching the revenue-maximizing ("Laffer") rate.

The resulting formula (derived in annex 7A, in the section "WMVPF Formula: Value-Added Tax") is[1]

$$\text{WMVPF}_{VAT} = \bar{\omega}_{VAT} \times \frac{1}{1 + \varepsilon_{VAT} \frac{t_{VAT}}{1 + t_{VAT}}} \quad \text{(E7.2).}$$

Data requirements. To calculate the VAT WMVPF, practitioners need

- Household survey data on per capita consumption and formal sector consumption (to estimate $\bar{\omega}_{VAT}$);
- An estimate of the elasticity of formal consumption with respect to the VAT rate (ε_{VAT}), ideally from a quasi-experimental study exploiting a prior VAT reform; and
- The current VAT rate (from the tax code).

Box 7.3 illustrates the WMVPF framework applied to Mexico, showing how these inputs can be combined to evaluate an increase in the VAT rate.

Box 7.3 Raising the VAT rate in Mexico

Using Bachas et al. (2024)'s informality Engel curves for Mexico—which describe how informal sector consumption varies with household per capita consumption—together with Mexico's per capita consumption distribution, the welfare weight is estimated at $\bar{\omega}_{VAT} \approx 0.61$ (refer to annex 7A, in the section "Calculating Welfare Weights for VAT Using Informality Engel Curves"). Welfare weights are normalized such that, if all incidence fell on households with median per capita consumption, the welfare weight for the given tax policy would be exactly 1 (refer to annex 7A). Thus, a value below 1 indicates that the incidence falls more heavily on higher-consumption households—unsurprising given that formal sector consumption is concentrated among higher-income households. Bachas et al. (2024) also estimate a formal consumption elasticity of $\varepsilon_{VAT} = -1.5$, reflecting significant informal sector substitution. With Mexico's 16 percent VAT rate, the Welfare-Weighted Marginal Value of Public Funds of raising the VAT equals 0.77—each additional US$1 raised via the VAT reduces welfare by US$0.77.

Top income tax rate

What drives the top income tax WMVPF? The top income tax targets the highest earners. Its WMVPF depends on the following:

- **Distributional incidence ($\bar{\omega}_{TTR}$):** Top earners have high incomes; society typically places a low welfare weight on giving them additional money. A lower welfare weight pushes the WMVPF down (all else equal), making raising additional revenue through top income taxes more appealing.
- **Elasticity of taxable income (ε_{TTR}):** High-income earners can reduce their reported income through avoidance, evasion, or reduced work effort. The elasticity of taxable income, ε_{TTR}, captures the percentage change in average top incomes when the net-of-tax rate (or "keep rate"), $1 - t_{TTR}$, increases by 1 percent—in other words, how responsive top earners are to changes in the tax rate. A higher elasticity means top earners are more responsive, leading to greater base erosion and a higher WMVPF, making the top income tax a more costly way to raise revenue.
- **Existing top income tax rate (t_{TTR}):** As with the VAT, a higher existing rate amplifies the revenue cost of behavioral responses—because each dollar of income that goes unreported costs the government more in lost revenue when the rate is already high. A higher existing rate, therefore, raises the WMVPF, making it more costly to raise additional revenue through the top income tax, all else equal.
- **Thickness of the right tail of the income distribution (Pareto parameter):** The Pareto parameter measures the thickness of the top income distribution. A thicker right tail means a larger base, making each rate increase more lucrative and the WMVPF lower.

The resulting formula (derived in annex 7A, in the section "WMVPF Formula: Top Income Tax Rate") is

$$\text{WMVPF}_{TTR} = \bar{\omega}_{TTR} \times \frac{1}{1 - \varepsilon_{TTR} \frac{t_{TTR}}{1 - t_{TTR}} \times \frac{\bar{y}}{\bar{y} - b}} \qquad \text{(E7.3)},$$

where $\bar{y}$ is the mean taxable income in the top bracket, b is the top bracket threshold, and $\bar{y}/(\bar{y} - b)$ is the Pareto parameter.

Data requirements. To calculate the top income tax WMVPF, practitioners need

- Data on the distribution of taxable incomes for top earners along with the distribution of per capita consumption (or per capita income) for the top earners (to estimate $\bar{\omega}_{TTR}$);

- An estimate of the taxable income elasticity (ε_{TTR}), ideally from a quasi-experimental study exploiting a prior top income tax reform; and
- The current top tax rate (t_{TTR}) along with the location of the top income tax bracket and average taxable incomes in the top bracket (to calculate the Pareto parameter).

Box 7.4 illustrates the WMVPF framework applied to Mexico, showing how these inputs can be combined to evaluate an increase in the top PIT rate.

Box 7.4 Raising the top personal income tax rate in Mexico

The welfare weight on top earners is low—annex 7A, section "Calculating $\bar{\omega}_{TTR}$ for Mexico," calculates $\bar{\omega}_{TTR} \approx 0.013$ for Mexico, reflecting the fact that society places little value on giving money to the highest earners (because welfare weights are normalized, if all incidence fell on households with median per capita consumption, the welfare weight would be 1; thus, a welfare weight much lower than 1 indicates incidence is falling on households with per capita consumption much higher than the median). Vázquez and Martínez (2016) estimate a taxable income elasticity of $\varepsilon_{TTR} = 0.53$ and a Pareto parameter of the income distribution of 1.6. At a top rate of 35 percent, this yields a Welfare-Weighted Marginal Value of Public Funds (WMVPF) of 0.02—each additional US$1 raised via the top income tax reduces welfare by just US$0.02. This is much lower than the VAT's WMVPF of 0.77, pointing toward raising additional revenue via increasing the top income tax rate over the VAT.

CIT

What drives the CIT WMVPF? The CIT is a tax on corporate profits. Its WMVPF depends on the following:

- **Distributional incidence ($\bar{\omega}_{CIT}$):** Firm owners typically have above-average incomes, implying low welfare weights. In some contexts, part of the burden also falls on workers through lower wages (Fuest et al. 2018; Serrato and Zidar 2016), affecting the relevant welfare weight (refer to the section "WMVPF for Raising CIT Rates When Wages Are Impacted" in annex 7A).
- **Taxable profit elasticity (ε_{CIT}):** Firms can reduce reported profits through avoidance or changes to real activity. The elasticity of taxable profits, ε_{CIT}, measures the percentage change in average taxable profits when there is a 1 percent increase in the net-of-CIT tax rate. A higher elasticity means firm owners are more responsive, leading to greater base erosion and a higher WMVPF, making the CIT a more costly way to raise revenue.

- **Existing CIT rate (t_{CIT}):** As with the VAT and top income tax rate, a higher existing CIT rate amplifies the revenue cost of behavioral responses, because each dollar of profit that goes unreported costs the government more in lost revenue when the rate is already high. A higher existing rate therefore raises the CIT's WMVPF.

The resulting formula (derived in annex 7A, in the section "WMVPF Formula: Corporate Income Tax") is[2]

$$\text{WMVPF}_{CIT} = \frac{\bar{\omega}_{CIT}}{1 - \varepsilon_{CIT} \dfrac{t_{CIT}}{1 - t_{CIT}}} \qquad \text{(E7.4).}$$

Data requirements. To calculate the CIT WMVPF, practitioners need

- Data on the distribution of taxable firm profits along with the per capita consumption of affected firm owners (to estimate $\bar{\omega}_{CIT}$);
- An estimate of the taxable profit elasticity (ε_{CIT}), ideally from a quasi-experimental study; and
- The current CIT rate.

Box 7.5 applies the WMVPF framework to Indonesia, comparing improved tax administration and an increase in the top CIT rate as alternative ways to raise additional revenue.

Box 7.5 Improved tax administration versus raising the CIT rate in Indonesia

While this chapter has so far focused on calculating Welfare-Weighted Marginal Values of Public Funds (WMVPFs) for tax rate changes, WMVPFs can be calculated for any policy reform. Basri et al. (2021) explore the revenue impacts of a tax administration reform in Indonesia that assigned medium-size firms to new medium taxpayer offices (MTOs) with much higher staff-to-taxpayer ratios. They then compare these findings to the revenue impacts of raising the corporate income tax (CIT) rate. Using their results, one can calculate the WMVPFs of both the MTO reform and raising the CIT rate to assess which policy is more effective at raising additional government revenue.

Administrative reform. Basri et al. (2021) estimate that the MTO reform increased tax revenues by IDR 520 million per year per affected taxpayer and cost the government IDR 8 million per year per affected taxpayer. Assuming the impacted firm owners' willingness to pay (WTP) to

(Continued)

Box 7.5 Improved tax administration versus raising the CIT rate in Indonesia *(continued)*

avoid this reform is equal to the additional taxes they remit,[a] the decline in welfare from this reform is $\bar{\omega}_{\text{MTO}} \times 520 \times N$, where $\bar{\omega}_{\text{MTO}}$ is the welfare weight society places on the impacted firm owners, and N is the number of impacted firm owners. The revenue gain from this reform is IDR $(520 - 8) \times N$ million. Thus, the WMVPF of the MTO reform is

$$\text{WMVPF}_{\text{MTO}} = \bar{\omega}_{\text{MTO}} \frac{520 \times N}{(520 - 8) \times N} = 1.02\ \bar{\omega}_{\text{MTO}} \qquad \text{(E.B7.5.1).}$$

Raising the top CIT rate. The WMVPF for raising the CIT rate derived above assumed a flat CIT rate. If the CIT schedule is progressive, the WMVPF of raising the top CIT rate is

$$\text{WMVPF}_{\text{topCIT}} = \bar{\omega}_{\text{topCIT}} \frac{1}{1 - \epsilon_{\text{topCIT}} \frac{t_{\text{topCIT}}}{1 - t_{\text{topCIT}}} \frac{\bar{\pi}}{\bar{\pi} - b}} = 1.49\ \bar{\omega}_{\text{topCIT}} \qquad \text{(E.B7.5.2),}$$

where $\bar{\pi}$ represents average taxable profits for those in the top CIT bracket, b is the taxable profit threshold for the top CIT rate, ϵ_{topCIT} is the elasticity of the firm's taxable profits to an increase in the net of the tax top CIT rate, and $\bar{\omega}_{\text{topCIT}}$ denotes the (incidence-weighted) welfare weight placed on firms in the top CIT bracket. Basri et al. (2021) note that the top CIT rate is 30 percent (that is, $t_{\text{topCIT}} = 0.3$) and estimate that $\frac{\bar{\pi}}{\bar{\pi} - b} = 1.33$ and $\epsilon_{\text{topCIT}} = 0.58$. Thus, the WMVPF of raising the top CIT rate equals $1.49\bar{\omega}_{\text{topCIT}}$.

To compare these two revenue instruments, we must assess the relative welfare weights of the taxpayers affected, $\bar{\omega}_{\text{MTO}}$ and $\bar{\omega}_{\text{topCIT}}$. As the set of firms assigned to MTO offices have similar levels of taxable corporate income to firms in the top tax bracket, it is reasonable to assume that $\bar{\omega}_{\text{MTO}} \approx \bar{\omega}_{\text{topCIT}}$. In other words, welfare declines by 1.02 $\bar{\omega}_{\text{MTO}}$ when an additional US$1 of revenue is raised by increasing tax administration spending on medium-size firms, whereas welfare declines by 1.49 $\bar{\omega}_{\text{MTO}}$ when an additional US$1 of revenue is raised by increasing top CIT rates. In this context, **investing in the tax administration appears to be a superior way to raise additional revenue compared to raising the top CIT rate.**

a. Basri et al. (2021) suggest that the increased staff-to-taxpayer ratio may reduce the cost of complying with taxes, in which case affected firms may be willing to pay less than IDR 520 million to avoid this reform, because they value the reduced compliance costs. This would lower the WMVPF estimate for the medium taxpayer office (MTO) reform, making it a more desirable revenue-raising policy.

Should a government raise additional revenue at all?

Thus far, this chapter has focused on determining the best way for a government to raise a small amount of additional tax revenue. The next natural step is to determine whether a government should actually raise this additional tax revenue at all. To do this, it is necessary to know on what the additional tax revenue will be spent. Fortunately, the same WMVPF framework applies directly to spending programs: For a given spending policy p, the WMVPF measures the welfare gain to citizens per dollar of government expenditure. A higher WMVPF on the spending side is better—each dollar spent generates more welfare.

The Revenue Decision Rule. Raising additional tax revenue (using the lowest-WMVPF tax instrument) and spending it on program p **improves welfare** if and only if

$$\underbrace{\text{WMVPF(spending program } p)}_{\text{welfare gain per \$1 spent}} > \underbrace{\text{WMVPF(best tax instrument)}}_{\text{welfare cost per \$1 raised}} \qquad \text{(E7.5)}.$$

If this condition does not hold, the government should not raise additional tax revenue (or should seek a more valuable spending program).

More generally, if the government has flexibility over what to spend additional revenue on, it should choose the spending program with the highest WMVPF—the mirror image of choosing the tax instrument with the lowest WMVPF.

Box 7.6 applies this decision rule to Mexico, comparing the welfare cost of raising additional tax revenue with the welfare gains from using it to fund a street-paving project.

Box 7.6 Raising tax revenue in Mexico to fund a street-paving project

Ardanaz et al. (2020) study a street-paving program in urban Mexico. At a government cost of MXN 11.3 million, the program raised home values by MXN 12.3 million. Assuming that only homeowners on the relevant streets benefit from this project (in reality, those who live nearby will likely benefit), the increase in aggregate welfare from this program is

$$\text{MXN } 12.3 \times \bar{\omega}_{\text{paving}} \text{ million} \qquad \text{(E.B7.6.1)},$$

where $\bar{\omega}_{\text{paving}}$ represents the welfare weight society places on the affected homeowners. Ardanaz et al. (2020) show that affected homeowners have an average per capita monthly consumption of MXN 1,045, whereas median per capita monthly consumption in Mexico around the same time

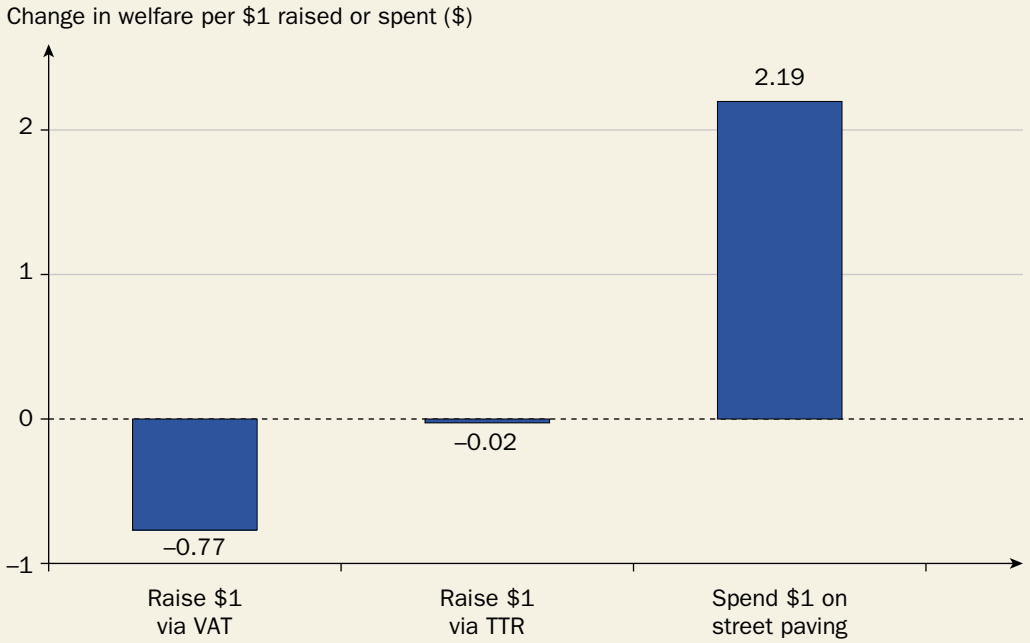
(Continued)

Box 7.6 Raising tax revenue in Mexico to fund a street-paving project *(continued)*

was MXN 2,104 (calculated from Mexico's 2008 National Survey of Household Income and Expenditure). A back-of-the-envelope calculation for $\bar{\omega}_{\text{paving}}$ is 2,104/1,045 = 2.[a] Thus, the Welfare-Weighted Marginal Value of Public Funds (WMVPF) for this street paving project is 2 × 12.3/11.3 = 2.19—each peso spent generates MXN 2.19 of welfare.

Compare this to the WMVPF of raising the top income tax rate in Mexico: 0.02. Because 2.19 ≫ 0.02, the decision rule strongly favors raising the top income tax rate at the margin to fund street paving. Figure B7.6.1 illustrates this comparison: The welfare loss from the tax is negligible compared to the welfare gain from the spending. Now suppose the Mexican government instead raised the additional revenue via the value-added tax rate. This would still be welfare-improving because 2.19 > 0.77; however, the net welfare gain would be smaller than in the scenario where revenue is raised via the top income tax rate.

Figure B7.6.1 Welfare change from two revenue-raising policies and one spending policy in Mexico



Source: Original figure for this publication.

Note: TTR = top personal income tax rate; VAT = value-added tax.

a. This estimate uses equation 7A.7 in annex 7A, setting $\gamma = 1$, while further assuming that affected households are homogeneous in terms of their per capita consumption.

Moving away from optimal tax-to-GDP ratios

Based on the information in the section "Should a Government Raise Additional Revenue at All?" raising additional tax revenue is welfare-improving as long as the tax policy's WMVPF is lower than the WMVPF of the policy on which this tax revenue will be spent. More generally, a government should continue to adjust both tax and spending until the WMVPFs of all policies are the same. At this point, the amount of tax revenue raised is optimal. In theory, one can find this optimal tax revenue level or, equivalently, the optimal tax-to-GDP ratio, by conducting a series of optimal reforms (refer to Bergstrom et al. [2026] for a more thorough discussion): (1) raise a small amount of additional government revenue using the policy with the lowest WMVPF and spend that additional revenue on the policy with the highest WMVPF; (2) recalculate policy WMVPFs; and (3) repeat steps 1 and 2 until all WMVPFs across spending and tax policies are the same. It is essential to recalculate policy WMVPFs after each reform, as they will change with the economy's levels of taxation and spending. For example, the welfare benefits of increased education spending would be expected to decline as more revenue is spent on education. Furthermore, as the earlier expressions show, as the level of the tax rate changes, the cost of behavioral responses changes, thus changing WMVPF estimates.

Although this iterative procedure can, in principle, be used to determine the optimal tax-to-GDP ratio, it is neither direct nor practical. This raises a natural question: Is there a more direct way to determine the optimal tax-to-GDP ratio? Several approaches have been—or could be—proposed, as outlined later. Each, however, relies on strong and often untestable assumptions. For this reason, this chapter argues against targeting an optimal tax-to-GDP ratio and instead advocates a marginal fiscal approach, for which the WMVPF framework is specifically designed.

Methods to estimate an optimal tax-to-GDP ratio and why it is so difficult

Structural approach: One could estimate the optimal tax-to-GDP ratio by making structural assumptions and then calibrating a complex model (for example, a Ramsey tax model with many different linear tax rates and elasticities calibrated to existing estimates). This approach is advantageous insofar as it allows computing of optimal tax schedules and, in turn, an optimal tax-to-GDP ratio. However, it relies on much stronger assumptions than the incremental tax reform approach discussed earlier, regarding individual preferences, firm cost functions, and population heterogeneity.

Reduced-form approach: Alternatively, one could take an empirical approach and estimate the optimal tax-to-GDP ratio using cross-country regressions, where the optimal ratio is modeled as a function of observable country-level characteristics. This approach, however, faces several fundamental drawbacks.

First, the dependent variable—the optimal tax-to-GDP ratio—is unobservable, as few, if any, countries are likely to operate at their optimum. A common workaround is to assume that governments maximize tax revenue, treating the revenue-maximizing tax-to-GDP ratio as the optimum. Under this assumption, observed tax-to-GDP ratios are necessarily below the optimum, allowing the dependent variable to be bounded. This is the approach adopted in the tax-effort literature (refer to Glenday et al. [2019], Mawejje and Sebudde [2019], and McNabb et al. [2021]). However, the assumption is difficult to justify. If the marginal benefits of public spending decline while the marginal costs of raising revenue increase, the socially optimal tax-to-GDP ratio could easily be below the revenue-maximizing level.

Second, even if the revenue-maximizing ratio were an adequate proxy, reduced-form cross-country regressions face well-known econometric challenges. Omitted variable bias is a major concern, as many relevant country characteristics are unobserved, measured imperfectly, or available only for a subset of countries, and the appropriate functional form is often unclear. Key features of the tax system itself—such as statutory tax rates, thresholds, and exemptions—are also frequently omitted. Reverse causality further complicates interpretation. For example, is a country's tax-to-GDP ratio low because corruption is high, or is corruption high because limited tax revenue constrains the government's ability to monitor public officials? Disentangling these causal relationships in a cross-country setting is exceedingly difficult.

Finally, and perhaps most importantly, even if these econometric challenges could be overcome, the results of such regressions would be of limited practical use. At best, they can inform policy makers whether a country is below its estimated tax capacity and by how much, but they say nothing about *which* tax instruments to adjust or in which direction. This is precisely the guidance that the WMVPF framework is designed to provide.

Minimum tax-to-GDP thresholds: A closely related literature seeks to empirically estimate a minimum tax-to-GDP ratio required for accelerated economic growth and development (Choudhary et al. 2024; Gaspar et al. 2016). This literature has converged on the view that a minimum threshold of around 15 percent is necessary. However, this conclusion rests on two strong assumptions: first, that a well-defined tipping point between taxation and growth exists, and second, that this tipping point is the same across countries. Even if such a tipping point were to exist, it would almost certainly vary across countries based on deeper structural characteristics.

On the cost side, the degree of informality shapes how strongly households and firms respond to taxation: For example, a country with a large informal sector will face greater base erosion for any given tax increase, making revenue-raising more costly. On the benefit side, the return to additional government spending depends on the quality of public institutions:

Where corruption is high, a greater share of each additional dollar of public expenditure is likely wasted, reducing the welfare gains from raising additional revenue. As both the costs and benefits of taxation are, in part, driven by structural factors that differ markedly across countries, a single minimum threshold is unlikely to be informative for any particular country. Moreover, the welfare gains from additional spending vary with societal preferences for redistribution, which vary across countries.

Why marginal reforms are more tractable

The WMVPF framework sidesteps some of these difficulties by focusing on *incremental* reforms rather than optimal levels of taxation. This approach has several advantages:

- **Testable assumptions.** The assumptions underlying WMVPF estimates (such as zero cross-tax-base effects) can, in principle, be tested with data. In contrast, many of the assumptions underlying optimal tax-to-GDP ratio calculations cannot.
- **Actionable guidance.** WMVPF calculations tell governments not only whether to raise or lower taxes but precisely which tax to adjust and in which direction.
- **Country-specific calibration.** WMVPFs are computed using country-specific data on incidence, elasticities, and welfare weights—automatically capturing the features that make optimal ratios country-specific.
- **Feasible data requirements.** While still demanding, WMVPF estimation relies on household surveys, administrative tax data, and quasi-experimental elasticity estimates that are increasingly available in low- and middle-income countries.

Estimating WMVPFs for tax policies requires credible estimates of behavioral responses, ideally from quasi-experimental variation and administrative data. As tax data improve across EMDEs, this is becoming increasingly feasible. In the meantime, practitioners can rely on estimates from comparable settings and report sensitivity analyses. Because the WMVPF framework is relatively new, further work is needed to expand the evidence base, test key assumptions, and assess robustness. More fundamentally, WMVPFs are most informative for incremental reforms; when considering major tax reforms or entirely new instruments, their reliance on local approximations may be less suitable, highlighting the need for frameworks tailored to large-scale policy changes.

The bottom line. Rather than pursuing a target tax-to-GDP ratio, governments should focus on whether each proposed tax or spending reform improves welfare at the margin. A systematic application of the WMVPF framework—ranking tax instruments by their welfare cost and spending programs by their welfare benefit—will, over time, move any government toward a better fiscal position, regardless of where the optimal ratio ultimately lies.

Annex 7A The Welfare-Weighted Marginal Value of Public Funds

Formal definition

This section develops the formal definition of the WMVPF, beginning with the basic setup and then deriving its welfare and revenue components. It concludes by showing how the framework can be extended to account for the dynamic effects of permanent tax changes.

Setup and notation

Suppose the government has K tax rates $t_1, t_2, \ldots, t_K$ available. Government tax revenue is

$$R = \sum_{i=1}^{K} t_i \, \text{TaxBase}_i \qquad \text{(E7A.1)},$$

where TaxBase_i is the tax base associated with rate t_i (for example, total formal sector consumption for a VAT, or taxable income in a bracket for an income tax).[3]

Now suppose that the government previously estimated that changing tax rate t_i by some small amount generated a decrease in welfare (well-being) of ΔW_i and raised ΔR_i dollars of revenue (refer to a later discussion on how to mathematically calculate ΔW_i and ΔR_i). Dividing the observed decrease in welfare ΔW_i by the increase in revenue ΔR_i provides a measure of the decrease in well-being incurred for each US$1 of revenue raised by changing tax rate t_i, otherwise referred to as the *WMVPF*.[4] Formally, the welfare-weighted marginal value of public funds for changing tax rate t_i by a small amount, WMVPF_i, is calculated as follows:

$$\text{WMVPF}_i = \frac{\Delta W_i}{\Delta R_i} \qquad \text{(E7A.2)},$$

where ΔW_i measures the decline in economic well-being from this tax change, and ΔR_i measures the increase in government revenue from this tax change. In other words, WMVPF_i measures the decline in welfare for each additional US$1 raised from changing tax rate t_i.

The WMVPF is closely connected to the MVPF recently popularized by Hendren and Sprung-Keyser (2020). The section "Measuring the Change in Welfare: ΔW_i" illustrates that ΔW_i measures households' cumulative WTP to avoid the change in tax rate t_i multiplied by a welfare weight, $\bar{\omega}_i$, which captures society's relative preference to redistribute toward those affected by this change in t_i. Hence, WMVPF_i can be expressed as this welfare weight multiplied by the MVPF of changing tax rate t_i:

$$\text{WMVPF}_i = \bar{\omega}_i \text{MVPF}_i \qquad \text{(E7A.3)}.$$

Measuring the change in welfare: ΔW_i

Suppose that changing tax rate t_i will affect N households. To assess the welfare impact of such a tax change, one needs to determine how much each of these N households is financially hurt by this policy. Specifically, it is necessary to estimate how much each household $n = 1, 2, \ldots, N$ would be willing to pay to hypothetically *avoid* the change to tax rate t_i, $\text{WTP}_{i,n}$.[5] Then,

$$\Delta W_i = \sum_{n=1}^{N} \omega_n \text{WTP}_{i,n} \equiv \bar{\omega}_i \sum_{n=1}^{n} \text{WTP}_{i,n} \quad \text{(E7A.4)},$$

where ω_n are weights that capture society's relative valuation of giving money to household n, and $\bar{\omega}_i$ denotes the (incidence-weighted) average weight the government places across the N households affected by changing tax rate t_i. In particular,

$$\bar{\omega}_i = \frac{\sum_{n=1}^{N} \text{WTP}_{i,n} \omega_n}{\sum_{n=1}^{N} \text{WTP}_{i,n}} \quad \text{(E7A.5)}.$$

If WTP is constant across the N households, then $\bar{\omega}_i$ is simply the unweighted average across the N households:

$$\bar{\omega}_i = \frac{1}{N} \sum_{n=1}^{N} \omega_n \quad \text{(E7A.6)}.$$

ω_n is larger for households to which the government cares more about giving money (for example, poor households), and ω_n is smaller for households to which the government cares less about giving money (for example, wealthy households). How, in practice, should a government determine sensible weights ω_n? One approach is to set weights based on the following equation:

$$\omega_n = \left(\frac{c_{\text{med}}}{c_n} \right)^{\gamma} \quad \text{(E7A.7)},$$

where c_n denotes per capita consumption for household n, and the weights are normalized so that the welfare impact of giving US$1 to a household with median per capita consumption, c_{med}, equals 1. In other words, ω_n captures the weight the government places on giving US$1 to household n relative to giving US$1 to a household with median per capita consumption.

Governments already use the weights given by equation 7A.7 for distributional cost–benefit analysis: The US Office of Management and Budget recommends that government agencies use equation 7A.7 with $\gamma = 1.4$, while the UK Treasury recommends that $\gamma = 1.3$ (refer to HM Treasury 2022; Office of Management and Budget 2023). A higher value of γ implies more progressive weights (that is, a lower weight placed on higher-consumption households).

Several studies have attempted to determine an appropriate value for γ. For instance, Chetty (2006) and Layard et al. (2008) estimate the extent to which higher-consumption households value receiving an extra dollar relative to low-consumption households, finding $\gamma \approx 1$ and $\gamma \approx 1.26$, respectively. Capozza and Srinivasan (2024) directly elicit how much individuals value giving US$1 extra to high- versus low-consumption households in the United States and find $\gamma \approx 0.45$. Very few (quasi)experimental studies have been conducted in low- and middle-income countries to assess γ. However, one of these studies—Bergstrom and Dodds (2023)—estimates $\gamma \approx 1.6$ in rural Mexico. Ultimately, more research is needed, especially in low- and middle-income countries, to assess societal preferences for redistribution. In the meantime, governments might consider estimating WMVPFs under a few alternative values of γ to see how sensitive policy recommendations are to these values. For simplicity, throughout the chapter, we assume household weights are given by equation 7A.7 with $\gamma = 1$.

The next component needed to estimate ΔW_i is each affected household's WTP to avoid the change in the tax rate t_i. Under standard assumptions, a household's WTP can be calculated as the increase in its tax payments, *holding its behavior constant*.[6] For example, the WTP for household n to avoid an increase in the consumption tax rate t_i is simply its level of formal sector consumption under the original consumption tax multiplied by the increase in the consumption tax rate. Hence, under standard assumptions, one can calculate the WTP for a tax change simply by calculating the impact on taxes owed by each household, *ignoring changes in household behavior*.

Measuring the change in government revenue: ΔR_i

The change in revenue ΔR_i captures the increase in revenue from changing tax rate t_i by a small amount and comprises two different effects: mechanical effects and fiscal externalities. *Mechanical effects* measure the revenue change that results from changing tax rates while holding household and firm behavior constant. *Fiscal externalities* measure the change in revenue when households and firms change their behavior through, for example, evasion, avoidance, or real responses, as a result of the policy change. Such changes in behavior can alter the size of different tax bases and, in turn, the amount of tax revenue.

More generally, the change in revenue from a small change in tax rate t_i can be expressed as follows, where tax base TaxBase_j is associated with tax rate t_j[7]:

$$\Delta R_i = \underbrace{\Delta t_i \text{TaxBase}_i}_{\text{mechanical effect}} + \underbrace{t_i \Delta \text{TaxBase}_i}_{\text{own-base fiscal externality}} + \underbrace{\sum_{j \neq i}^{K} t_j \Delta \text{TaxBase}_j}_{\text{cross-base fiscal externalities}} \quad \text{(E7A.8)}.$$

The mechanical effect is comparatively easy to estimate: Only the size of the (proposed) tax change and the size of the existing tax base are necessary. Usually the "own-base fiscal externality" for tax rate i, $t_i\Delta\text{TaxBase}_i$, is the next easiest to calculate, because it only requires estimating the *causal* impact of changing tax rate i on its own tax base (that is, the amount TaxBase_i changes as a result of increasing t_i). Economists have estimated how tax bases change with own-tax rates for a variety of different tax policies in both developed and developing countries. The most-difficult components to estimate are the "cross-base fiscal externalities," $t_j\Delta\text{TaxBase}_j$ for $j \neq i$. Practitioners usually need to assume that some tax bases associated with other tax rates will not change with t_i; otherwise the set of empirical objects to be estimated will quickly become unmanageable.

Dynamic considerations: Permanent tax rate changes

For permanent tax changes, the WMVPF should in principle account for all future welfare and revenue impacts. Under the following three conditions,

- The household discount rate equals the government borrowing rate,
- Welfare and revenue impacts grow at the same constant annual rate, and
- Welfare weights are time-invariant

The net present value (NPV)-weighted WMVPF collapses to the ratio of current-year impacts:

$$\text{WMVPF}_i = \frac{\Delta W_{i,0}}{\Delta R_{i,0}} \qquad \text{(E7A.9)}.$$

This simplification is used throughout the main text. Below we derive this result, and in doing so, also show how to calculate the WMVPF before imposing these three conditions.

To determine the WMVPF of a permanent tax rate change, consider a permanent change to tax rate t_i today. Normalize the current year to $s = 0$, and let the impact on government revenue in year s be given by

$$\Delta R_{i,s} = \Delta t_i \text{TaxBase}_{i,s} + \sum_{j=1}^{K} t_j \Delta \text{TaxBase}_{j,s} \qquad \text{(E7A.10)},$$

where $\text{TaxBase}_{i,s}$ denotes the size of the tax base associated with tax rate t_i in year s, and $\Delta\text{TaxBase}_{j,s}$ denotes how much tax base j changes in year s when there is a permanent increase in t_i by Δt_i.

The expected impact on government revenue in NPV from this permanent tax rate change is given by

$$\Delta R_i = \sum_{s=0}^{\infty} \frac{\mathbb{E}[\Delta R_{i,s}]}{(1+r)^s} = \sum_{s=0}^{\infty} \frac{\Delta t_i \mathbb{E}\left[\text{TaxBase}_{i,s}\right] + \sum_{j=1}^{K} t_j \mathbb{E}\left[\Delta \text{TaxBase}_{j,s}\right]}{(1+r)^s} \quad \text{(E7A.11)},$$

where r denotes the annual borrowing rate for the government, assuming that this is known (this can be relaxed).

Next, let $\epsilon_{j,i,s}$ measure the percentage change in value of tax base j in period s that results from a permanent 1 percent increase in $1 - t_i$ today:

$$\epsilon_{j,i,s} = \frac{\partial \text{TaxBase}_{j,s}}{\partial (1-t_i)} \frac{(1-t_i)}{\text{TaxBase}_{j,s}} \quad \text{(E7A.12)}.$$

The impact of changing t_i by Δt_i on tax base j in year s is

$$\mathbb{E}\left[\Delta \text{TaxBase}_{j,s}\right] \approx -\mathbb{E}\left[\epsilon_{j,i,s} \text{TaxBase}_{j,s}\right] \frac{\Delta t_i}{1-t_i} \quad \text{(E7A.13)}.$$

We can rewrite ΔR_i as

$$\Delta R_i = \sum_{s=0}^{\infty} \frac{\Delta t_i \mathbb{E}\left[\text{TaxBase}_{i,s}\right] - \sum_{j=1}^{K} t_j \mathbb{E}\left[\epsilon_{j,i,s} \text{TaxBase}_{j,s}\right] \frac{\Delta t_i}{1-t_i}}{(1+r)^s} \quad \text{(E7A.14)}.$$

Next, let $\text{WTP}_{n,s}$ denote how much household n is willing to pay in year s to avoid the permanent tax increase of t_i. Let $\omega_{n,s}$ denote the expected value society will place on giving US$1 to household n in year s (for example, $\omega_{n,s}$ captures the expected value society will place on giving US$1 to household n in year s relative to giving US$1 to a household with median per capita consumption in year s).

The expected impact on welfare is represented by

$$\Delta W_i = \sum_{s=0}^{S} \delta^s \Delta W_{i,s} = \sum_{s=0}^{S} \delta^s \sum_{n=1}^{N} \omega_{n,s} \mathbb{E}[\text{WTP}_{n,s}] \quad \text{(E7A.15)},$$

where δ is the rate at which households discount across years, assuming this is constant across households (this can be relaxed). Thus, the WMVPF is given by

$$\text{WMVPF}_i = \frac{\sum_{s=0}^{S}\sum_{n=1}^{N}\delta^s\omega_{n,s}\mathbb{E}[\text{WTP}_{n,s}]}{\sum_{s=0}^{\infty}\frac{\Delta t_i\mathbb{E}[\text{TaxBase}_{i,s}]-\sum_{j=1}^{K}t_j\mathbb{E}\left[\epsilon_{j,i,s}\text{TaxBase}_{j,s}\right]\frac{\Delta t_j}{1-t_j}}{(1+r)^s}} \quad \text{(E7A.16)}.$$

Next, suppose that $\delta=\frac{1}{1+r}$, the expected annual aggregate WTP and the expected annual revenue effect are expected to grow at some constant annual rate $1 + g$, and $\omega_{n,s} = \omega_{n,0}\,\forall n, s$. Then, using the properties of a geometric series, the WMVPF collapses to

$$\begin{aligned}\text{WMVPF}_i &= \frac{\frac{1-[(1+g)\delta]^{S+1}}{1-[(1+g)\delta]}\sum_{n=1}^{N}\omega_{n,0}\text{WTP}_{n,0}}{\frac{1-[(1+g)\delta]^{S+1}}{1-[(1+g)\delta]}\left[\Delta t_i\text{TaxBase}_{i,0}-\sum_{j=1}^{K}t_j\epsilon_{j,i}\text{TaxBase}_{j,0}\frac{\Delta t_i}{1-t_i}\right]}\\ &= \frac{\sum_{n=1}^{N}\omega_{n,0}\text{WTP}_{n,0}}{\Delta t_i\ \text{TaxBase}_{i,0}-\sum_{j=1}^{K}t_j\epsilon_{j,i}\text{TaxBase}_{j,0}\frac{\Delta t_i}{1-t_i}} \quad \text{(E7A.17)}\\ &= \frac{\Delta W_{i,0}}{\Delta R_{i,0}}\end{aligned}$$

WMVPF formula: VAT

This section derives the WMVPF for a change in the VAT rate under two alternative assumptions about the extent to which the tax is passed through to consumer prices.

Full pass-through case

Under full pass-through, a change in the VAT rate is fully reflected in consumer prices, leaving firms' pre-tax prices unchanged. The following derivation considers the resulting effects on government revenue and household welfare.

Change in tax revenue: ΔR_{VAT}

Suppose there are N households, each with annual formal sector spending C_n^f.[8] The VAT tax base is

$$\text{TaxBase}_{\text{VAT}} = \sum_{n=1}^{N} C_n^f = N\overline{C}^f \quad \text{(E7A.18)},$$

where $\overline{C}^f$ denotes average household formal sector consumption (excluding VAT taxes paid). Considering a VAT tax rate change of Δt_{VAT} and assuming no cross-base fiscal externalities, the impact on contemporaneous government revenue equals

$$\Delta R_{\text{VAT}} = \Delta t_{\text{VAT}} N\overline{C}^f + t_{\text{VAT}} N\Delta\overline{C}^f \quad \text{(E7A.19)}.$$

The first term, *mechanical effect,* captures the change in tax revenue that results from raising t_{VAT} by Δt_{VAT}, holding formal sector consumption constant. The second term, *fiscal externality,* captures the tax revenue change that results from households adjusting their formal sector consumption in response to the higher consumption tax rate. To measure the change in formal sector consumption, one can use the latter's elasticity with respect to the tax rate, ϵ_{VAT}, defined as follows:

$$\epsilon_{VAT} = \frac{\%\Delta \bar{C}^f}{\%\Delta(1 + t_{VAT})} \quad \text{(E7A.20).}$$

This elasticity captures the percentage change in average formal sector consumption when $(1 + t_{VAT})$ increases by 1 percent. Using this elasticity, the change in contemporaneous tax revenue can be expressed as

$$\Delta R_{VAT} = \Delta t_{VAT} N\bar{C}^f + \epsilon_{VAT} \frac{t_{VAT}}{1 + t_{VAT}} \Delta t_{VAT} N\bar{C}^f \quad \text{(E7A.21).}$$

Change in welfare: ΔW_{VAT}

To assess the change in welfare from increasing the VAT, it is necessary to understand who bears the incidence of the tax increase. Suppose that the increase in the VAT tax is fully passed through onto formal sector after-tax prices so that firm pre-tax prices remain unchanged by the tax change. Under this assumption, household n is willing to pay $\Delta t_{VAT} C_n^f$ in the current year to avoid the tax change. Suppose the weight the government places on giving household n an additional US$1 in the current year is equal to ω_n. Then the contemporaneous change in welfare due to increasing the consumption tax by Δt_{VAT} is

$$\Delta W_{VAT} = \sum_{n=1}^{N} \omega_n \Delta t_{VAT} C_n^f \equiv \bar{\omega}_{VAT} \Delta t_{VAT} N\bar{C}^f \quad \text{(E7A.22),}$$

where $\bar{\omega}_{VAT} = \frac{1}{N}\sum_{n=1}^{N} \omega_n C_n^f / \bar{C}^f$ captures the incidence-weighted welfare weight across all households.

Putting it all together: WMVPF_{VAT}

Under the assumptions of this section, the WMVPF of raising the VAT by Δt_{VAT} is given by

$$\text{WMVPF}_{VAT} = \bar{\omega}_{VAT} \frac{1}{1 + \epsilon_{VAT} \frac{t_{VAT}}{1 + t_{VAT}}} \quad \text{(E7A.23).}$$

Limited pass-through

This section illustrates how to calculate the WMVPF for a change in the VAT rate when this change has limited pass-through into prices. For simplicity, suppose there is just one formal sector good consumed, and p denotes the price of the good (exclusive of the VAT) under the original rate t_{VAT}. Let Q_n^f denote the quantity in units that household n is purchasing. Thus, $C_n^f = pQ_n^f$.

$$\text{TaxBase}_{\text{VAT}} = \sum_{n=1}^{N} pQ_n^f = \sum_{n=1}^{N} C_n^f = N\overline{C}^f \tag{E7A.24}$$

The impact on government revenue from raising t_{VAT} by Δt_{VAT} is now

$$\Delta R_{\text{VAT}} = \Delta t_{\text{VAT}} N\overline{C}^f + t_{\text{VAT}} \left(N \frac{d\overline{C}^f}{dt_{\text{VAT}}} \right) \Delta t_{\text{VAT}} \tag{E7A.25}$$

Noting that ϵ_{VAT} captures the percentage change in $\overline{C}^f$ in response to a 1 percent change in $1 + t_{\text{VAT}}$, accounting for the fact that changes in t_{VAT} impact both p and $\bar{Q}^f$, one gets

$$\Delta R_{\text{VAT}} = \left(1 + \frac{t_{\text{VAT}}}{1 + t_{\text{VAT}}} \epsilon_{\text{VAT}} \right) \Delta t_{\text{VAT}} NC^f \tag{E7A.26}$$

To determine the welfare impact, household n's WTP to avoid this reform is now

$$\begin{aligned} \text{WTP}_{i,n} &= \left(pQ_n^f + (1 + t_{\text{VAT}})\, Q_n^f \frac{dp}{dt_{\text{VAT}}} \right) \Delta t_{\text{VAT}} \\ &= \left(C_n^f + (1 + t_{\text{VAT}})\, C_n^f \left(\eta_{\text{VAT}} - \frac{1}{1 + t_{\text{VAT}}} \right) \right) \Delta t_{\text{VAT}} \\ &= C_n^f \eta_{\text{VAT}} (1 + t_{\text{VAT}}) \Delta t_{\text{VAT}} \end{aligned} \tag{E7A.27}$$

where η_{VAT} is the semi-elasticity of formal sector prices with respect to the VAT rate:

$$\eta_{\text{VAT}} = \frac{dp(1 + t_{\text{VAT}})}{d(1 + t)} \frac{1}{p(1 + t_{\text{VAT}})} = \frac{1}{1 + t_{\text{VAT}}} + \frac{1}{p} \frac{dp}{dt_{\text{VAT}}} \tag{E7A.28}$$

noting that, with limited pass-through, p changes with t_{VAT}.

Meanwhile, firm owner m has WTP to avoid this reform equal to his decline in profits, holding production decisions constant:

$$\begin{aligned} \mathrm{WTP}_{i,m} &= -q_m^f \frac{dp}{dt_{\mathrm{VAT}}} \Delta t_{\mathrm{VAT}} \\ &= -q_m^f \left(\eta_{\mathrm{VAT}} p - \frac{p}{1 + t_{\mathrm{VAT}}} \right) \Delta t_{\mathrm{VAT}} \end{aligned} \tag{E7A.29},$$

where q_m^f is how much firm owner m produces, whereby market clearing $\sum_m q_m^f = \sum_n Q_n^f$. Thus, the change in welfare is given by

$$\begin{aligned} \Delta W_i &= \sum_{n=1}^{N} \omega_n \mathrm{WTP}_{i,n} + \sum_{m=1}^{M} \omega_m \mathrm{WTP}_{i,m} \\ &= \bar{\omega}_{\mathrm{VAT}}^{\mathrm{hhs}} \sum_{n=1}^{N} \mathrm{WTP}_{i,n} + \bar{\omega}_{\mathrm{VAT}}^{\mathrm{firms}} \sum_{m=1}^{M} \mathrm{WTP}_{i,m} \\ &= \bar{\omega}_{\mathrm{VAT}} \left(\sum_{n=1}^{N} \mathrm{WTP}_{i,n} + \sum_{m=1}^{M} \mathrm{WTP}_{i,m} \right) \\ &= \bar{\omega}_{\mathrm{VAT}} \left(\eta_{\mathrm{VAT}} t_{\mathrm{VAT}} + \frac{1}{1 + t_{\mathrm{VAT}}} \right) \Delta t_{\mathrm{VAT}} N \bar{C}^f \end{aligned} \tag{E7A.30},$$

where

$$\bar{\omega}_{\mathrm{VAT}}^{\mathrm{hhs}} = \frac{\sum_{n=1}^{N} \omega_n \mathrm{WTP}_{i,n}}{\sum_{n=1}^{N} \mathrm{WTP}_{i,n}} \tag{E7A.31}$$

(recall n indexes households),

$$\bar{\omega}_{\mathrm{VAT}}^{\mathrm{firms}} = \frac{\sum_{m=1}^{M} \omega_m \mathrm{WTP}_{i,m}}{\sum_{m=1}^{M} \mathrm{WTP}_{i,m}} \tag{E7A.32}$$

(recall m indexes firms), and

$$\bar{\omega}_{\mathrm{VAT}} = \frac{\bar{\omega}_{\mathrm{VAT}}^{\mathrm{hhs}} \sum_{n=1}^{N} \mathrm{WTP}_{i,n} + \bar{\omega}_{\mathrm{VAT}}^{\mathrm{firms}} \sum_{m=1}^{M} \mathrm{WTP}_{i,m}}{\sum_{n=1}^{N} \mathrm{WTP}_{i,n} + \sum_{m=1}^{M} \mathrm{WTP}_{i,m}} \tag{E7A.33}$$

is the average welfare weight across affected households and firm owners weighted by their WTP to avoid raising the VAT rate. Putting this all together, the WMVPF of raising the VAT with limited pass-through is

$$\mathrm{WMVPF}_{\mathrm{VAT}} = \bar{\omega}_{\mathrm{VAT}} \frac{\eta_{\mathrm{VAT}} t_{\mathrm{VAT}} + \frac{1}{1 + t_{\mathrm{VAT}}}}{1 + \frac{t_{\mathrm{VAT}}}{1 + t_{\mathrm{VAT}}} \epsilon_{\mathrm{VAT}}} \tag{E7A.34}.$$

WMVPF formula: Top income tax rate

This section derives the WMVPF for an increase in the top income tax rate by considering its effects on government revenue and household welfare.

Change in government tax revenue: ΔR_{TTR}

Suppose that there are N households in the top income tax bracket, and each of these households has a taxable income of y_n. The top tax bracket starts at income level b. Hence, the tax base for the top income tax equals

$$\text{TaxBase}_{\text{TTR}} = \sum_{n=1}^{N} (y_n - b) = N(\bar{y} - b) \qquad \text{(E7A.35)},$$

where $\bar{y}$ denotes average taxable income of households within the top bracket. Under the assumption that there are no cross-base fiscal externalities, the impact of raising the top tax rate (TTR) by Δt_{TTR} on contemporaneous government revenue is given by

$$\Delta R_{\text{TTR}} = \underbrace{\Delta t_{\text{TTR}} N(\bar{y} - b)}_{\text{Mechanical Effect}} + \underbrace{t_{\text{TTR}} N \Delta \bar{y}}_{\text{Fiscal Externality}} \qquad \text{(E7A.36)}.$$

In this case, the mechanical effect represents the change in tax revenue that results from raising t_{TTR} by Δt_{TTR}, holding the incomes of those in this tax bracket constant. However, a second effect that arises from increasing the top income tax rate is that households report less income to the government—either because they choose to work less or misreport more—because the cost of reporting an additional US$1 of income has increased. This behavioral effect generates a fiscal externality, because the average reported incomes of those in the top bracket decline. To estimate the fiscal externality, it is useful to define the elasticity of (top) taxable income, ϵ_{TTR}, with respect to the keep rate, $1 - t_{\text{TTR}}$, which captures the percentage change in average top incomes that results when the keep rate increases by 1 percent:

$$\epsilon_{\text{TTR}} = \frac{\%\Delta \bar{y}}{\%\Delta(1 - t_{\text{TTR}})} \qquad \text{(E7A.37)}.$$

Using this definition, ΔR_{TTR} can be rewritten as

$$\Delta R_{\text{TTR}} = \Delta t_{\text{TTR}} N(\bar{y} - b) - \epsilon_{\text{TTR}} \frac{t_{\text{TTR}}}{1 - t_{\text{TTR}}} \Delta t_{\text{TTR}} N \bar{y} \qquad \text{(E7A.38)}.$$

Change in welfare: ΔW_{TTR}

To calculate the change in welfare from increasing the TTR, one needs to determine how much each household in the top tax bracket would be willing to pay to avoid the increase in the tax. A household with taxable income y_n has to pay $\Delta t_{\text{TTR}}(y_n - b)$ additional dollars (ignoring their behavioral responses to the tax change); hence, this household would be willing to pay up to $\Delta t_{\text{TTR}}(y_n - b)$ to avoid this tax change. Thus,

$$\Delta W_{\text{TTR}} = \sum_{n=1}^{N} \omega_n \Delta t_{\text{TTR}}(y_n - b) = \bar{\omega}_{\text{TTR}} \Delta t_{\text{TTR}} N (\bar{y} - b) \quad \text{(E7A.39)},$$

where

$$\bar{\omega}_{\text{TTR}} = \tfrac{1}{N} \textstyle\sum_{n=1}^{N} \omega_n (y_n - b) / (\bar{y} - b) \quad \text{(E7A.40)}$$

is the average welfare weight across all households in the top tax bracket weighted by their WTP to avoid the tax increase.

Putting it all together: $\text{WMVPF}_{\text{TTR}}$

Under the assumptions of this section, the WMVPF of raising the top income tax rate by Δt_{TTR} is given by the following equation:

$$\text{WMVPF}_{\text{TTR}} = \bar{\omega}_{\text{TTR}} \frac{1}{1 - \epsilon_{\text{TTR}} \frac{t_{\text{TTR}}}{1 - t_{\text{TTR}}} \frac{\bar{y}}{\bar{y} - b}} \quad \text{(E7A.41)}.$$

Calculating $\bar{\omega}_{\text{TTR}}$ for Mexico

In Mexico, income taxes are levied at the individual level. Suppose that the distribution of individual incomes for those earning above the top bracket of b is approximately Pareto distributed.

Then,

$$\bar{\omega}_{\text{TTR}} = \frac{\int_b^{\infty} \omega(z)(z - b) f(z)\, dz}{\int_b^{\infty} (z - b) f(z)\, dz} \quad \text{(E7A.42)}$$

where $f(z) = \frac{\alpha b^{\alpha}}{z^{\alpha+1}}$ denotes the Pareto density with Pareto parameter α, and $\omega(z)$ is the welfare weight placed on individuals earning income z. For simplicity, assume that individual

consumption is equal to individual income, so that $\omega(z) = \left(\frac{z_{med}}{z}\right)^{\gamma}$, where z_{med} is median earnings across all individuals in Mexico (refer to equation 7A.7).

For Mexico, Vázquez and Martínez (2016) estimate a Pareto parameter of $\alpha = 1.6$. Moreover, the top income tax bracket starts at b = MXN 4,511,707.38 in 2025 (refer to https://taxsummaries.pwc.com/mexico/individual/taxes-on-personal-income). Median individual income is assumed to be the same as average gross national income (GNI) per capita in 2024 for Mexico, which equals US$12,800 (current USD) (refer to World Bank Development Indicators, https://data.worldbank.org/indicator/NY.GNP.PCAP.CD?locations=MX). This is approximately MXN 254,720 (using an exchange rate of US$1 = MXN 19.9 for 2025), and γ is set to 1, consistent with Chetty (2006). Plugging these values into equation E7A.42 obtains $\bar{\omega}_{\text{TTR}} = 0.013$.

WMVPF formula: CIT

This section derives the WMVPF for an increase in the CIT rate, beginning with a baseline case and then considering how the formula changes when the reform affects the turnover tax base or workers' wages.

Baseline case

The baseline case assumes that an increase in the CIT rate affects only the CIT tax base and that firm owners bear the full incidence of the tax increase. The derivation considers the resulting effects on government revenue and welfare.

Change in government tax revenue: ΔR_{CIT}

Suppose there are N firms in an economy whose profit tax liability is higher than their turnover tax (TOT) liability. The tax base for the profit tax is given by

$$\text{TaxBase}_{\text{CIT}} = \sum_{n=1}^{N} \pi_n = N\bar{\pi} \qquad \text{(E7A.43)},$$

where π_n denotes taxable profits of firm n = 1, 2, ..., N, and $\bar{\pi}$ denotes average profits of firms subject to the CIT. Under the assumption that raising the CIT tax only impacts the CIT tax base, the impact of raising t_{CIT} by a small amount Δt_{CIT} on contemporaneous government revenue is given by[2]

$$\Delta R_{\text{CIT}} = \underbrace{\Delta t_{\text{CIT}} N\bar{\pi}}_{\text{Mechanical Effect}} + \underbrace{t_{\text{CIT}} N\Delta\bar{\pi}}_{\text{Fiscal Externality}} \qquad \text{(E7A.44)}.$$

To measure the fiscal externality, it is useful to define the elasticity of taxable profits with respect to the net-of-CIT-tax rate, $1 - t_{\text{CIT}}$, which captures the percentage change in average taxable profits when there is a 1 percent increase in the net-of-CIT-tax rate:

$$\epsilon_{\text{CIT}} = \frac{\%\Delta\bar{\pi}}{\%\Delta(1 - t_{\text{CIT}})} \tag{E7A.45}.$$

Using this elasticity, the contemporaneous increase in government revenue from an increase in t_{CIT} can be expressed as

$$\Delta R_{\text{CIT}} = \Delta t_{\text{CIT}} N\bar{\pi} - \epsilon_{\text{CIT}} \frac{t_{\text{CIT}}}{1 - t_{\text{CIT}}} \Delta t_{\text{CIT}} N\bar{\pi} \tag{E7A.46}.$$

Change in welfare: ΔW_{CIT}

To estimate the change in welfare due to a CIT increase, it is assumed that firm owners bear the full incidence of the increase in the profit tax. This assumption is relaxed in the section "WMVPF for Raising CIT Rates When Wages Are Impacted," where employees of the affected firms bear some of the incidence via reduced wages, which is consistent with findings in Germany and the United States (refer to Fuest et al. [2018] and Serrato and Zidar [2016]). Under this assumption, each firm owner with taxable profit π_n would be willing to pay up to $\Delta t_{\text{CIT}} \pi_n$ to avoid this tax change. Thus,

$$\Delta W_{\text{CIT}} = \sum_{n=1}^{N} \omega_n \Delta t_{\text{CIT}} \pi_n = \bar{\omega}_{\text{CIT}} \Delta t_{\text{CIT}} N\bar{\pi} \tag{E7A.47},$$

where

$$\bar{\omega}_{\text{CIT}} = \frac{1}{N} \sum_{n=1}^{N} \omega_n \pi_n / \bar{\pi} \tag{E7A.48}$$

is the average welfare weight across the affected firm owners weighted by their WTP to avoid the CIT rate hike.

Putting it all together: $\text{WMPVF}_{\text{CIT}}$

Under the assumptions of this section, the WMVPF for raising the CIT rate by Δt_{CIT} is given by

$$\text{WMVPF}_{\text{CIT}} = \frac{\bar{\omega}_{\text{CIT}}}{1 - \epsilon_{\text{CIT}} \frac{t_{\text{CIT}}}{1 - t_{\text{CIT}}}} \tag{E7A.49}.$$

WMVPF for raising CIT rates with turnover tax base effects

This section illustrates how to compute the WMVPF for raising CIT rates when there are a nonnegligible number of firms shifting from paying the CIT to paying the TOT in response to an increase in the CIT rate.

Suppose there are N firms in the economy. The tax base for the profit tax is given by

$$\text{TaxBase}_{\text{CIT}} = \sum_{n=1}^{N} \pi_n = N\bar{\pi} \tag{E7A.50},$$

where π_n denotes taxable profits of firm $n = 1, 2, \ldots, N$, and $\bar{\pi}$ denotes average taxable profits. Importantly, note that π_n is zero for firms that are not subject to CIT. Similarly, the tax base for the TOT is defined as

$$\text{TaxBase}_{\text{TOT}} = \sum_{n=1}^{N} y_n = N\bar{y} \tag{E7A.51},$$

where y_n denotes taxable turnover of firm $n = 1, 2, \ldots, N$, and $\bar{y}$ denotes the average taxable turnover. Again, y_n is zero for firms that are not subject to the TOT. Assuming that raising the CIT only affects the CIT and TOT tax bases, the impact of raising t_{CIT} by a small amount Δt_{CIT} on contemporaneous government revenue is given by

$$\Delta R_{\text{CIT}} = \underbrace{\Delta t_{\text{CIT}} N\bar{\pi}}_{\text{Mechanical Effect}} + \underbrace{t_{\text{CIT}} N\Delta\bar{\pi} + t_{\text{TOT}} N\Delta\bar{y}}_{\text{Fiscal Externality}} \tag{E7A.52}.$$

Next, by defining two elasticities:

$$\epsilon_{\text{CIT}} = \frac{\%\Delta\bar{\pi}}{\%\Delta(1 - t_{\text{CIT}})} \tag{E7A.53) and}$$

$$\epsilon_{\text{TOT}} = \frac{\%\Delta\bar{y}}{\%\Delta(1 - t_{\text{CIT}})} \tag{E7A.54},$$

the contemporaneous increase in government revenue from an increase in t_{CIT} can be expressed as

$$\Delta R_{\text{CIT}} = \Delta t_{\text{CIT}} N\bar{\pi} - \epsilon_{\text{CIT}} \frac{t_{\text{CIT}}}{1 - t_{\text{CIT}}} \Delta t_{\text{CIT}} N\bar{\pi} - \epsilon_{\text{TOT}} \frac{t_{\text{TOT}}}{1 - t_{\text{CIT}}} \Delta t_{\text{CIT}} N\bar{y} \tag{E7A.55}.$$

Assuming that firm owners bear the full incidence of the increase in the profit tax, by the envelope theorem, each firm owner with taxable profit π_n would be willing to pay up to $\Delta t_{\text{CIT}}\pi_n$ to avoid this tax change. Thus,

$$\Delta W_{\text{CIT}} = \sum_{n=1}^{N} \omega_n \Delta t_{\text{CIT}} \pi_n = \bar{\omega}_{\text{CIT}} \Delta t_{\text{CIT}} N \bar{\pi} \quad \text{(E7A.56)},$$

where

$$\bar{\omega}_{\text{CIT}} = \frac{1}{N} \sum_{n=1}^{N} \omega_n \pi_n / \bar{\pi} \quad \text{(E7A.57)}$$

is the average welfare weight across firm owners weighted by their WTP to avoid the CIT rate hike.

Hence, the WMVPF for raising the CIT rate by Δt_{CIT} is given by

$$\text{WMVPF}_{\text{CIT}} = \frac{\bar{\omega}_{\text{CIT}}}{1 - \epsilon_{\text{CIT}} \frac{t_{\text{CIT}}}{1 - t_{\text{CIT}}} - \epsilon_{\text{TOT}} \frac{t_{\text{TOT}}}{1 - t_{\text{CIT}}} \frac{\bar{y}}{\bar{\pi}}} \quad \text{(E7A.58)}.$$

WMVPF for raising CIT rates when wages are impacted

To estimate the change in welfare associated with increased CIT rates, one needs to understand the associated incidence. Fuest et al. (2018) and Serrato and Zidar (2016) investigate incidence of CITs in Germany and the United States, showing that workers in affected firms bear 30–35 percent and 51 percent, respectively, of the total incidence. To assess this incidence of CITs on workers, researchers typically estimate the elasticity of worker wages with respect to the net-of-profit-tax rate:

$$\delta_{\text{CIT}} = \frac{\%\Delta \text{WageBase}_{\text{CIT}}}{\%\Delta (1 - t_{\text{CIT}})} \quad \text{(E7A.59)},$$

where $\text{WageBase}_{\text{CIT}}$ captures the cumulative wages of workers in firms subject to the CIT. With this elasticity, the cumulative WTP for workers to avoid the CIT increase is

$$\delta_{\text{CIT}} \frac{\text{WageBase}_{\text{CIT}}}{1 - t_{\text{CIT}}} \Delta t_{\text{CIT}} \quad \text{(E7A.60)},$$

which captures how much cumulative wages decline when t_{CIT} is raised by Δt_{CIT}.[10] Firm owners, on the other hand, have a cumulative WTP of Δt_{CIT} ($\text{TaxBase}_{\text{CIT}} - \delta_{\text{CIT}} \text{WageBase}_{\text{CIT}}$) to avoid the tax increase. Firm owners' WTP for the wage decrease is

$$-(1-t_{CIT})\,\delta_{CIT}\frac{\text{WageBase}_{CIT}}{1-t_{CIT}}\Delta t_{CIT} \tag{E7A.61}$$

because their wage savings are taxed at $1 - t_{CIT}$. Let $\bar{\omega}_{CIT}$ denote the WTP-weighted welfare weight on firm owners and their workers given by

$$\bar{\omega}_{CIT} \equiv \frac{\omega_{Owners}\,\Delta t_{CIT}\,(\text{TaxBase}_{CIT} - \delta_{CIT}\text{WageBase}_{CIT}) + \omega_{Workers}\,\Delta t_{CIT}\,\delta_{CIT}\frac{\text{WageBase}_{CIT}}{1-t_{CIT}}}{\Delta t_{CIT}\,(\text{TaxBase}_{CIT} - \delta_{CIT}\text{WageBase}_{CIT} + \delta_{CIT}\frac{\text{WageBase}_{CIT}}{1-t_{CIT}})} \tag{E7A.62}.$$

Thus, the impact on welfare from raising the CIT rate by Δt_{CIT} is

$$\Delta W_{CIT} = \bar{\omega}_{CIT}\Delta t_{CIT}\,(\text{TaxBase}_{CIT} - \delta_{CIT}\text{WageBase}_{CIT} + \delta_{CIT}\frac{\text{WageBase}_{CIT}}{1-t_{CIT}}) \tag{E7A.63}.$$

Finally, the changes in wages also impact government revenue insofar as they impact profits. Thus, the change in revenue when wages adjust to the corporate tax rate equals[11]

$$\Delta t_{CIT}(\text{TaxBase}_{CIT} - \epsilon_{CIT}\frac{t_{CIT}}{1-t_{CIT}}\text{TaxBase}_{CIT} - \delta_{CIT}\frac{\text{WageBase}_{CIT}}{1-t_{CIT}}t_{CIT}) \tag{E7A.64}.$$

Putting this together with the increase in government revenue from raising CIT rates yields the following for the WMVPF:

$$\text{WMVPF}_{CIT} = \frac{\bar{\omega}_{CIT}\Delta t_{CIT}\,(\text{TaxBase}_{CIT} - \delta_{CIT}\text{WageBase}_{CIT} + \delta_{CIT}\frac{\text{WageBase}_{CIT}}{1-t_{CIT}})}{\Delta t_{CIT}(\text{TaxBase}_{CIT} - \epsilon_{CIT}\frac{t_{CIT}}{1-t_{CIT}}\text{TaxBase}_{CIT} - \delta_{CIT}\frac{\text{WageBase}_{CIT}}{1-t_{CIT}}t_{CIT})} \tag{E7A.65}.$$

Calculating welfare weights for VAT using Informality Engel Curves

From Bachas et al. (2024), the Informality Engel Curve (IEC) measures the percent of household per capita consumption spent on informal goods and services:

$$\frac{c^{inf}}{c}\times 100 = \alpha + \beta\log(c) \tag{E7A.66},$$

where α and β represent the country-specific intercept and slope of the IEC, c measures the value of per capita household consumption, and c^{inf} measures the value of informal per capita household consumption. Noting that $c = c^f + c^{inf}$, formal sector consumption is given by

$$c^f(c) = c \times \left(1 - \frac{\alpha + \beta \log(c)}{100}\right) \quad \text{(E7A.67)}.$$

If there are $n = 1, .., N$ households in society, each with per capita consumption of c_n and family size fam_n, then the WTP-weighted average welfare weight across households is given by

$$\bar{\omega}_{\text{VAT}}^{\text{hhs}} = \frac{\frac{1}{N}\sum_{n=1}^{N} \omega(c_n) \times C^f(c_n)}{\frac{1}{N}\sum_{n=1}^{N} C^f(c_n)} \quad \text{(E7A.68)},$$

where

$$\omega(c_n) = \left(\frac{c_{med}}{c_n}\right)^{\gamma} \quad \text{(E7A.69)}$$

measures the welfare weight on household n (refer to equation 7A.7), and $C^f(c_n) = c^f(c_n) \times fam_n$ is total formal sector consumption for household n (multiplied by family size because $c^f(c_n)$ is per capita formal sector consumption for household n). If data on family size are unavailable, one can make the simplifying assumption that family size is constant across all households n:

$$\bar{\omega}_{\text{VAT}}^{\text{hhs}} = \frac{\frac{1}{N}\sum_{n=1}^{N} \omega(c_n) \times c^f(c_n)}{\frac{1}{N}\sum_{n=1}^{N} c^f(c_n)} \quad \text{(E7A.70)}.$$

Finally, if only the IEC slope, the IEC intercept, and two moments from the per capita consumption distribution (for example, the mean and variance) are available, and if the per capita consumption distribution is well-approximated by a log-normal distribution, then

1. The two observed moments of the per capita consumption distribution can be used to parameterize the log-normal distribution. Mathematically, assume $c \sim \log N(\mu, \sigma)$, and use two observed moments from the c distribution to estimate μ and σ by maximum likelihood.
2. Determine $c^f(c)$ using the observed IEC slope and intercept via equation 7A.67.
3. Assume family size is constant and use a continuous version of equation 7A.70:

$$\bar{\omega}_{\text{VAT}}^{\text{hhs}} = \frac{\int_0^{\infty} \omega(c)\, c^f(c)\, f(c)\, dc}{\int_0^{\infty} c^f(c)\, f(c)\, dc} = \frac{\int_0^{\infty} \left(\frac{c_{med}}{c}\right)^{\gamma} c \times \left(1 - \frac{\alpha + \beta \log(c)}{100}\right) f(c)\, dc}{\int_0^{\infty} c \times \left(1 - \frac{\alpha + \beta \log(c)}{100}\right) f(c)\, dc} \quad \text{(E7A.71)},$$

where $f(c)$ is the parametrized log-normal distribution obtained from step 1, and c_{med} is median per capita consumption from the parameterized log-normal distribution.

Calculating $\bar{\omega}_{VAT}^{hhs}$ for Mexico

Using the above three steps, taking the following estimates from Bachas et al. (2024):

- Median per capita consumption, c_{med}, of US$2,441 (2010 USD) and a 95th percentile per capita consumption of US$9,897 (2010 USD; refer to figure 1, panel b, in Bachas et al. [2024]). Using these values, parameterize the log-normal distribution of per capita consumption as $c \sim \log N(3{,}506, 0.85)$.
- An IEC slope of −12 and an IEC intercept of 133 for Mexico (Bachas et al. 2024). This gives $\alpha = 133$ and $\beta = -12$ in equation 7A.67.
- $\gamma = 1$, which is consistent with Chetty (2006) in equation 7A.71.

Using the above information, equation 7A.71 obtains $\bar{\omega}_{\text{VAT}}^{\text{hhs}} = 0.61$ for Mexico. Note that this number is less than 1, because formal sector consumption is increasing in per capita consumption, so that the incidence of raising the VAT is borne more by the households with per capita consumption that exceeds median per capita consumption.

Notes

1. This derivation assumes 100 percent pass-through of the VAT increase onto consumer prices. This assumption can be relaxed and the formula modified. Refer to annex 7A, the "Limited Pass-Through" section.
2. This formula is derived assuming raising the CIT does not impact the TOT base, and all incidence of the increased CIT rate is borne by firm owners. In annex 7A, the sections "WMVPF for Raising CIT Rates with Turnover Tax Base Effects" and "WMVPF for Raising CIT Rates When Wages Are Impacted" relax these assumptions, respectively.
3. Technically, the different tax bases should be understood as present discounted values. For example, the tax base of a VAT should be the discounted sum of all future formal sector consumption. Refer to annex 7A, the section "Dynamic Considerations: Permanent Tax Rate Changes," for further discussion.
4. Most studies define the WMVPF numerator as the *increase* in welfare and the denominator as the *decrease* in revenue (that is, the increase in costs), which is mathematically equivalent to the definition set forth in this chapter.
5. In general, $\text{WTP}_{i,n}$ should be understood as the present discounted WTP to avoid the change to tax rate t_i for household n, recognizing that tax changes are often permanent. Refer to annex 7A, the section "Dynamic Considerations: Permanent Tax Rate Changes," for further discussion.

6. This is a consequence of the *envelope theorem*. The assumptions needed are that (1) households do not make mistakes when choosing how much to work and how much to purchase, (2) the tax change is small, and (3) changes in tax rates do not change wages or prices. Note that it is still possible to calculate WTP if changes in prices or wages occur; however, one must know the *causal* impacts that changing t_i has on these objects.
7. For large tax changes, the revenue impact can be expressed as

$$\Delta R_i = \underbrace{\Delta t_i \text{TaxBase}_i}_{\text{mechanical effect}} + \underbrace{(t_i + \Delta t_i)\,\Delta \text{TaxBase}_i}_{\text{own-base fiscal externality}} + \underbrace{\sum_{j=i}^{K} t_j \Delta \text{TaxBase}_j}_{\text{cross-base fiscal externalities}} \quad \text{(EN7.7.1).}$$

8. Dividing household formal sector expenditures by $1 + t_{VAT}$ yields C_n^f.
9. This chapter assumes that the number of firms that were initially paying the CIT and then shifted to the TOT regime when t_{CIT} increases by a small amount is negligible. If there are many such firms, then it is necessary to account for the change in TOT revenue that arises when calculating the impact on government revenue. In annex 7A, in the section "WMVPF for Raising CIT Rates with Turnover Tax Base Effects" illustrates how to do this, showing that the estimates of the causal impact of raising the CIT on the sizes of both the CIT tax base and the TOT tax base are needed.
10. This assumes workers face zero labor income taxes; otherwise, their WTP is scaled by 1 – the income tax rate.
11. This expression for the change in revenue assumes that the workers' income tax rate is zero. If it is non-zero, then

$$\delta_{\text{CIT}} \frac{\text{WageBase}_{\text{CIT}}}{1 - t_{\text{CIT}}} t_z \quad \text{(EN7.11.1)}$$

captures the change in labor income taxes, where t_z is the labor income tax rate.

References

Ardanaz, Martin, Leopoldo Fergusson, and Pablo Querubín. 2020. "Paving Streets for the Poor: Experimental Analysis of Infrastructure Effects." *Review of Economics and Statistics* 102 (2): 284–300.

Bachas, Pierre, Lucie Gadenne, and Anders Jensen. 2024. "Informality, Consumption Taxes, and Redistribution." *Review of Economic Studies* 91 (5): 2604–634.

Basri, M. Chatib, Mayara Felix, Rema Hanna, and Benjamin A. Olken. 2021. "Tax Administration versus Tax Rates: Evidence from Corporate Taxation in Indonesia." *American Economic Review* 111 (12): 3827–871.

Bergstrom, Katy, and William Dodds. 2023. "Using Schooling Decisions to Estimate the Elasticity of Marginal Utility of Consumption." *Journal of Public Economics* 224: 104948.

Bergstrom, Katy, William Dodds, and Juan Rios. 2026. "Optimal Policy Reforms." CESifo Working Paper 12883. CESifo.

Capozza, Francesco, and Krishna Srinivasan. 2024. "Who Should Get Money? Estimating Welfare Weights in the U.S." CESifo Working Paper 11086. CESifo.

Chetty, Raj. 2006. "A New Method of Estimating Risk Aversion." *American Economic Review* 96 (5): 1821–834.

Choudhary, Rishabh, Franz Ulrich Ruch, and Emilia Skrok. 2024. "Taxing for Growth: Revisiting the 15 Percent Threshold." Policy Research Working Paper 10943. World Bank.

Fuest, Clemens, Andreas Peichl, and Sebastian Siegloch. 2018. "Do Higher Corporate Taxes Reduce Wages? Micro Evidence from Germany." *American Economic Review* 108 (2): 393–418.

Gaspar, Vitor, Laura Jaramillo, and Philippe Wingender. 2016. "Tax Capacity and Growth: Is There a Tipping Point?" IMF Working Papers 234. International Monetary Fund.

Glenday, Graham, Ipchita Bharali, and Ziyuan Wang. 2019. "Enhancing Domestic Revenues: Constraints and Opportunities: A Cross-Country Comparative Study of Tax Capacity, Effort and Gaps." Center for Policy Impact in Global Health, Duke University.

Hendren, Nathaniel, and Ben Sprung-Keyser. 2020. "A Unified Welfare Analysis of Government Policies." *Quarterly Journal of Economics* 135 (3): 1209–318.

HM Treasury. 2022. *The Green Book: Central Government Guidance on Appraisal and Evaluation*. HM Treasury.

Layard, R., G. Mayraz, and S. Nickell. 2008. "The Marginal Utility of Income." *Journal of Public Economics* 92 (8–9): 1846–857.

Mawejje, Joseph, and Rachel K. Sebudde. 2019. "Tax Revenue Potential and Effort: Worldwide Estimates Using a New Dataset." *Economic Analysis and Policy* 63: 119–29.

McNabb, Kyle, Michael Danquah, and Abrams M. E. Tagem. 2021. "Tax Effort Revisited: New Estimates from the Government Revenue Dataset." WIDER Working Paper 2021/170. United Nations University–World Institute for Development Economics Research.

OMB (Office of Management and Budget). 2023. "Circular A-4: Regulatory Analysis." OMB.

Serrato, Juan Carlos Suárez, and Owen Zidar. 2016. "Who Benefits from State Corporate Tax Cuts? A Local Labor Markets Approach with Heterogeneous Firms." *American Economic Review* 106 (9): 2582–624.

Vázquez, Rosa María Cárdenas, and María Ángeles Martín Martínez. 2016. "Cambios en el impuesto sobre la renta en México: Implicaciones para los contribuyentes y las finanzas públicas." Centro de Estudios de las Finanzas Públicas.

CHAPTER 8

Administrative Tax Data for Policy

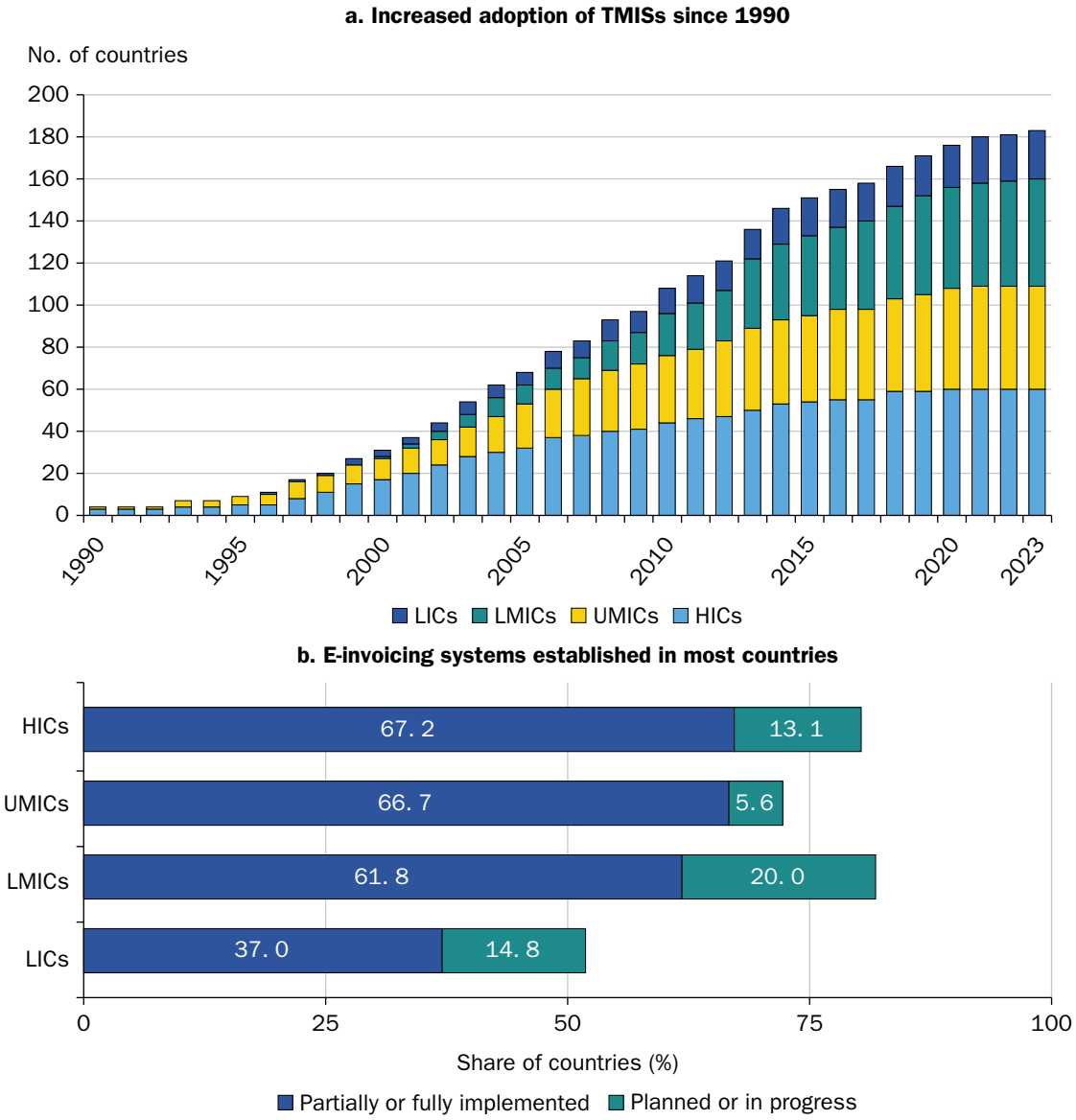
Prepared by Pierre Bachas, Gaston Bernheim, and Thiago Scot

Introduction

A digital tax (r)evolution. The digital age is reshaping how individuals, firms, and governments collect, analyze, and share information: Tax authorities are central to this data revolution. With the right investments in digital infrastructure, they can now collect vast amounts of high-quality, high-frequency data required to manage their tax and transfer systems. Integrated digital information systems, otherwise known as *tax management information systems* (TMISs), which automate and standardize processes such as filing and processing tax declarations, make such collection possible. Two decades ago, only high-income countries (HICs) implemented TMISs. Since then, the number of adopters has increased sixfold, and the practice has become nearly universal (refer to figure 8.1, panel a). On the advanced end of the TMIS technologies spectrum is electronic invoicing (e-invoicing), which transmits transaction data to tax administrations in real time. A majority of countries are implementing—or planning to implement—e-invoicing systems, with many lower-income and upper-middle-income countries (UMICs) leapfrogging their high-income counterparts (refer to figure 8.1, panel b).

The unique advantages of tax data. Compared to survey data, administrative tax data have several advantages. First, they record the economic activity of all registered firms and individuals, resulting in a much larger number of observations. They also capture outcomes beyond the scope of even the best surveys on, for example, firms' trade partners or employees' wages. Second, administrative tax data are collected from sources such as payroll and e-invoicing almost in real time. Third, administrative data collection is recurring, so taxpayers' activity can be followed over time. Fourth, taxpayer identifiers enable linking multiple datasets within the tax administration

Figure 8.1 Digital expansion in tax administrations, by income group



Sources: Original figure for this publication based on data from the World Bank's Group GovTech Dataset and the VatCalc E-Invoicing Global Tracker.

Note: The sample covers 183 countries in panel a (60 HICs, 49 UMICs, 51 LMICs, and 23 LICs) and 197 countries in panel b (61 HICs, 54 UMICs, 55 LMICs, and 27 LICs). e-invoicing = electronic invoicing; HICs = high-income countries; LICs = low-income countries; LMICs = lower-middle-income countries; TMISs = tax management information systems; UMICs = upper-middle-income countries.

and across other government bodies (for example, social security and procurement). Together, these features make tax data well-suited to policy evaluation and cutting-edge research (Bachas and Jensen 2023; Brockmeyer 2019; Card et al. 2010).

Putting data to use. Although many governments have an abundance of data, they face challenges in translating this information into timely, actionable insights. These challenges stem from limited institutional capacity, weak incentives, and inadequate data integration (Wani 2025). This chapter's objective is to showcase how tax data have the potential to inform public policy across a range of economic domains and to demonstrate how to overcome challenges in using tax data. This chapter also aims to guide policy makers, public officials, and researchers who are either new to or already working with administrative microdata. By the end, readers should have a solid grasp of how tax data can uniquely inform policy; how to build flexible, mutually beneficial partnerships with tax administrations; which analytical tools to use; and how to mitigate privacy and security risks.

Outline. This chapter presents practical insights and real-world examples to help readers with relevant use cases. By linking administrative datasets, one can answer questions such as, How do shocks propagate through supply chains? How do the wealthiest individuals earn their income? How often do workers change jobs? (refer to the section "Innovative Data to Learn About the Economy"). In addition to showcasing innovative examples, this chapter promotes collaboration among tax administrations, researchers, and civil society organizations by outlining partnership models that can be tailored to contexts such as data exchange, data labs, and remote workflows (refer to the section "Building Collaborations: Practical Models for Every Need"). This chapter then introduces analytical tools to work with large-scale administrative data, including descriptive methods, econometric techniques, and newer approaches that use artificial intelligence and machine learning (refer to the section "Analytical Tools for Big Administrative Data"). The chapter continues by discussing limitations and risks of administrative tax data use, such as gaps in coverage and privacy (refer to the section "Lurking in the Shadows: What Are We Missing?"). The chapter concludes with recommendations depending on a country's starting point with administrative data (refer to the section "From Tax Records to Data-driven Policy Making: A Roadmap for Strengthening Tax Data Use").

Link to the report. This final chapter builds on key themes presented in earlier chapters, especially technology (refer to chapter 3) and transparency (refer to chapter 4). Chapter 3 discusses how technological innovations are transforming tax collection by generating richer data. Chapter 4 describes global trends in transparency that provide tax administrations with information on top economic actors and offshore economic activity. This chapter builds on these foundations to present a practical approach to turning tax data into policy insights by illustrating concrete ways

tax administrations and researchers can harness this information to support evidence-based decision-making. On its own, this chapter serves as a reference regarding administrative tax data, identifying innovative uses, flexible collaboration models, and analytical tools.

Innovative data to learn about the economy

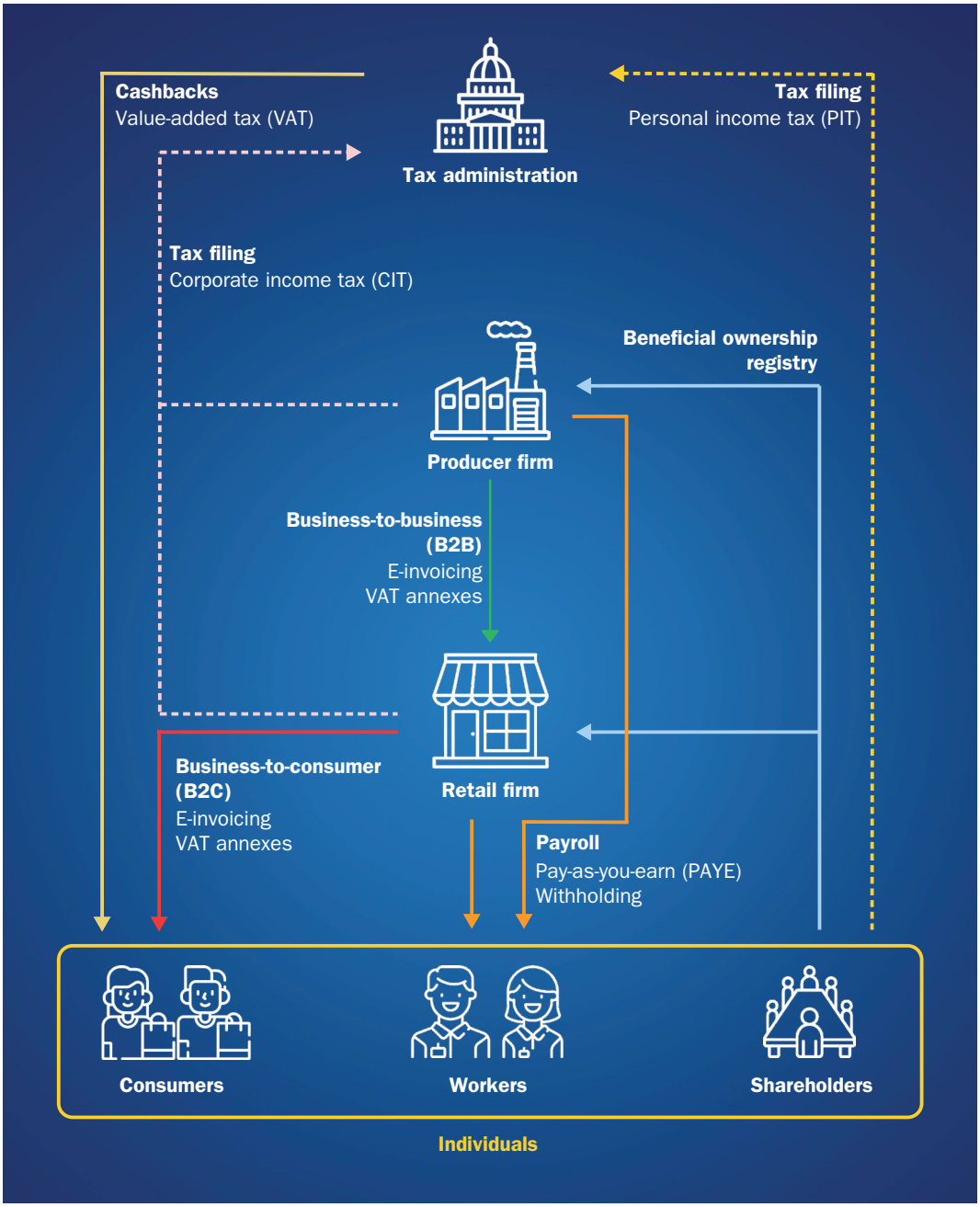
Administrative tax data. *Administrative tax data* refer to the various datasets that tax administrations generate by managing tax and transfer systems. These datasets can be classified as taxpayer registries, self-reported information, third-party reports, internal administrative records (for example, audit results), and data shared by other government entities (for example, customs and procurement). Tax administrations differ in how they integrate these different data types, due to differences in reporting requirements, technology adoption and digitization, and their collaboration with other government bodies (refer to the section "Building Collaborations: Practical Models for Every Need").

Data generation. One of the key functions of tax administrations is to tackle information asymmetries that arise from firms' and individuals' private knowledge of their own activity. As economic actors interact with each other and with the state, they signal their activity. For example, firms report both their own and their stakeholders' activities, including wages paid to employees, sales to clients, purchases from suppliers, and dividends to shareholders. Reporting is shaped by incentives that may distort the data (refer to the section "Lurking in the Shadows: What Are We Missing?"), yet tax data are increasingly valuable and often the only cost-effective and timely data source on economic activity.

Data linkages hold the key. Administrative data shine when multiple datasets can be linked together via taxpayer identifiers. Figure 8.2 displays the key actors and flows of information in the economy. At the top is tax administration, which mandates information reporting, receives taxes, and sends tax rebates. In the middle are the firms, such as retailers and upstream suppliers (producers), involved at different points of the supply chains. At the bottom are individuals, who play different economic roles: consumer, worker, or a shareholder of a firm. In this flow, there are four data links among employers and employees (in orange); producers and retailers (in green); firms and their owners (in blue); and retailers and individual consumers (in red) that provide critical insights about the economy.

For each of the four key links presented in figure 8.2, the following sections detail innovative use cases from collaborations between tax administrations and researchers. We order the topics from the least to most challenging based on each data type's difficulty and accessibility.

Figure 8.2 Administrative tax data generation process



Source: Original figure for this publication. Icons from Flaticon and licensed by CC-BY 3.0.

Note: E-invoicing = electronic invoicing.

Labor market outcomes. Because employers report wages to the tax administration, tax records can be used to observe labor market relationships. For instance, when workers change employers, tax records allow the tracking of their subsequent employment, enabling the study of job mobility and labor market dynamics in the formal sector. Labor force surveys are the only substitutes that follow a set of workers over the course of a few quarters (Donovan et al. 2023). However, these surveys usually include only limited information on employers. In contrast, tax data provide a much richer view of labor market demand. In this regard, administrative employer–employee matched datasets have become a staple of labor economics research in HICs and are increasingly being used elsewhere, given their longer-term panel dimensions. The section "Labor Market Transitions: Insights from Employer–Employee Linked Data" provides examples of recent studies that use such data to study job-switching dynamics and entrepreneurship in developing countries.

Supply chains and trading networks. The second link concerns firm-to-firm (also called business-to-business [B2B]) transactions). The recent expansion of electronic invoices has greatly facilitated the visibility of B2B transactions, as invoices often include identifiers for both partners. In most countries, data on B2B transactions are also available from value-added tax (VAT) forms, because firms are often mandated to report transactions with their suppliers and buyers to cross-validate claims. No other data source provides this information on intranational trade between firms. The section "Trade Networks Revealed: The Power of Firm-to-Firm Transaction Data" illustrates how these data are used to track domestic trade flows, to analyze how trade responds to weather shocks, and to examine discrepancies in how buyers and sellers report the same transaction.

Firm ownership. The third link concerns firms and their owners. Shareholder and beneficial ownership registries, often managed by tax administrations, make it possible to link firms to their owners (refer to chapter 4). The only substitute for such data are listings of publicly traded firms, of which few exist in lower-middle-income countries (LMICs), and some private databases which aggregate online sources (such as Orbis). Ownership registries are a new trove of valuable data with multiple applications. The section "The View from the Top: Linking Tax and Ownership Data" shows how these registries include business income and, thereby, provide a comprehensive view of wealthy individuals' income sources.

Prices and individual consumption patterns. The fourth data structure comes from e-invoicing, which records transactions in the formal sector, including prices, quantities, and products sold. Many countries implement programs that encourage consumers to request proof of purchase, typically by granting partial VAT rebates or awarding consumers lottery prizes for their transactions. To participate in these programs, consumers must include their national IDs at the

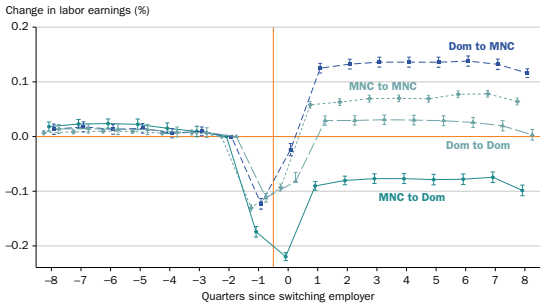
time of purchase. Connecting consumers to their purchases generates rich data on individuals' formal consumption patterns. Electronic invoices also offer high-quality, high-frequency data on prices, enabling real-time inflation measurement and a deeper analysis of the prices governments pay in public procurement. Building on these examples, the section "E-invoicing: Toward Granular Insights" presents frontier applications using e-invoicing data.

Labor market transitions: Insights from employer–employee linked data

The studies that follow illustrate how employer–employee linked data can be used to answer policy-relevant questions on labor mobility, firm dynamics, and entrepreneurship that are difficult to address with traditional surveys.

The Case of Costa Rica: How Do Multinational Corporations Impact Local Labor Markets?

Figure 8.3 Wage gains in Costa Rica, by type of move, 2006–17



Source: Adapted from figure 1, panel b, from Alfaro-Urena et al. (2021).

Note: Dom = domestic firm; MNC = multinational corporation.

Question: How do multinational corporations (MNCs) impact local workers' wages?

Data: Matched employer–employee data and corporate tax filings.

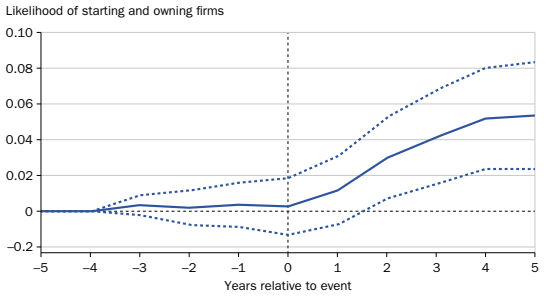
Findings:

- Workers taking a job at MNCs earn 9 percent more than those switching jobs between domestic firms.
- MNC expansion raises wages in local firms by improving outside options for workers (labor market exposure) and boosting performance of local suppliers (firm-level linkages).

Policy implications: Attracting MNCs has the potential to increase wages economywide, through direct and indirect channels (refer to figure 8.3).

The Case of the Dominican Republic: Does Managerial Experience Foster Entrepreneurship?

Figure 8.4 Firm ownership in the Dominican Republic, 2010–18



Source: Figure used with permission from Pecenco et al. (2026).

Question: How does managerial experience impact business creation?

Data: Matched employer–employee data, public procurement lottery records, and firm balance sheets.

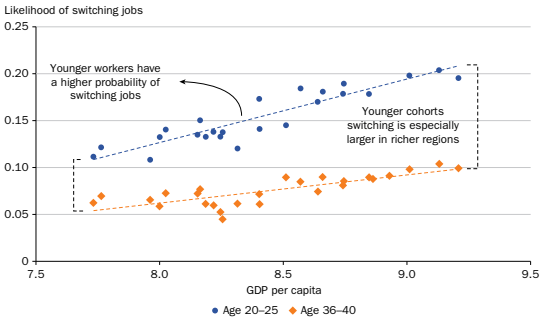
Findings:

- Access to temporary managerial roles boosts entrepreneurship, increasing the likelihood of starting a firm by 22 percent.
- This effect is driven by the gain in managerial experience and self-selection of high-potential individuals into these roles.

Policy implications: Managerial opportunities via public contracting can catalyze private business creation (refer to figure 8.4).

The Case of Brazil: How Does Worker Mobility Relate to Economic Development?

Figure 8.5 Likelihood of switching jobs in Brazil, by age group, 1994–2017



Source: Adapted from figure 4, panels c and d, from Brockmeyer et al. (2026).

Note: GDP = gross domestic product.

Question: How do formal employment patterns evolve with the income level of an economy?

Data: Matched employer–employee data across 8 countries and across more than 26 regions within 2 large countries (Brazil and Colombia).

Findings:

- Job transitions within the formal sector are more common in richer economies and correlate with higher lifecycle wage growth.
- Young workers are more mobile everywhere, particularly in richer economies.

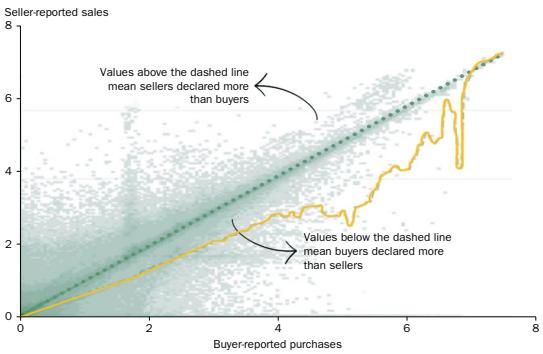
Policy implications: Enhancing labor mobility can lead to long-term wage gains (refer to figure 8.5).

Trade networks revealed: The power of firm-to-firm transaction data

The examples that follow illustrate how firm-to-firm transaction data can uncover the structure of domestic supply chains, firms' responses to shocks, and reporting frictions within the tax system.

The Case of Uganda: Are Firms Sophisticated Tax Evaders or Confused by the Tax System?

Figure 8.6 VAT amounts declared by sellers and buyers in Uganda, 2013–16



Source: Figure used with permission from Almunia et al. (2024).

Note: VAT = value-added tax.

Question: Do firms misreport VAT liabilities to strategically evade taxes, or do they make reporting mistakes?

Data: Firm-to-firm VAT transaction-level records.

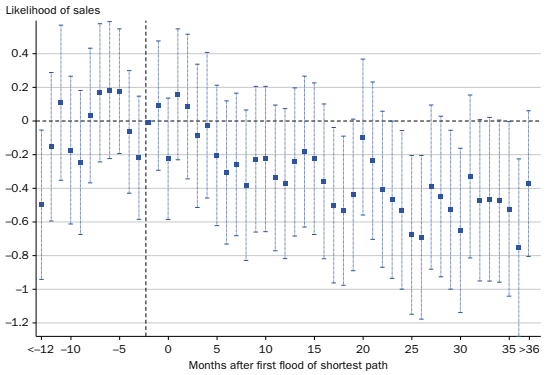
Findings: To pay less taxes, buyers want to overreport purchases (input VAT) and sellers want to underreport sales (output VAT).

- 75 percent of firms report in ways that lower their tax liability, but 25 percent misreport in ways that actually increase their tax liability.

Policy implications: Eliminating discrepancies between seller and buyer reports would increase total VAT collected by 28 percent. Yet, many firms are just confused by reporting requirements (refer to figure 8.6).

The Case of Pakistan: How Do Commercial Relationships Adapt to Extreme Climate Events?

Figure 8.7 Impact of road flooding on sales in Pakistan, 2011–18



Source: Figure used with permission from Balboni et al. (Forthcoming).

Question: How do firms adapt in response to weather shocks?

Data: Georeferenced VAT firm-to-firm monthly transactions and satellite-derived data on major flood events and flood risk.

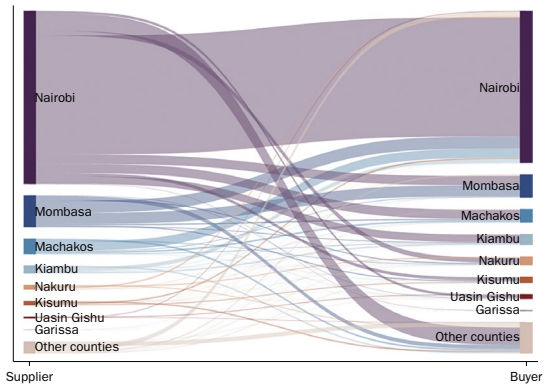
Findings:

- Firms adapt to flood events by relocating to safer areas and shifting input sourcing toward less flood-prone suppliers.
- These responses are persistent and consistent with firms learning about underlying climate risk.

Policy implications: Private sector adaptation is a significant factor mediating the impacts of climate events. Providing accurate information on risks would speed adaptation (refer to figure 8.7).

The Case of Kenya: Are Trade Flows in the Formal Sector Representative of the Full Economy?

Figure 8.8 County-level trade flows between formal firms in Kenya, 2015–19



Source: Figure used with permission from Wiedemann et al. (2024).

Question: Supply chains in developing countries combine formal and informal firms. What is missing when using transaction data only from formal firms?

Data: Firm-to-firm VAT transaction records; census and surveys recording activity in the informal sector.

Findings: Ignoring the informal sector implies that

- Trade seems more concentrated in large cities than it truly is and
- Exposure of domestic firms to international trade shocks is overestimated.

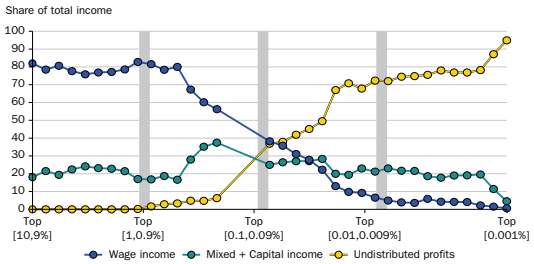
Policy implications: In the presence of a large informal sector, complementing tax records with additional data is key to correctly assessing macroeconomic impacts of policies (refer to figure 8.8).

The view from the top: Linking tax and ownership data

The studies that follow demonstrate how linking tax records with ownership information provides a more complete picture of top incomes, wealth concentration, and the distribution of the tax burden.

The Case of Honduras: From Wages to Profits—Tracking Changes in the Composition of Top Incomes

Figure 8.9 Composition of top incomes in Honduras, 2011–19



Source: Adapted from figure 3, panel a, from Del Carmen et al. (2025).

Question: What are the main income sources of high earners?

Data: Personal income tax (PIT) and corporate income tax (CIT) records, connected through a corporate shareholder registry.

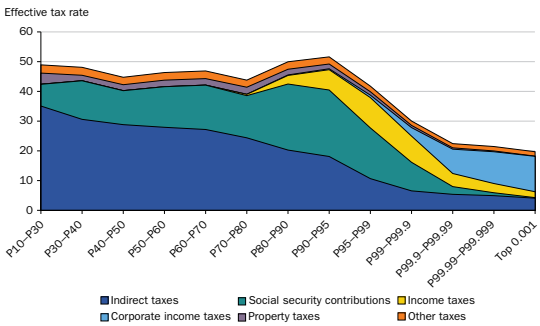
Findings:

- Capital income, mostly undistributed corporate profits, accounts for 80 percent of the income of the richest 0.01 percent of individuals.
- Honduras exhibits high and persistent inequality, with the top 1 percent receiving around 30 percent of total pre-tax income.

Policy implications: Taking a comprehensive view of income, including business income—profits retained in firms—is essential to understanding the income level and composition of top earners (refer to figure 8.9).

The Case of Brazil: Who Bears the Tax Burden? A Look across the Income Distribution

Figure 8.10 Effective tax rate across the income distribution in Brazil, 2019



Source: Adapted from figure 10 from Palomo et al. (2025).

Question: How equitable is the tax system when we consider all taxes paid, including taxes from capital income of firm owners?

Data: Firm ownership registry linking CIT records to their owners, PIT records, household surveys, and national accounts aggregates.

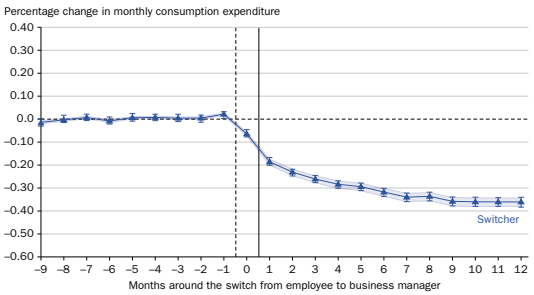
Findings:

- US$1 million earners (top 0.01 percent) pay 20 percent of their income in taxes, while the average tax rate in the economy is 42 percent.
- The tax system is regressive: Income taxes are slightly progressive but insufficient to offset the large regressive consumption taxes.

Policy implications: Designing equitable tax reforms requires considering the effects of indirect and direct taxes, including those collected at the corporate level (refer to figure 8.10).

The Case of Portugal: The Blurred Line between Business Inputs and Personal Consumption

Figure 8.11 Reported consumption drops after becoming a business manager in Portugal, 2016–19



Source: Adapted from figure 2 from Leite (2024).

Question: How does personal consumption via the firm affect tax fairness and income inequality?

Data: Expenditures from e-invoicing data, social security records, and PIT returns and firm accounting data.

Findings:

- Owner–managers of closely held firms shift one-third of their personal expenditures to the firm.
- This generates corporate tax deductions, leading to lower corporate tax payments and lower VAT: Revenue lost amounts to 1 percent of gross domestic product (GDP) annually.

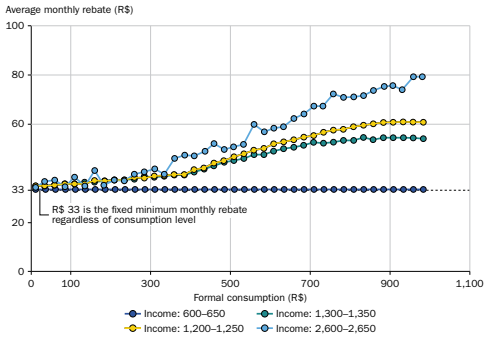
Policy implications: Consumption through the firm generates large tax losses. Because firm owners belong to the top of the income distribution, addressing this practice matters for tax equity (refer to figure 8.11).

E-invoicing: Toward granular insights

The examples that follow illustrate how transaction-level e-invoicing data can be repurposed to improve tax policy design, price monitoring, and public procurement analysis.

The Case of Brazil: Personalized and Targeted VAT Cashbacks

Figure 8.12 VAT rebates in Brazil, by income and consumption levels, 2023



Source: Adapted from figure 3 from Bachas, Flores, et al. (2025).

Question: How does a VAT cashback program, aimed at reducing consumption taxes for low-income households, work in practice?

Data: Administrative records on beneficiaries' formal consumption and cashback.

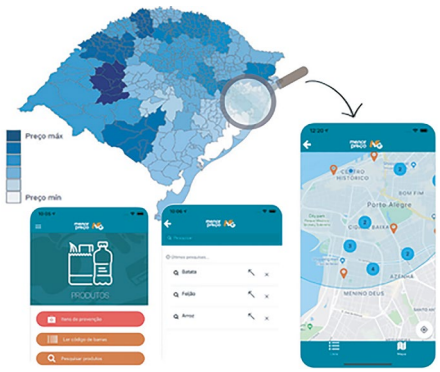
Findings:

- Over 90 percent of the lowest-income households include their national IDs sometimes when making formal purchases.
- The incentives to request formal invoices are muted: Due to a lump-sum part of the program, only 40 percent receive more than the minimum transfer.

Policy implications: VAT cashback programs that require formal identification at the point of sale can help low-income individuals, but program design is key (refer to figure 8.12).

The Case of Brazil: Tracking Consumer Prices in Near Real Time

Figure 8.13 Near-real-time information on consumer prices in Brazil



Sources: Figure based on Receita Estadual's Dynamic Prices Bulletin (*Boletim de Preços Dinâmicos*), State Secretariat of Finance of Rio Grande do Sul (SEFAZ-RS) (https://receitadoc.sefaz.rs.gov.br/), and images from the Menor Preço, Nota Gaúcha mobile application.

Question: How can real-time fiscal data be used to improve the transparency of consumer food prices across regions?

Data: E-invoicing data with detailed product classification.

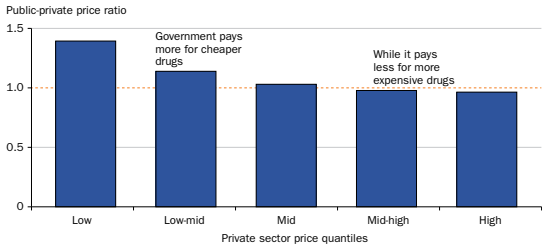
Findings:

- Prices for 65 food products are updated monthly, providing near-real-time information and improving both the timeliness and geographic coverage relative to traditional price surveys.
- Enables the creation of interactive dashboards that enhance transparency and reveal market dynamics across regions.

Policy implications: Electronic invoice data can be a powerful tool to reduce information asymmetries, empowering consumers with transparent price data and supporting real-time monitoring of inflation (refer to figure 8.13).

The Case of Brazil: Public Procurement Prices—Are Governments Getting a Good Deal?

Figure 8.14 When do governments pay more? Brazil, 2018–23



Source: Adapted from data from Best et al. (2024).

Question: Do governments pay more than private firms for the same goods?

Data: Firm-to-firm and firm-to-government transaction records from e-invoices and public procurement auction data from the health sector.

Findings:

- On average, the government pays 14 percent higher prices than the private sector for identical medications.
- The price wedge is largely driven by supplier selection—the government contracts with firms that charge higher prices.
- Governments perform best in markets where they are major buyers and for expensive goods.

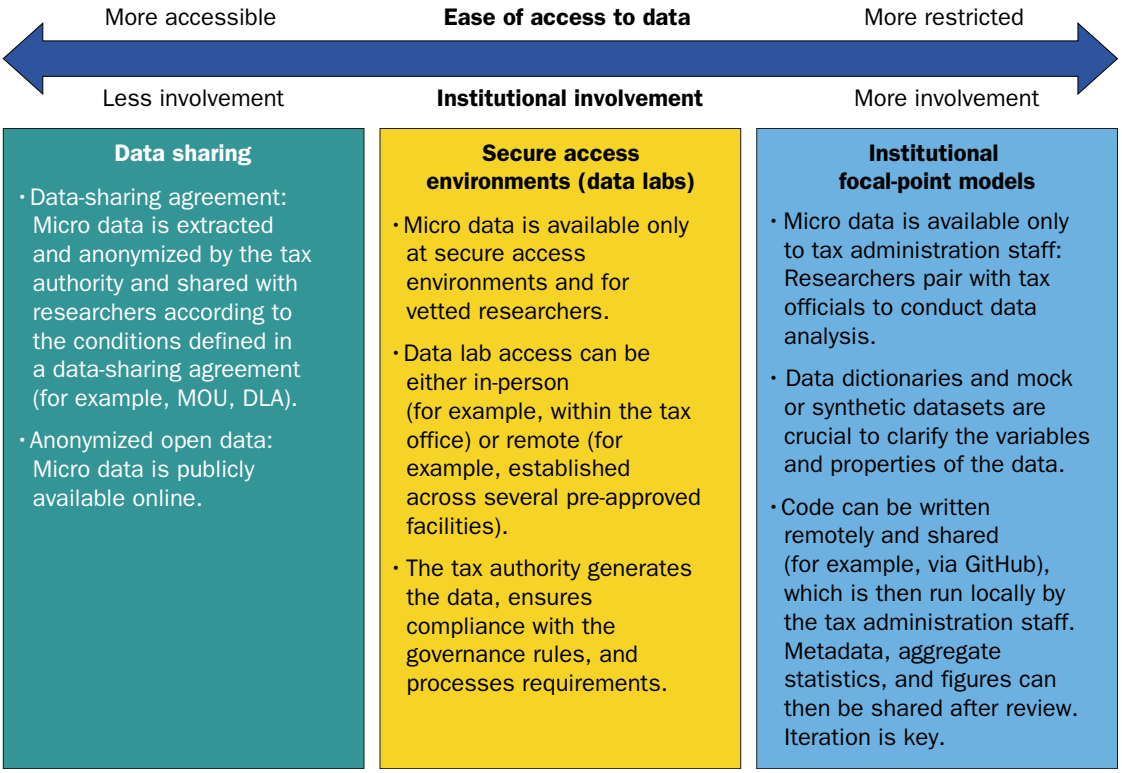
Policy implications: Improving procurement outcomes depends less on auction design and more on broadening access to lower-cost suppliers (refer to figure 8.14).

Building collaborations: Practical models for every need

Securing privacy while unlocking policy insight. Administrative data collected by tax authorities contains sensitive information, including names, addresses, income, and business transactions, which must be carefully protected. To ensure confidentiality, legal frameworks, internal protocols, and access restrictions should be in place to allow *only* authorized individuals to use the data for a predetermined purpose. Tax data hold immense potential to inform tax policy, compliance strategies, and our understanding of economic activity. Tax authorities often recognize this potential and are increasingly open to collaborations (Pomeranz and Vila-Belda 2019). Although a tradeoff between data usage and taxpayer privacy exists, several types of collaboration models enable meaningful policy analysis while fully complying with data protection (Bowen 2024; Burman et al. 2024; Slemrod 2025).

Practical collaboration models. This section presents several models for collaboration that tax authorities and researchers can adopt, ranging from secure data-sharing agreements to in-house data labs and remote analysis setups with code submission. Each model varies in terms of institutional involvement and technical setup, but all share two core principles: flexibility and security. The approaches described as follows can be adapted to meet diverse legal and capacity needs, allowing tax administrations to responsibly unlock the value of their data. These models are grouped into three broad categories that reflect increasing levels of institutional involvement: data sharing, secure access environments (data labs), and institutional focal-point workflows (refer to figure 8.15).

Figure 8.15 Types of collaboration models



Source: Original figure for this publication.

Note: DLA = data license agreement; MOU = memorandum of understanding.

Data-sharing models

Data sharing is the simplest form of collaboration between tax authorities and researchers. As such, it requires the least involvement from tax administration staff. This section discusses open-access tax data (publicly available) and arrangements governed by data-sharing agreements.

Public access microdata. In some contexts, tax authorities provide open online access to tax data. This practice has been implemented in Scandinavian countries; for example, in Norway, tax records have been available online since 2001, enabling public access to everyone's taxable income (Bø et al. 2015). The release of these records was highly popular among Norway's inhabitants and generated more views in the first week than all of YouTube during the same period (Perez-Truglia 2020). Similarly, Mexico's tax administration makes personal and corporate tax data available on its website (refer to https://www.sat.gob.mx/minisitio/DatosAbiertos/sat_mas_abierto.html).

These data are anonymized, with numerical values perturbed to make matching with external sources difficult. Although tax administrations release the data publicly to meet transparency mandates, allowing anyone to access them without a formal agreement, in many countries such public access requires tax administrations' collaboration with local universities. This requirement has promoted partnerships between the administrations and top researchers and helped build domestic research capacity.

Data sharing. Most governments are reluctant to release open-access data. More often, tax administrations provide anonymized tax records to researchers. In this model, researchers gain access to microdata on individual tax filings after all identifying information, such as tax identifiers, names, and addresses, is hidden or removed. From the researchers' perspective, this model allows direct access to the data from any location. For tax administrations, this is the simplest arrangement, because they need only prepare and anonymize the data without participating in any subsequent analysis.

Determining which data are shared. Determining precisely which data will be shared and carefully managing the anonymization process is key to this collaboration model. Suppose a researcher wants to investigate the impacts of a program that exempts specific firms from CIT, which is common in special economic zones. The researcher will need access to the list of eligible firms; their CIT filings reporting their profits and investments; and, possibly, their VAT filings, which include higher-frequency measures of revenues and inputs used. To protect privacy, tax administrations would need to generate "ID masks" for tax identifiers that are consistent across datasets and over time (that is, the same taxpayer is masked using the same unique randomly generated identifier). This enables the researcher to link datasets consistently, even when adding new data, while maintaining anonymity and upholding privacy. Tax administrations should also provide data documentation, such as variable dictionaries, for analysts to make appropriate use.

Formalizing access via data-sharing agreements. Data sharing is typically formalized by means of memorandums of understanding (MOUs) or data license agreements (DLAs). These agreements define the terms under which researchers can access administrative tax data. An *MOU* is a broad, flexible, and nonlegal agreement outlining mutual intentions and roles, while a *DLA* is a more specific and legally binding agreement that details the terms of data use. Both instruments play a central role in structuring a collaboration: They should clearly specify the data shared, for which purposes they can be used, how they will be stored, and the duration of their accessibility and by whom. These agreements protect the interests of all parties: the data provider; the data users; and, most importantly, the data subjects, the taxpayers whose information is contained in the data (Bjarkefur et al. 2021; O'Hara 2020).

What should a data-sharing agreement contain? Data-sharing agreements offer a flexible framework that can be tailored to tax administrations' and researchers' specific needs. While the content of the agreement may vary depending on the scope and complexity of the collaboration, it should contain certain key elements to facilitate effective coordination and promote responsible data use, handling, and protection. Table 8.1 presents a nonexhaustive list of recommended elements categorized as either critical (must have), desirable (should have), or optional (could have).

Table 8.1 Suggested elements of data-sharing agreements

Category	Element	Description
Critical	Parties involved	Identify participating institutions, and define their roles.
	Objectives	State collaboration goals and permitted data uses.
	Dataset details	Provide type, name, description, and metadata of dataset.
	Data handling	Define data format, how data will be accessed or delivered, usage rights, handling rules, and secure storage requirements.
	Personal data protection	Specify how identifiers are protected (for example, data anonymization).
	Confidentiality and intellectual property	Set rules for data ownership, confidentiality, and citations.
	Agreement terms	Define duration, renewal, and amendment rules.
Desirable	Points of contact	Assign responsible individuals or teams.
	Communication of results	Define the scope and process for publishing, sharing, or disseminating results.
	Quality standards	Set data validation checks and procedures to improve data quality.
Optional	Additional data requests	Define procedures for requesting additional datasets.
	Other types of collaboration	Specify other forms of collaboration, such as capacity building, training, and lessons learned.

Source: Original table for this publication.

Extending data sharing across government. Many of the same principles of data sharing between tax administrations and researchers apply to data sharing within government entities. Data sharing across public sector institutions (for example, ministries, agencies, and departments) allows governments to build integrated datasets that support policy design and evaluation. Box 8.1 discusses common approaches to interagency data sharing and highlights the potential to link tax data with other administrative sources.

Box 8.1 Breaking data silos for smarter policy

Fragmented data, limited insights. Government agencies often rely on partial datasets because interagency data sharing is limited. This siloing hampers the effective design and evaluation of public policies. Moving toward integrated, interoperable data systems can enable timely and evidence-based decision-making.

An example: Social mobility across generations. Governments often implement policies aimed at promoting social mobility. Public investments in health, education, and social transfers can enable children from low-income families to achieve higher living standards as adults. Estimating the extent of social mobility is daunting because it requires data on both parents' and children's incomes across decades. This is especially so in countries with high informality, where tax records provide a limited view of the income of poorer individuals. In Brazil, measuring intergenerational mobility precisely was possible by linking data from different agencies: tax records, social security data, public benefit registries, and surveys, which revealed that Brazil has much lower mobility than higher-income countries and that there are large disparities across regions and race (Britto et al. 2025).

Integrating data across institutions. Pooling data sources that are often fragmented across institutions, such as tax administrations, social security agencies, central banks, and business registries, requires strong interagency coordination. Countries can adopt several approaches to achieve integration:

- **Data-sharing agreements** allow agencies to share data for specific projects based on agreed conditions, frequency, and security (refer to the section "Data-sharing Models" in the chapter text).
- **Centralized microdata repositories** led by tax administrations, national statistical offices, or public-interest consortia link, anonymize, store, and provide secure access to administrative data (refer to Statistics Denmark, https://www.dst.dk/en/TilSalg/data-til-forskning, and France's Secure Data Access Center, https://www.casd.eu/en/).
- **Interoperable data-sharing platforms,** a key element of digital public infrastructure (DPI; refer to chapter 3 for its relevance in tax administration), take a systemic approach by establishing shared protocols and infrastructure to enable secure, real-time data exchange across agencies. Rather than building one-off connections, agencies can "plug into" a common platform that ensures scalability, security, and trust while continuing to operate their own

(Continued)

Box 8.1 Breaking data silos for smarter policy *(continued)*

systems (Clark et al. 2025). A touted example is Estonia's X-Road (https://e-estonia.com/solutions/interoperability-services/x-road/), which provides interoperability, data integrity, and privacy for secure data sharing across agencies.

Tax administrations can lead the way. Effective data integration requires standardized identifiers, secure access protocols, and strong governance. Tax administrations are well positioned to start with modest projects (for example, collaborating with one other agency on a specific project) and showcase the value generated for the entire government. Successful collaborations can then catalyze systemic change by promoting interoperable systems and data standards while reducing resistance.

Secure access environment models: Data labs

As administrative tax data become abundant, complex, and valuable, tax authorities are seeking more structured and secure mechanisms to support long-term collaborations. One such mechanism is the establishment of secure access environments known as *data labs.*

A lab to generate policy insights. Tax data labs, which are managed by tax administrations or in collaboration with other institutions, provide centralized and secure access to de-identified microdata. In some countries, legal frameworks restrict direct access to tax data exclusively to the tax administration, thereby limiting the integration of these data with other sources or sharing them for external analysis. Tax data labs, on the other hand, make it possible to handle all data within the tax administration's servers, which process, clean, and anonymize the data before making them accessible within a secure and controlled environment. This model protects data confidentiality while leveraging their access and use for policy insights.

The expansion of data labs. Secure data environments, such as the Federal Statistical Research Data Centers in the United States and the Restricted Data Access Lab (Sala de Acesso a Dados Restritos) in Brazil, have long provided researchers with access to microdata from national statistical offices. Building on similar principles, tax data labs have emerged more recently and gained traction in HICs; for example, the United Kingdom's His Majesty's Revenue and Customs Datalab and France's Secure Data Access Centre. Over time, the presence of these labs has increased in low-income countries (LICs) and middle-income countries (MICs) such as South Africa (refer to box 8.2), Uganda, and Zambia due to the support of the United Nations University–World Institute for Development Economics Research Domestic Revenue

Mobilization program, and Honduras recently launched the DATALAB SAR (refer to https://www.sar.gob.hn/laboratorio-de-datos/) with the support of the World Bank. These examples show that institutionalizing secure access to tax data is both feasible and valuable.

Designing the right lab. Setting up a tax data lab involves a series of strategic decisions shaped by policy objectives and by institutional, legal, and technical constraints. Table 8.2 summarizes the key elements to take into consideration when designing a tax data lab: technical infrastructure, governance rules, and operational processes:

- *Technical infrastructure* involves the lab setup (physical or virtual); the systems used to store and access data; and the protocols, if any, for managing remote access.
- *Governance rules* define the lab's management structure, the scope of data included, and user access policies and fees.
- *Operational processes* include determining the criteria for proposal evaluation, the protocols for user authorization, and privacy safeguards, such as output checking.

Box 8.2 South Africa's National Treasury Secure Data Facility

South Africa stands out as a leading example of how secure access to administrative tax data can fuel high-impact research and inform better policy making.

The origins. In 2014, South Africa created the National Treasury Secure Data Facility (NT–SDF), a collaboration among the National Treasury, the Revenue Service (SARS), and the United Nations University–World Institute for Development Economics Research (UNU–WIDER). Conceived as a secure access environment for administrative tax data, the NT–SDF initially operated out of National Treasury's offices in Pretoria with just three computers and a small team of data scientists. As demand for data access grew rapidly, policy makers recognized the value of these datasets, and the NT–SDF scaled up, acquiring more computers and adding new datasets in collaboration with users, making the NT–SDF a dynamic space where data infrastructure and research needs evolved hand-in-hand.

How does it work? The NT–SDF lab is structured around a secure workflow aligned with international best practices. Researchers submit project proposals, which are reviewed for policy relevance, feasibility, and legal compliance. Once a project is approved, users complete training

(Continued)

Box 8.2 South Africa's National Treasury Secure Data Facility *(continued)*

on legal obligations, data security, and compliance protocols before being granted onsite access to de-identified tax microdata. The secure environment is equipped with statistical software, and all outputs—tables, figures, and results—are subject to tax administration review to safeguard sensitive information.

Scaling up. By 2017, demand again outpaced the NT–SDF lab's capacity. In response, NT—supported by the Capacity Support Program and international donors—invested in expanding and institutionalizing its secure access model. This expansion took shape under the Southern Africa–Towards Inclusive Economic Development (SA–TIED) program; dedicated full-time staff were hired to manage daily operations and expand data availability. Today, the NT–SDF hosts more than 10 major administrative datasets, including corporate income tax, personal income tax, value-added tax, and payroll, and has supported the publication of over 175 studies and 60 papers on a wide range of topics.

A platform for national data integration. Building on the NT–SDF's success, South Africa is now developing an Integrated Data Lake, an ambitious initiative to combine administrative and survey data from across the government into a single standardized platform. The goal is to foster cross-agency data exchange, streamline data management, and provide a unified resource for data analysis. As part of this initiative, the NT–SDF was rebranded as South Africa's national secure data facility, positioning it at the heart of the country's data ecosystem to support government decision-making and respond to societal challenges.

Sources: This case study draws on information from NT–SDF (refer to https://www.treasury.gov.za/research/NT-SDF/NT-SDF%20Overview/Default.aspx), SA–TIED (refer to https://sa-tied.wider.unu.edu/about), and UNU–WIDER (https://www.wider.unu.edu/publication/building-tax-data-research), as well as on presentations delivered by Ayanda Hlatshwayo, Acting Chief Data Analytics Officer, at the National Treasury at the World Bank. Refer also to Hlatshwayo (2025).

Although the design choices presented in table 8.2 are binary, variations are often possible. For example, proposal evaluations may combine policy relevance and academic merit, and a single agency could host the tax data while collaborating with other institutions to incorporate other data.

One lab, one workflow. Tax data labs help establish a standardized and transparent workflow. While procedures vary across countries, most labs follow similar steps to examine a project. The process begins when a team interested in analyzing the tax data submits a proposal. The tax administration or designated scientific committee reviews the proposal based on its policy relevance, academic merit, and feasibility. If a proposal is approved, then the researchers are required to complete training modules on legal obligations, compliance protocols, and data security practices. From there,

Table 8.2 Institutional design elements of secure access environments

Pillar	Feature	Decision	Pros	Cons
Technical infrastructure	**Access environment**	On premises (physical lab)	• High security • Controlled environment • Less cyber risk	• Limited researcher access (subject to PC availability) • Costly to maintain and scale
		Remote access (virtual lab)	• Flexible for researchers • Scalable	• Cybersecurity risks • Requires robust monitoring • Complex setup
	IT infrastructure	Local servers	• Complete data control • High data security	• Requires physical space and ongoing maintenance
		Cloud based or hybrid	• Scalability • Flexibility • Potentially lower costs	• Sensitive data management complexities (for example, legislation might not allow it)
Governance rules	**Managing institution and scope of data**	Single-agency governance	• Clear accountability • Centralized oversight and streamlined decision-making and processes • Focused data scope (that is, tax, employment, social protection, and education)	• Potential for narrow focus • Limited cross-sector collaboration • Reduced stakeholder engagement
		Multi-agency governance	• Shared responsibilities • Improved buy-in • Cross-sector integration	• Complex coordination • Legislation or legal agreements between institutions perhaps necessary
	Access fees	Free access	• Equity • Promotes research	• Limited cost recovery
		Fee-based access	• Helps sustain the lab • Covers maintenance costs	• Barriers for underfunded researchers
Operational processes	**Proposal evaluation criteria**	Policy relevance	• Ensures alignment with institutional goals and increases policy impact	• May exclude important but less immediately relevant research
		Academic merit	• Promotes academic rigor and innovation	• Risk of limited institutional buy-in or misalignment with tax authority priorities
	Privacy safeguards (output checking)	Manual review	• Ensures no disclosure	• Time-consuming • Delays researcher outputs
		Automated tools	• Faster processing • Scalable	• May miss complex disclosure risks

Source: Original table for this publication.

Note: IT = information technology; PC = personal computer.

the researchers are granted access to the relevant datasets within a secure environment. In-person labs provide onsite access, while virtual labs enable remote access via secure terminals. These environments are equipped with standard statistical software and configured to meet a project's technical requirements. Throughout the project, the tax administration reviews the outputs to ensure that no sensitive information is disclosed. Any statistic should be built with a minimum number of observations (for example, at least 10) to avoid de-anonymization. In some cases, analysts are expected to collaborate with tax officials, which can improve understanding of the data and ensure that a project remains aligned with policy goals.

Focal-point models: Workflows without direct data access

When government officials alone can access the data. In some countries, legal restrictions prevent outside analysts from accessing tax records, even in an anonymized form, reserving access only to tax officials. In such cases, researchers can collaborate via an institutional focal point: a government official authorized to access and analyze the data. This model demands substantial engagement from the tax administration by requiring one or more officials to work closely with researchers throughout the project. This dynamic, however, also yields large benefits: Researchers and government analysts learn from each other, fostering knowledge transfer in policy, data, and analytical techniques.

Conducting empirical research without seeing the data. When analysts do not have direct access to data, tools like data dictionaries and synthetic ("mock") datasets are essential for developing a functional workflow. A *data dictionary,* which lists available variables along with their definitions and formats, is indispensable for writing code appropriately. Even more useful is access to *synthetic data:* a simulated dataset that mimics the structure of the real data without revealing any sensitive information. Although synthetic data do not contain actual taxpayer records, they preserve key features of the original data such as variable names, types, and formats. Researchers can use the mock data to write, test, and refine code before it is run on the confidential dataset.

Iteration is key. Once researchers understand the structure of the synthetic data, they may conduct their entire analysis without ever directly accessing the confidential data. In other words, they can share code—via platforms like GitHub—with their designated tax administration contact who, in turn, can run the code to generate descriptive statistics, such as the number of observations, mean values, or tabulations of key variables. The code may not run perfectly at first, prompting government partners to troubleshoot and adjust it. Based on the initial outputs, researchers request further statistics or investigate unexpected patterns, initiating an iterative process that continues until the final outputs—tables, figures, or regressions—are complete.

Which information can be extracted? An important element of such collaborations is agreeing on which types of aggregated data may be disclosed and setting minimum observation thresholds for statistical calculations. For instance, disclosing the total profits of all firms is typically considered acceptable, whereas publishing the average profits of the three largest taxpayers might be problematic. Although such statistics are not at the individual level, their high granularity could risk exposing sensitive information. To protect taxpayer privacy, tax administrations often impose disclosure rules—for example, requiring that any publicly released statistic be based on a minimum of 5–10 underlying observations. These safeguards allow research using detailed information while protecting taxpayer confidentiality.

Analytical tools for big administrative data

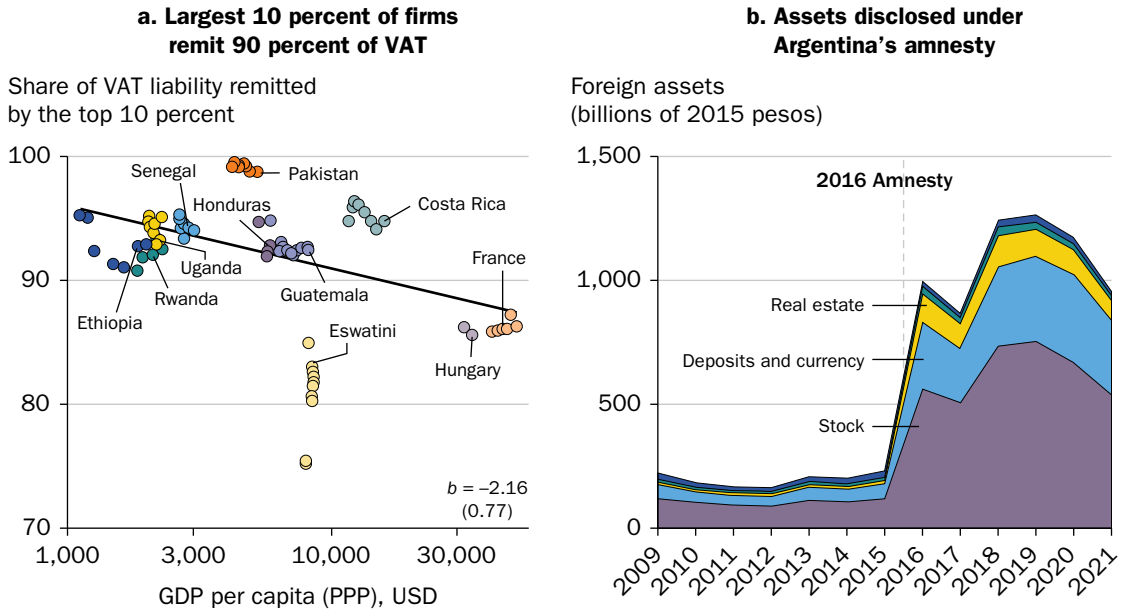
Using the right analytical tools. Certain administrative tax records are better suited to specific types of analyses. Data features such as comprehensive coverage, temporal depth, and granularity facilitate the use of specialized analytical tools to address policy questions. This section provides an overview of these methods along with illustrative examples.

Descriptive analysis: Learning from the data

Starting with the basics. Tax administrations often publish aggregate data, such as total revenue by tax type or overall tax expenditures. Aggregates are valuable to monitor public finances and the macroeconomy. For example, monthly VAT revenues may signal shifts in economic activity. Individual-level tax records allow for richer descriptive analysis and insights into taxpayer behavior, distributional patterns, and policy impacts. Despite their potential, microdata remain underused, even for simple descriptive statistics.

Learning from your neighbors. Cross-country comparisons using microdata can shed light on the quality of tax policy implementation and tax administration practices. For instance, consider VAT; while figures like total VAT collected or tax expenditures can be compared across countries using simple aggregates, access to microdata can provide more granular diagnostics. Figure 8.16, panel a, shows that, across countries with vastly different GDP per capita, the largest 10 percent of firms by revenue always report more than 85 percent of total VAT liability (Brockmeyer et al. 2024), indicating that, although VAT is a broad-based tax on all formal consumption, a small number of firms are responsible for the majority of the reported value added and tax payments. The use of firm-level declarations made this insight possible. As microdata become increasingly available, conducting cross-country studies should become increasingly feasible.[1]

Figure 8.16 Simple descriptive analyses can be very informative



Sources: Panel a is used with permission from Brockmeyer et al. (2024), and panel b is used with permission from Londoño-Vélez and Tortarolo (2025).

Note: GDP = gross domestic product; PPP = purchasing power parity; USD = US dollars; VAT = value-added tax.

Sometimes plotting the microdata is all that is necessary. Descriptive work based on tax records can also provide a detailed assessment of tax reforms, particularly when the effects are large. Consider Argentina's 2016 voluntary disclosure program, which exempted taxpayers from paying tax penalties for previously undisclosed assets. Detailed tabulation from tax records revealed that taxpayers disclosed new assets equivalent to 21 percent of the GDP (Londoño-Vélez and Tortarolo 2025). Over 80 percent of these newly disclosed assets were held abroad, with the majority held in offshore stocks (refer to figure 8.16, panel b). The same study shows that tax evasion was concentrated at the top: 0.1 percent of individuals with the largest wealth revealed most of the undisclosed assets.

Learning from both data and theory. While simple descriptive analysis using microdata can reveal key insights, it also has limitations. To answer the question, "What is the causal impact of a policy on the economic outcomes we care about?" researchers will often rely on a combination of knowledge from theory, insights from data, and specific statistical and econometric tools, which we discuss as follows.

Discontinuities and thresholds

The world is not smooth. Real-world policies often display discontinuities: Firms that exceed a certain number of employees become subject to stricter labor regulations, workers who make a specific number of quarterly social contributions qualify for retirement benefits, and businesses with an annual revenue above a threshold must register for VAT. These conditions are implemented for practical reasons: to reduce compliance costs and administrative burdens, especially for smaller economic actors. At these thresholds, taxpayers' incentives change abruptly, creating opportunities to study behavioral responses and estimate policy parameters. For example, one can assess tax elasticities: What is the change in taxpayers' reported base when their tax rate changes by 1 percent? While policy discontinuities and thresholds have long existed, they have become far more useful for studying behavior as administrative data and modern econometric methods have expanded.

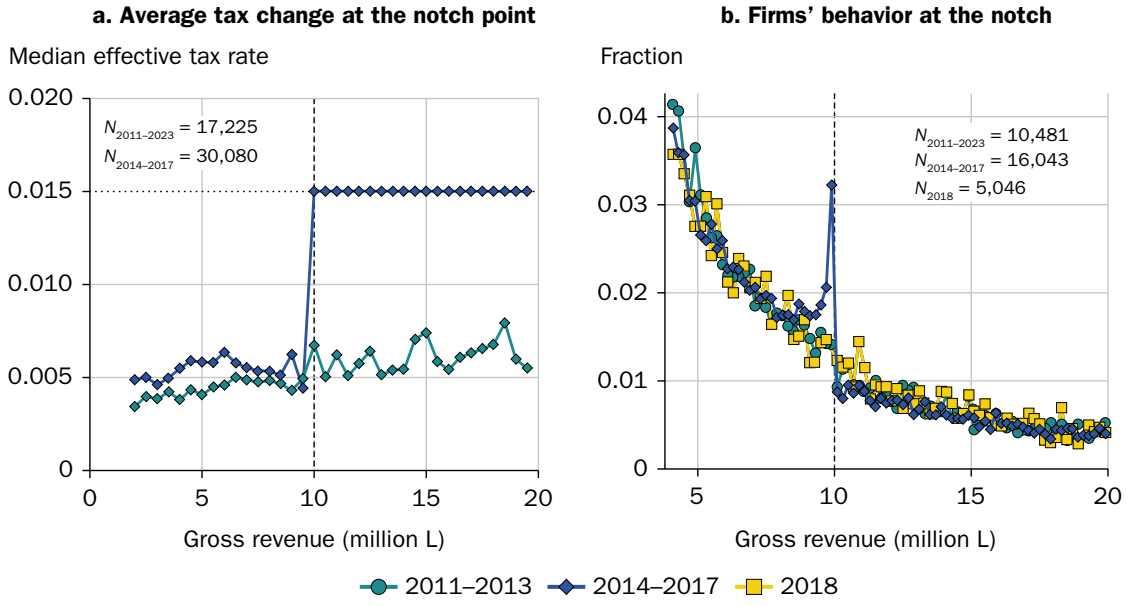
Everyone wants big data—For discontinuities, it is a necessity. Tax data are particularly useful for analyzing policy discontinuities for several reasons. First, they cover the full formal population, offering large sample sizes that are essential for econometric techniques that rely on variation around thresholds. Second, although administrative records may be strategically manipulated, they are recorded at high frequency and with less noise than self-reported or recall-based survey data. This combination of scale and precision makes tax data uniquely powerful for detecting sharp behavioral responses at policy cutoffs.

Manipulation experts: Bunching. The first econometric technique well-suited to administrative data is bunching. *Bunching* is used to estimate how people or firms respond to policies above or below a threshold. For example, a firm might face a higher tax rate (the policy parameter) when its revenue (the running variable) exceeds the threshold. Firms wanting to escape the higher tax rate might report a revenue just below the threshold. If this were the case, then an analyst might observe an excess of taxpayers with revenue at the threshold, or "a bunch." By combining the size of the bunch with the change in incentives at the threshold, the analyst could estimate the responsiveness of firms' taxable revenue to the tax rate (tax elasticity). In bunching estimation, a key hypothesis is constructing a credible counterfactual distribution of taxpayers along the running variable. In other words, if the tax rate had remained constant, what would have been the shape of the (smooth) distribution of taxpayers along the running variable?

Bunching varieties: Kinks and notches. There are two main bunching designs: kinks and notches. *Kinks* correspond to thresholds that generate a change in the marginal tax rate:

The excess revenue above the threshold is taxed at a higher rate. Kinks generate a bunching mass around the threshold (both below and above). *Notches* correspond to thresholds that generate a change in the average tax rate: The full revenue past the threshold is taxed at a higher rate; therefore, notches only generate a bunching mass below the threshold and too little mass above it. Figure 8.17, panel a, shows an example of a tax notch in Honduras: As the firms' revenue surpasses 10 million, their effective tax rate triples. As a result, firms face strong incentives to report revenue below the threshold. Indeed, figure 8.17, panel b, shows that the fraction of taxpayers with revenue below the threshold is three times larger than the fraction of taxpayers reporting revenue just above. Compared to 2011–13, when there was no notch, the taxpayer distribution was continuous, providing a credible counterfactual (Lobel et al. 2024). Because these techniques plot distributions, they require large and precisely recorded data, key attributes of administrative tax data, whose increased availability has led to the development and refinement of the econometrics of bunching (for detailed guides, refer to Bertanha et al. [2020] and Kleven [2016]).

Figure 8.17 Bunching at a tax notch: Incentives and responses in Honduras



Source: Figure used with permission from Lobel et al. (2024).

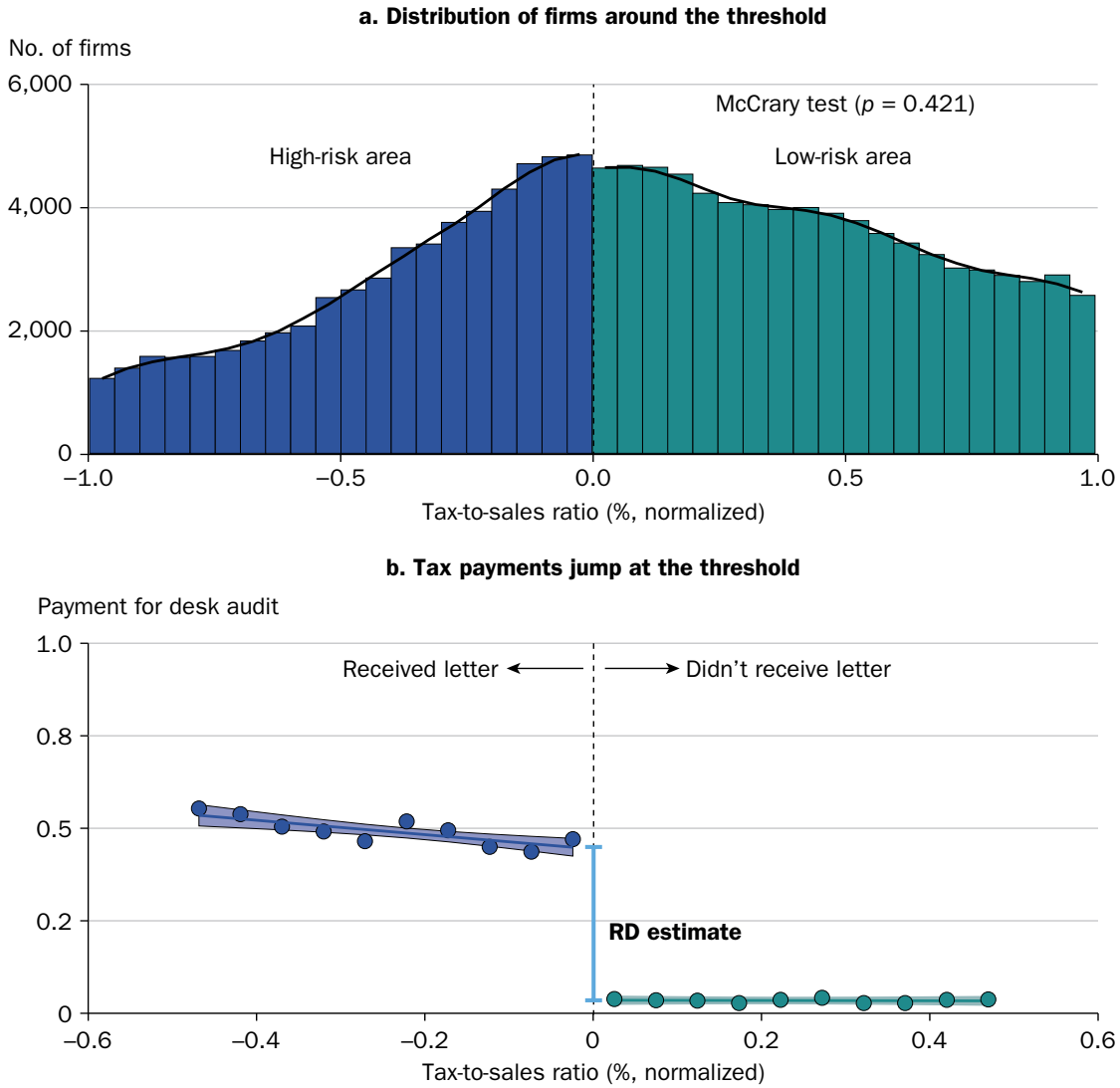
When there is no manipulation: Regression discontinuity. Econometrically, regression discontinuity is a close cousin of bunching that also relies on analyzing data around a policy threshold. *Regression discontinuity* is used when a policy changes at a threshold, but the running variable is not manipulated, which means that no excess density at the threshold occurs. If the distribution of the running variable is smooth around the threshold, then taxpayers just below the threshold can be credibly compared to those just above.

Consider an example from China, where firms with a VAT-to-sales ratio below a certain threshold receive a notification from the tax administration requesting justification for their low effective tax payments (Li and Wang 2025). This threshold is computed using past tax records and is reset annually. As a result, at the time of reporting, firms cannot manipulate their tax returns to stay above an unknown threshold, so the distribution of firms around the threshold remains smooth (that is, there is no bunching), as shown in figure 8.18, panel a. This lack of manipulation makes it possible to use a regression discontinuity design to estimate causal effects. In this case, the outcome of interest is the tax revenue recovered through audits. Figure 8.18, panel b, demonstrates that recovered revenue is significantly and discontinuously higher just to the left of the threshold (where firms are notified) than to the right (where firms are not). Because firms near the threshold are otherwise similar, assignment to treatment (audit) is effectively random within a narrow interval, allowing any observed difference in outcomes to be attributed to the policy. As with bunching, regression discontinuity estimations require a large volume of data near the threshold to obtain precise estimates (for methodological guidance, refer to Cattaneo et al. [2020, 2024]).

Artificial intelligence, machine learning, and high-frequency data

Bring on the machines. Policy makers involved in predictions in high-dimensional settings—that is, who use a large number of variables to forecast outcomes of interest—face some of the most-pressing challenges. A prime example is audit selection. To predict which taxpayers are most likely to evade taxes, tax administrations must rely on vast amounts of information from individual taxpayers, firms, suppliers, and so on. For tasks like this based on complex, data-rich problems, modern machine learning (ML) and artificial intelligence (AI) techniques—combined with administrative records—offer powerful tools to improve predictive accuracy and support policy decisions (Aslett 2024; Junquera-Varela et al. 2022).

Figure 8.18 Regression discontinuity: Tax audit risk and recovered revenue in China



Source: Panels a and panel b adapted from figures 2 and 5, respectively, from Li and Wang (2025).

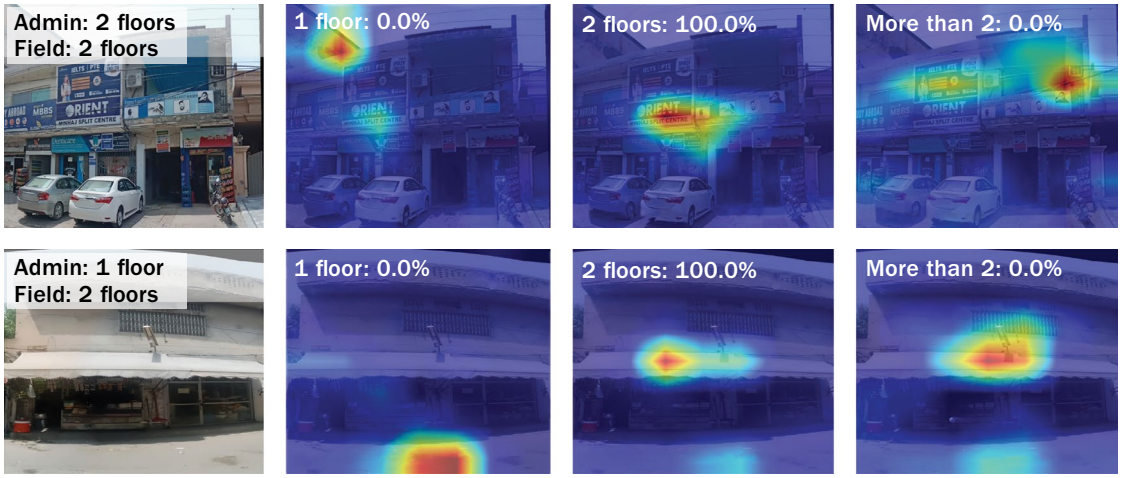
Note: RD = regression discontinuity.

Targeting scarce resources. How should policy makers allocate scarce resources? Although tax audits, for example, can uncover evasion, they are costly to implement and intrusive. To address this, tax administrations are increasingly developing risk models—often powered by ML—to prioritize enforcement actions (Boning et al. 2024; Caspi et al. 2024). ML models are well-suited to this task, especially when combined with random audits that help establish "ground truth." By auditing a random subset of taxpayers and observing their compliance, tax authorities can train models to predict other taxpayers' evasion. However, accurate prediction alone does not guarantee improved compliance or revenue collection. In India, for example, a highly accurate model for detecting fraudulent firms failed to raise revenue due to its limited integration into day-to-day practices (Barwahwala et al. 2024). Moreover, algorithms do not necessarily outperform humans: In Senegal, inspector-selected audits were sometimes better targeted than algorithm-selected audits, particularly when the data available for model training were limited (Bachas, Brockmeyer, Ferreira, et al. 2025).

How much does that property cost? Another way in which ML models can be used to mobilize revenue is to improve property taxation. The biggest challenge that many LICs and MICs face when taxing properties is determining correct property valuation. While computer-assisted mass appraisal (CAMA) tools have become more common, many countries still rely on tax officers to conduct manual appraisals. These two approaches can differ markedly, as a tailored CAMA in Dakar, Senegal, provides more accurate property valuation, particularly at the top of the distribution, than bureaucrats (Knebelmann et al. 2026). Another common challenge is that property tax rolls are often incomplete or outdated. ML models trained on property images and administrative data offer new opportunities to address this problem by helping reconstruct missing records and fill gaps in survey data (Bergeron et al. 2023). In Punjab, Pakistan, image-based ML models are being used to improve property tax assessments by estimating key attributes, such as the number of floors, that can update or complement existing administrative data, potentially leading to more accurate property valuations (Asad et al. 2025). Figure 8.19 shows how these models can work in practice by highlighting the parts of the image that influence the prediction of the number of floors.

Better data for better targeting. Another application of ML and AI is in *social assistance targeting,* or determining who should receive support from social programs. Classical approaches rely on self-reporting of income, community targeting, or asset-based welfare measures (Grosh et al. 2022). Novel literature documents the benefits of using satellite

Figure 8.19 Using image-based ML to identify property characteristics in Pakistan



Source: Adapted from Asad et al. (2025).

Note: ML = machine learning.

imagery and mobile phone data, combined with ML models, to improve targeting (Aiken et al. 2022; Lawson et al. 2023). While the use of tax data for similar purposes is underexplored, electronic invoices are a potential data source for better targeting because formal consumption can be directly linked to individuals, providing detailed measures of expenditures that could be leveraged for targeting.

Seeing the world in real time. The high-frequency nature of tax records makes them an invaluable resource to document close to real-time changes in the economy. Consider first the task of measuring GDP, a core indicator of economic activity. Recent research has shown that transaction data from banks in Spain can be used to determine estimates of private consumption consistent with those used to measure GDP in national accounts (Buda et al. 2023). This not only allows for a much higher-frequency measurement of consumption, because data are available in real time, but also gives a glimpse of the distribution of consumption and inequalities across individuals. While this strand of research (refer to Andersen et al. [2026] as well) uses banking transactions, the same application can be made to electronic invoice data, which covers the universe of formal transactions in many countries.

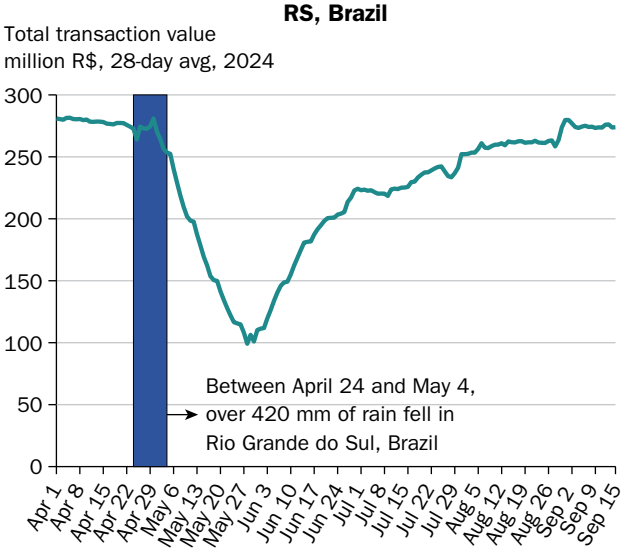
Providing insights in response to crises. Providing near-real-time data on the state of the economy in times of crises is a particularly attractive feature of tax records. Consider, for example, the devastating floods in the state of Rio Grande do Sul, Brazil, in late April to early May 2024, which affected over 2.4 million people. The state government leveraged electronic invoice data to estimate not only how many businesses had to stop operations but also how economic activity evolved throughout the disruption (SEFAZ, RS 2024; refer to figure 8.20). This information supported the design of programs aimed at providing support to affected firms as well as of a VAT cashback program to encourage families to replace household appliances. High-frequency data on firms were also a useful tool at the onset of the COVID-19 pandemic. B2B transaction data, for example, shed light on the impacts of the crisis on production chains in Kenya (Chacha et al. 2024). Harmonized CIT data were also used to estimate the likely impact of the pandemic and responses to it, such as lockdowns, on firms' activity (Bachas, Brockmeyer, Garriga, et al. 2025). In retrospect, firms turned out to be more resilient than initially predicted, and monthly VAT data on firms' revenues were an early indicator of that resilience.

Figure 8.20 Tracking crises with e-invoicing data in Brazil

a. Drone view of the flooded neighborhood of Mathias Velho in Canoas, RS, Brazil



b. Daily economic activity of businesses in affected areas of RS, Brazil



Source: Panel a is used with permission from Reuters (2024), and panel b is adapted from data from SEFAZ, RS (2024).

Note: Panel b shows the evolution of total transaction value from April 1 to September 15, 2024. Total transaction value includes B2B and B2C operations. B2B = business to business; B2C = business to consumer; RS = Rio Grande do Sul.

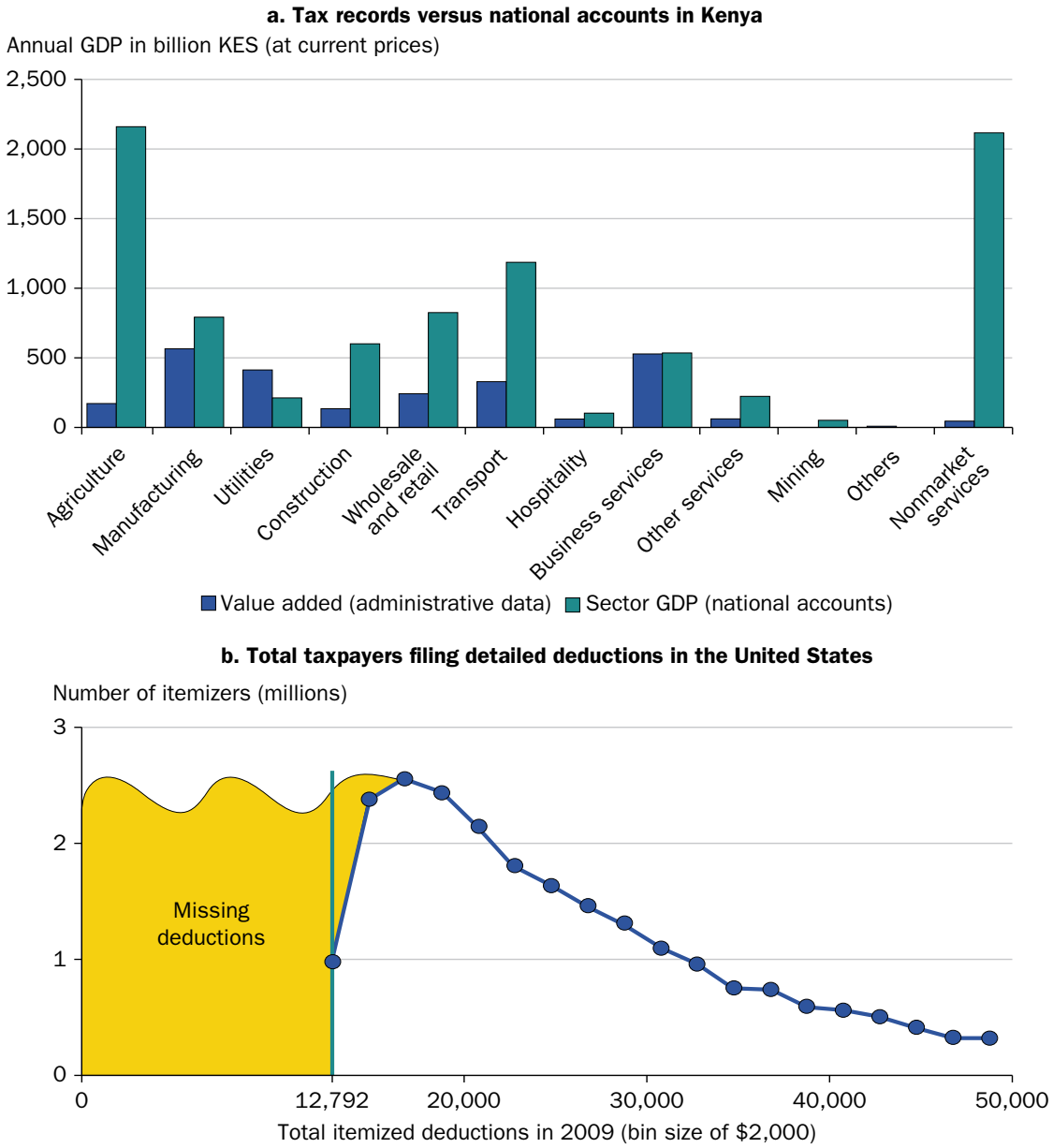
Lurking in the shadows: What are we missing?

So far, we have highlighted the strengths of tax records and how they illuminate otherwise difficult to observe dimensions of the economy. However, like any data source, tax records are not without their limitations. In this section, we discuss key shortcomings of administrative tax data, along with the ethical risks associated with their use, with the hope that researchers and policy makers will be aware of the challenges they may face when using tax data and devise thoughtful strategies to mitigate them.

All the economic activity we cannot see. Unlike surveys, which are designed to produce representative indicators of economic outcomes, tax records are not intended to capture all types of activity. Often, they are a (very useful) by-product of the government's core function to collect taxes. Activities that fall outside of tax records are often referred to as *informal* and include firms not registering as taxpayers, making cash purchases without an invoice, and receiving payments *under the table,* payments that do not appear on official payrolls. There are many reasons why economic agents might choose not to formally register or report certain transactions to tax authorities, among which the primary motive is to avoid taxation. The section "Trade Networks Revealed: The Power of Firm-to-Firm Transaction Data" includes an example of unobserved activities within the context of formal and informal trade flows in Kenya (Wiedemann et al. 2024).

Figure 8.21, panel a, illustrates that tax records miss substantial value added in both agriculture and construction but for different reasons: In agriculture, VAT data capture only large-scale commercial farming, while subsistence agriculture, which is responsible for most of the sector's GDP, remains invisible. In construction, many registered firms underreport their activity. In contrast, tax data perform much better in sectors where production is largely formal, such as manufacturing and business services. Many labor markets exhibit high levels of informality: 60 percent of all workers in the world are informal, with a high prevalence in LICs and MICs. Tax records, therefore, often offer an unprecedented view of *formal* economic activities, but, in highly *informal* settings, they fail to capture a large share of transactions, which should be taken into account when interpreting tax data findings.

Figure 8.21 Limitations of administrative tax data



Sources: Panel a is used with permission from Wiedemann et al. (2024), and panel b is adapted from figure 6, panel a, from Benzarti (2020).

Note: GDP = gross domestic product.

The rules that govern tax recording. Tax laws also limit the potential of tax records. For example, not all registered firms are required to file declarations and report comprehensive information. Firms with revenue below a threshold are often exempt from VAT registration, to reduce compliance burdens, which can be high for small and less sophisticated businesses. As a result, small firms are not included in VAT records. A similar rationale explains why detailed deductions are observable only just above (and not below) a certain threshold in PIT filings—most PIT systems include a simplified deduction that taxpayers can use without itemizing each deduction separately. Figure 8.21, panel b, shows that few US income taxpayers will choose to face the hassle of providing detailed itemizations only to save a few dollars (Benzarti 2020).

A related but distinct limitation arises when taxpayers are required to submit only partial data to the tax administration, which is the case with small firms that are subject to simplified tax regimes. Unlike the standard CIT regime, which mandates detailed financial reporting to calculate taxable profits, small firms are required to report only total sales. This reduces the administrative burden but also limits data availability and precludes the disclosure of key variables such as cost structure and investments, making parts of firms' activities invisible to researchers.

Tax me if you can. One additional limitation of tax records comes neither from fully informal agents nor from those who do not need to report information, but from taxpayers who change their behavior or misreport information in response to incentives. The bunching phenomenon discussed earlier illustrates such a response: If firms pay much higher taxes by declaring to be slightly larger, they will then resort to misreporting their true revenue. While this behavior can help economists estimate key policy parameters, it also distorts the data: A naive analyst might take the data at face value and be befuddled by this odd behavior. Evidence shows that intrinsic motivation to pay taxes can drive compliance at times (for example, if individuals believe their taxes will be used to provide public goods, then they will pay them), but some degree of avoidance and evasion is part of the tax enforcement business and, therefore, of tax records. This does not mean, however, that these behaviors are unchangeable—on the contrary. One data-related example is the increasing use of third-party records to enforce compliance, which lies at the heart of the functioning of VAT systems, where buyers and suppliers must report the same information about purchases or sales, which are checked against each other for accuracy (refer to figure 8.6).

Beyond these limitations, working with tax data also raises important questions about privacy, responsible use, and governance. Box 8.3 discusses how tax administrations and researchers can manage these risks while preserving the value of tax data for policy and research.

Box 8.3 Ethical governance of tax data

Balancing privacy and data use. Privacy is a fundamental right, and intrusions into privacy impose real costs. Concerns about privacy have shaped tax policy for centuries. In 17th-century England, for example, the government replaced a levy on fireplaces with a tax on windows, enabling assessments from outside the home rather than through intrusive household inspections (Oates and Schwab 2015). Modern tax systems rely primarily on self-reporting and third-party information, both of which involve the collection of sensitive personal and financial data. Governments must, therefore, consider privacy when deciding what information to collect, how it may be used, and who should have access to it.

Tax privacy has two dimensions. The first is external: the government's responsibility to protect tax data from unauthorized access or disclosure. The second is internal: the individual's right not to disclose certain information to the government (Slemrod 2025).

External privacy: Safeguards for secure data access. Tax administrations can use a range of safeguards when conducting analytical work. These include de-identification and anonymization, which remove or mask taxpayer identifiers and other personal information, as well as secure analytical environments that allow approved users to access microdata under strict protocols. Advances in privacy-preserving methods have expanded the available toolkit. A prominent example is *differential privacy,* which introduces calibrated statistical noise into outputs while preserving aggregate patterns and distributions (Wood et al. 2022). Other tools include *synthetic public-use datasets,* which reproduce the statistical properties of confidential data without revealing individual records, and verification and validation servers, which allow researchers to analyze sensitive data while limiting disclosure risks. *Verification servers* compare results obtained from synthetic and confidential data, while *validation servers* execute code developed on synthetic data against the confidential dataset and return only disclosure-protected aggregate outputs (Bowen 2024; Burman et al. 2024).

Internal privacy: Tax data governance. As the scope and granularity of tax data expand, so do public expectations regarding their responsible use. The misuse of administrative data for political surveillance, discriminatory targeting, or purposes unrelated to legitimate public policy objectives can erode trust and discourage individuals and firms from sharing information. The 2021 World Development Report, *Data for Better Lives,* provides a framework for managing these risks (World Bank 2021, particularly chapter 6). Among its recommendations are independent-oversight mechanisms, such as ethics review committees, to monitor data collection and use.

(Continued)

Box 8.3 Ethical governance of tax data *(continued)*

Similar to institutional review boards in academic research involving human subjects, these bodies can help ensure that government data are collected and used only for legitimate, well-defined, and proportionate purposes. Transparency about what data are collected, why they are needed, and how they are protected is essential for maintaining public trust. Ultimately, governments should weigh the public benefits of collecting additional taxpayer information against the associated privacy costs.

From tax records to data-driven policy making: A roadmap for strengthening tax data use

Different starting points. The previous sections discussed how tax records can inform policy making, how governments can build the collaborations and capabilities needed to use them effectively, and the challenges involved. In practice, however, countries differ markedly in their readiness to leverage tax data. Some still rely on fragmented or paper-based systems and inconsistent taxpayer registries. Others generate rich digital data but lack the analytical capacity, governance arrangements, or institutional processes needed to systematically embed evidence into policy design and implementation.

The path forward. Table 8.3 translates this chapter's lessons into a practical roadmap for strengthening the use of tax data across different country circumstances using the reportwide framework of structural fundamentals and distance from the fiscal frontier. Rather than prescribing a single path toward greater data use, these recommendations help countries identify priorities based on their starting point and the constraints they face. Where fundamentals are weak, priorities range from establishing basic digital and data infrastructure to building analytical capabilities, depending on how effectively existing capacity is being used. Where fundamentals are stronger, the emphasis shifts toward breaking down data silos, strengthening governance and interoperability, institutionalizing analytics, and adopting more sophisticated approaches to secure data access and sharing.

Table 8.3 Policy priorities for strengthening tax data use

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming:*** **Fragmented systems, limited data use** **Current situation** • Some systems remain paper based. • Taxpayer registries are inconsistent. • No data-sharing rules are in place. **Actions** • Assign unique taxpayer identifiers, and harmonize taxpayer registries. • Standardize main datasets. • Plan to digitize core processes (registration, filing, and payments). **Data sharing:** Simple data exchange for pilot collaborations under MOUs.	***Constrained but functional:*** **Strong rules, limited analytical capacity** **Current situation** • Digital processes generate rich data. • Protocols for data access and exchange are in place. • Analytical capacity is the bottleneck. **Actions** • Assemble an analytical unit with statistics and economics skills. • Determine policy-relevant analytical products and priority use cases. • Promote a culture of data-driven decisions across the organization. **Data sharing:** Promote systematic collaboration with external partners with a strong capacity-building component.
Strong fundamentals	***Capable but underperforming:*** **Digitized systems, siloed data** **Current situation** • Data analysis occurs in silos. • Data governance is undetermined. • Interoperability and privacy safeguards lag best practice. **Actions** • Institutionalize analytics teams. • Define data governance (for example, roles, approvals, and workflows), and strengthen privacy-by-design. • Maintain a data lake for the analytics team. **Data sharing:** Adopt governance rules that define access, responsibilities, and oversight to enable collaboration across government and with external partners.	***Capable and high-performing:*** **Integrated and data-driven** **Current situation** • Interoperable systems use tax data that are embedded in digital processes (for example, IDs, payments, and business registries). • Analytical models inform policy and operational decision-making. • Data safeguards are in place. **Actions** • Expand interoperability. • Adopt privacy-preserving data access and analytics (for example, synthetic data, differential privacy, and validation servers). • Formalize ethics and data reviews. **Data sharing:** Support data analytics as a public good (for example, data labs and trusted research environments), ensuring data security and reproducibility.

Source: Original table for this publication.

Note: MOUs = memoranda of understanding.

Note

1. Another example of leveraging microdata for cross-country insights is Bachas, Brockmeyer, Dom, et al. (2026), which harmonizes CIT returns in 16 countries to document that the largest firms in each country pay lower effective tax rates than medium-sized firms due to a higher take-up of tax incentives.

References

Aiken, Emily, Suzanne Bellue, Dean Karlan, Chris Udry, and Joshua E. Blumenstock. 2022. "Machine Learning and Phone Data Can Improve Targeting of Humanitarian Aid." *Nature* 603: 864–70.

Alfaro-Urena, Alonso, Isabela Manelici, and Jose P. Vasquez. 2021. "The Effects of Multinationals on Workers: Evidence from Costa Rican Microdata." Working Paper 285. Princeton University, Department of Economics, Center for Economic Policy Studies.

Almunia, Miguel, Jonas Hjort, Justine Knebelmann, and Lin Tian. 2024. "Strategic or Confused Firms? Evidence from 'Missing' Transactions in Uganda." *Review of Economics and Statistics* 106 (1): 256–65.

Andersen, Asger L., Kilian Huber, Niels Johannesen, Ludwig Straub, and Emil Toft Vestergaard. 2026. "Disaggregated Economic Accounts." *Quarterly Journal of Economics* 141 (2): 1005–1075.

Asad, Sher Afghan, Adnan Khan, Ben Olken, Mahvish Shaukat, and Jie Zhou. 2025. "Increasing Revenue Collection with Computer Vision: Experiments in Pakistan." Abdul Latif Jameel Poverty Action Lab. https://www.povertyactionlab.org/initiative-project/increasing-revenue-collection-computer-vision-experiments-pakistan.

Aslett, Joshua. 2024. "Understanding Artificial Intelligence in Tax and Customs Administration." *Technical Notes and Manuals* 2024 (6): 1.

Bachas, Pierre, Anne Brockmeyer, Roel Dom, and Camille Semelet. 2026. "Effective Tax Rates, Firm Size and the Global Minimum Tax." *Journal of Public Economics* 261: 105721.

Bachas, Pierre, Anne Brockmeyer, Alipio Ferreira, and Bassirou Sarr. 2025. "Algorithms and Bureaucrats: Evidence from Tax Audit Selection in Senegal." Policy Research Working Paper 11205. World Bank.

Bachas, Pierre, Anne Brockmeyer, Pablo Garriga, and Camille Semelet. 2025. "The Impact of COVID-19 on Formal Firms: Lessons from Administrative Tax Data." *Journal of Development Economics* 175: 103461.

Bachas, Pierre, Tatiana Flores, Gabriel Lara Ibarra, et al. 2025. "VAT Cashback Programs in Practice: TheCase of Devolve–ICMS in Rio Grande do Sul, Brazil." Prosperity Insight Series. World Bank.

Bachas, Pierre, and Anders Jensen. 2023. *Administrative Data and Methodologies for Tax Policy.* International Growth Centre.

Balboni, Clare, Johannes Boehm, and Mazhar Waseem. Forthcoming. "Firm Adaptation in Production Networks: Evidence from Extreme Weather Events in Pakistan." *American Economic Review*.

Barwahwala, Taha, Aprajit Mahajan, Shekhar Mittal, and Ofir Reich. 2024. "Is Model Accuracy Enough? A Field Evaluation of a Machine Learning Model to Catch Bogus Firms." NBER Working Paper 32705. National Bureau of Economic Research.

Benzarti, Youssef. 2020. "How Taxing Is Tax Filing? Using Revealed Preferences to Estimate Compliance Costs." *American Economic Journal: Economic Policy* 12 (4): 38–57.

Bergeron, Augustin, Arnaud Fournier, John Kabeya Kabeya, Gabriel Tourek, and Jonathan L. Weigel. 2023. *Using Machine Learning to Create a Property Tax Roll: Evidence from the City of Kananga, D.R. Congo.* ICTD Working Paper 176. Institute of Development Studies.

Bertanha, Marinho, Carolina Caetano, Hugo Jales, and Nathan Seegert. 2020. "Bunching Estimation Methods." In *Handbook of Labor, Human Resources and Population Economics,* edited by Klaus F. Zimmermann, 1–44. Springer International Publishing.

Best, Michael, Augustin Chaintreau, Joana Naritomi, and Dimitri Szerman. 2024. "When and Why Do Governments Pay More? Evidence from Brazil." Working Paper.

Bjarkefur, Kristoffer Gustav, Luiza Cardoso De Andrade, Benjamin B. Daniels, and Maria Ruth Jones. 2021. *Development Research in Practice: The DIME Analytics Data Handbook.* World Bank.

Bø, Erlend E., Joel Slemrod, and Thor O. Thoresen. 2015. "Taxes on the Internet: Deterrence Effects of Public Disclosure." *American Economic Journal: Economic Policy* 7 (1): 36–62.

Boning, William C., Nathaniel Hendren, Ben Sprung-Keyser, and Ellen Stuart. 2024. "A Welfare Analysis of Tax Audits Across the Income Distribution." *Quarterly Journal of Economics* 140 (1): 63–112.

Bowen, Claire McKay. 2024. "Government Data of the People, by the People, for the People: Navigating Citizen Privacy Concerns." *Journal of Economic Perspectives* 38 (2): 181–200.

Britto, Diogo G. C., Alexandre Fonseca, Paolo Pinotti, Breno Sampaio, and Lucas Warwar. 2025. "Intergenerational Mobility in the Land of Inequality." Working Paper.

Brockmeyer, Anne. 2019. *Working with Administrative Tax Data: A How-to-Get-Started Guide.* MTI Practice Note 7. World Bank.

Brockmeyer, Anne, François Gerard, Gabriel Ulyssea, et al. 2026. "Formal Labor Market Dynamics and Development." CEPR Discussion Paper DP21614. Centre for Economic Policy Research.

Brockmeyer, Anne, Giulia Mascagni, Vedanth Nair, Mazhar Waseem, and Miguel Almunia. 2024. "Does the Value-Added Tax Add Value? Lessons Using Administrative Data from a Diverse Set of Countries." *Journal of Economic Perspectives* 38 (1): 107–32.

Buda, Gergely, Stephen Hansen, Tomasa Rodrigo, Vasco M. Carvalho, Alvaro Ortiz, and José V. Rodríguez Mora. 2023. "National Accounts in a World of Naturally Occurring Data: A Proof of Concept for Consumption." Working Paper 2244. Cambridge Working Papers in Economics.

Burman, Leonard, Barry Johnson, Victoria L. Bryant, Graham MacDonald, and Robert McClelland. 2024. "Protecting Privacy and Expanding Access in a Modern Administrative Tax Data System." *National Tax Journal* 77 (4): 927–47.

Card, David, Raj Chetty, Martin S. Feldstein, and Emmanuel Saez. 2010. "Expanding Access to Administrative Data for Research in the United States." In *Ten Years and Beyond: Economists Answer NSF's Call for Long-Term Research Agendas*. American Economic Association. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1888586.

Caspi, Aviv, Jacob Goldin, Daniel Reck, and Daniel E. Ho. 2024. "Optimal Tax Audits Using Predictions." Working Paper.

Cattaneo, Matias D., Nicolás Idrobo, and Rocío Titiunik. 2020. *A Practical Introduction to Regression Discontinuity Designs: Foundations.* Elements in Quantitative and Computational Methods for the Social Sciences. Cambridge University Press.

Cattaneo, Matias D., Nicolás Idrobo, and Rocío Titiunik. 2024. *A Practical Introduction to Regression Discontinuity Designs: Extensions.* Elements in Quantitative and Computational Methods for the Social Sciences. Cambridge University Press.

Chacha, Peter Wankuru, Benard Kipyegon Kirui, and Verena Wiedemann. 2024. "Supply Chains in Times of Crisis: Evidence from Kenya's Production Network." *World Development* 173: 106363.

Clark, Julia, Georgina Marin, Oya Pinar Ardic Alper, and Guillermo Alfonso Galicia Rabadan. 2025. "Digital Public Infrastructure and Development: A World Bank Group Approach." Digital Transformation White Paper. World Bank.

Del Carmen, Giselle, Santiago Garriga, Wilman Ponce, and Thiago Scot. 2025. "Two Decades of Top Income Shares in Honduras." *Journal of Public Economics* 246: 105362.

Donovan, Kevin, Will Jianyu Lu, and Todd Schoellman. 2023. "Labor Market Dynamics and Development." *Quarterly Journal of Economics* 138 (4): 2287–325.

Grosh, Margaret, Phillippe Leite, Matthew Wai-Poi, and Emil Tesliuc, eds. 2022. *Revisiting Targeting in Social Assistance: A New Look at Old Dilemmas.* Human Development Perspectives. World Bank.

Hlatshwayo, Ayanda. 2025. "Introduction to the National Treasury Secure Data Facility." Unpublished presentation at the World Bank, March.

Junquera-Varela, Raúl Félix, Cristian Óliver Lucas-Mas, Ivan Krsul, Vladimir Calderón, and Paola Arce. 2022. "Digital Transformation of Tax and Customs Administrations." Equitable Growth, Finance and Institutions Insight. World Bank.

Kleven, Henrik Jacobsen. 2016. "Bunching." *Annual Review of Economics* 8: 435–64.

Knebelmann, Justine, Victor Pouliquen, and Bassirou Sarr. 2026. "Discretion versus Algorithms: Bureaucrats, Tax Equity, and Acceptability." IFS Working Paper 26/34. Institute for Fiscal Studies.

Lawson, Cina, Morlé Koudeka, Ana Lucía Cárdenas Martínez, Luis Iñaki Alberro Encinas, and Tina George Karippacheril. 2023. "Novissi Togo—Harnessing Artificial Intelligence to Deliver Shock-Responsive Social Protection." Social Protection and Jobs Discussion Paper 2306. World Bank.

Leite, David. 2024. "The Firm as Tax Shelter Micro Evidence and Aggregate Implications of Consumption Through the Firm." Working Paper 25. World Inequality Lab.

Li, Haonan, and Xuan Wang. 2025. "Firm Responses to Tax Audits: Regression Discontinuity Evidence from a Threshold-Based Audit Program." *Economic Journal* 136 (674): 560–601.

Lobel, Felipe, Thiago Scot, and Pedro Zúniga. 2024. "Corporate Taxation and Evasion Responses: Evidence from a Minimum Tax in Honduras." *American Economic Journal: Economic Policy* 16 (1): 482–517.

Londoño-Vélez, Juliana, and Dario Tortarolo. 2025. "Revealing 21% of GDP in Hidden Assets: Evidence from Argentina." *Journal of Public Economics* 250: 105471.

Oates, Wallace E., and Robert M. Schwab. 2015. "The Window Tax: A Case Study in Excess Burden." *Journal of Economic Perspectives* 29 (1): 163–80.

O'Hara, Amy. 2020. "Model Data Use Agreements: A Practical Guide." In *Handbook on Using Administrative Data for Research and Evidence-Based Policy,* edited by Shawn Cole, Iqbal Dhaliwal, Anja Sautmann, and Lars Vilhuber. Abdul Latif Jameel Poverty Action Lab. https://admindatahandbook.mit.edu/book/v1.0/dua.html.

Palomo, Theo, Davi Bhering, Thiago Scot, et al. 2025. *Tax Progressivity and Inequality in Brazil: Evidence from Integrated Administrative Data.* Report 9. EU Tax Observatory.

Pecenco, Matthew, Carlos Schmidt-Padilla, and Hamilton Taveras. 2026. "High Responsibility Work and Firm Creation: Experimental Evidence from the Dominican Republic." Working Paper.

Perez-Truglia, Ricardo. 2020. "The Effects of Income Transparency on Well-Being: Evidence from a Natural Experiment." *American Economic Review* 110 (4): 1019–54.

Pomeranz, Dina, and José Vila-Belda. 2019. "Taking State-Capacity Research to the Field: Insights from Collaborations with Tax Authorities." *Annual Review of Economics* 11: 755–81.

Reuters. 2024. "Stunning Photos Show Devastating Scale of Flooding in Brazil." May 10, 2024. https://www.reuters.com/pictures/stunning-photos-show-devastating-scale-flooding-brazil-2024-05-10/.

SEFAZ, RS (Secretaria da Fazenda do Estado de Rio Grande Do Sul). 2024. *Boletim Econômico Tributário: Edição No. 12.* SEFAZ, RS.

Slemrod, Joel. 2025. "Tax Privacy." *Journal of Economic Perspectives* 39 (1): 205–24.

Wani, Shahrukh. 2025. "From Data to Decisions: Improving Data Use in Governments." https://www.theigc.org/blogs/data-in-government-developing-countries.

Wiedemann, Verena, Benard K. Kirui, Vatsal Khandelwal, and Peter W. Chacha. 2024. "Spatial Inequality and Informality in Kenya's Firm Network." Policy Research Working Paper 10932. World Bank.

Wood, Alexandra, Micah Altman, Kobbi Nissim, and Salil Vadhan. 2022. "Designing Access with Differential Privacy." In *Handbook on Using Administrative Data for Research and Evidence-Based Policy,* edited by Shawn Cole, Iqbal Dhaliwal, Anja Sautmann, and Lars Vilhuber. Abdul Latif Jameel Poverty Action Lab. https://admindatahandbook.mit.edu/book/v1.0/diffpriv.html.

World Bank. 2021. *World Development Report 2021: Data for Better Lives.* World Bank.

CHAPTER 9

Policy Guidance

Prepared by Pierre Bachas, Oyebola Okunogbe, Mahvish Shaukat, and Dario Tortarolo

Introduction

This chapter provides policy makers and civil society with a practical guide to applying the report's key lessons and fiscal frontier framework in their own countries. A central theme of the report is that there is no single path to a stronger tax system. As such, this chapter prescribes how to identify feasible and appropriate reforms for a given context. Specifically, this chapter provides a simple framework for policy makers to assess their own country based on (1) the key features of its economy and institutions (referred to as its *structural fundamentals*) and (2) how well its tax system performs relative to peer countries given those fundamentals. Based on this assessment, the chapter outlines priorities for the tax system as a whole and for income, consumption, and property taxation specifically. It also highlights how technology, transparency, and trust can help strengthen tax systems.

How can countries identify tax reforms that are *feasible* and *appropriate?*

This section presents a two-step diagnostic framework that policy makers can apply to their own country to identify and prioritize effective tax reforms. The first step is to assess a country's structural fundamentals—its economic structure, administrative capacity, and political–institutional conditions—to identify which reforms are feasible. The second step is to benchmark the tax system's performance (that is, its ability to raise adequate revenues with minimal distortions, low compliance costs, and fairness) against that of countries with similar fundamentals to pinpoint the most-significant gaps. Together, these steps guide the prioritization and sequencing of reforms.

Step 1: What structural fundamentals determine feasible reforms?

Table 9.1 illustrates how to assess the structural fundamentals in a country. Although these conditions can evolve—and be relaxed through technology, transparency, and trust—they are relatively fixed in the short run.

- Each component of the fundamentals imposes different constraints:
  - **Weak economic structure.** Limits direct taxation, progressivity, and enforcement-intensive reforms. Policy makers should prioritize reforms with simple design and observable tax bases.
  - **Weak revenue administration capacity.** Limits policy complexity and enforcement effectiveness. Policy makers should prioritize reforms that focus on simplification; basic compliance systems; and investments in taxpayer registries, data, and digital infrastructure.
  - **Weak political and institutional foundations.** Limits the feasibility and durability of ambitious reforms. Policy makers should prioritize reforms that deliver visible, broadly shared gains to promote credibility, trust-building, and stakeholder engagement.
- Different constraints matter more for different reforms. For enforcement-intensive reforms, for example, revenue administration capacity determines whether a government can implement and enforce the reform, while political constraints determine whether it can manage resistance and mitigate backlash from affected stakeholders.

Table 9.1 Structural fundamentals

Constraint	Diagnostic Question	Sample Proxy Measures
Economic structure	To what extent is the tax base observable?	• Formal employment share • Self-employment share • Agricultural share of GDP • Economic complexity
Revenue administration capacity	How capable is the tax authority of carrying out core functions?	• Taxpayer registration coverage • Data integration with other public and private sector entities • Skills and training of tax officials • Staff-to-taxpayer ratio
Political and institutional constraints	How much political support and credibility exist?	• World Governance Indicators • Corruption perceptions • Perceived tax fairness

Source: Original table for this publication.

Note: GDP = gross domestic product.

- While the three dimensions are conceptually distinct, they are correlated and often mutually reinforcing. For example, political constraints may shape investments in administrative capacity.
- In practice, policy makers can assess their country's structural fundamentals using a principal component analysis (PCA) index that combines six indicators: the share of employees, economic complexity, taxpayer registration coverage, tax staff per capita, an innovation in tax administration score, and a measure of control of corruption. As a simple benchmark, a positive score indicates relatively strong fundamentals and a negative score relatively weak fundamentals. This provides a starting point for identifying policy priorities rather than a fixed classification: The report's website (https://www.worldbank.org/en/publication/raising-revenue-right) allows users to explore alternative measures and thresholds.

Step 2: How far is the country from its fiscal frontier?

Countries lie on the fiscal frontier if they achieve high levels of both efficiency and equity (refer to chapter 1). Table 9.2 presents variables that policy makers can use to compare their country against other countries with similar fundamentals in order to reveal performance gaps in efficiency and equity and indicate priority areas for improvement.

- Within comparable country groups, the fiscal frontier traces the best-possible observed combinations of efficiency and equity, indicating what is achievable in practice.

Table 9.2 Tax system performance: Distance to frontier

Dimension	Diagnostic Question	Practical Proxy Measures
Efficiency	Does the tax system minimize economic distortions and compliance costs?	• PIT, CIT, and VAT revenue productivity • EMTRs • Compliance burden (time and payments) • Tax rate dispersion across firms • Revenue share of tariffs and input taxes
Equity	Is the tax burden distributed in line with societal preferences for fairness and redistribution?	• Redistributive impact of taxes and transfers (pre- versus post-tax Gini) • Progressivity of PIT • Share of direct versus indirect taxation • Incidence of preferential tax regimes • Taxation of capital and top earners

Source: Original table for this publication.

Note: CIT = corporate income tax; EMTRs = effective marginal tax rates; PIT = personal income tax; VAT = value-added tax.

Box 9.1 Revenue adequacy and the fiscal frontier

The fiscal frontier evaluates tax systems along two dimensions: efficiency and equity. It does not determine how much revenue a country should raise. That question depends on revenue adequacy: whether the benefits of additional public spending exceed the costs of raising additional tax revenue. Economists summarize this tradeoff using the Marginal Value of Public Funds (MVPF) framework, which compares the social value of an additional dollar of public spending with the economic cost of raising it through taxation. A country is revenue adequate when these two are balanced. Chapter 7 covers the MVPF approach in greater detail.

In practice, however, many governments face short-run fiscal constraints that make raising revenue unavoidable. High debt, financing pressures, or limited access to borrowing may leave little alternative to increasing revenue, even when additional taxes impose large economic costs. In these circumstances, the relevant policy question is not whether to raise revenue but how to do so in the most-efficient and -equitable way.

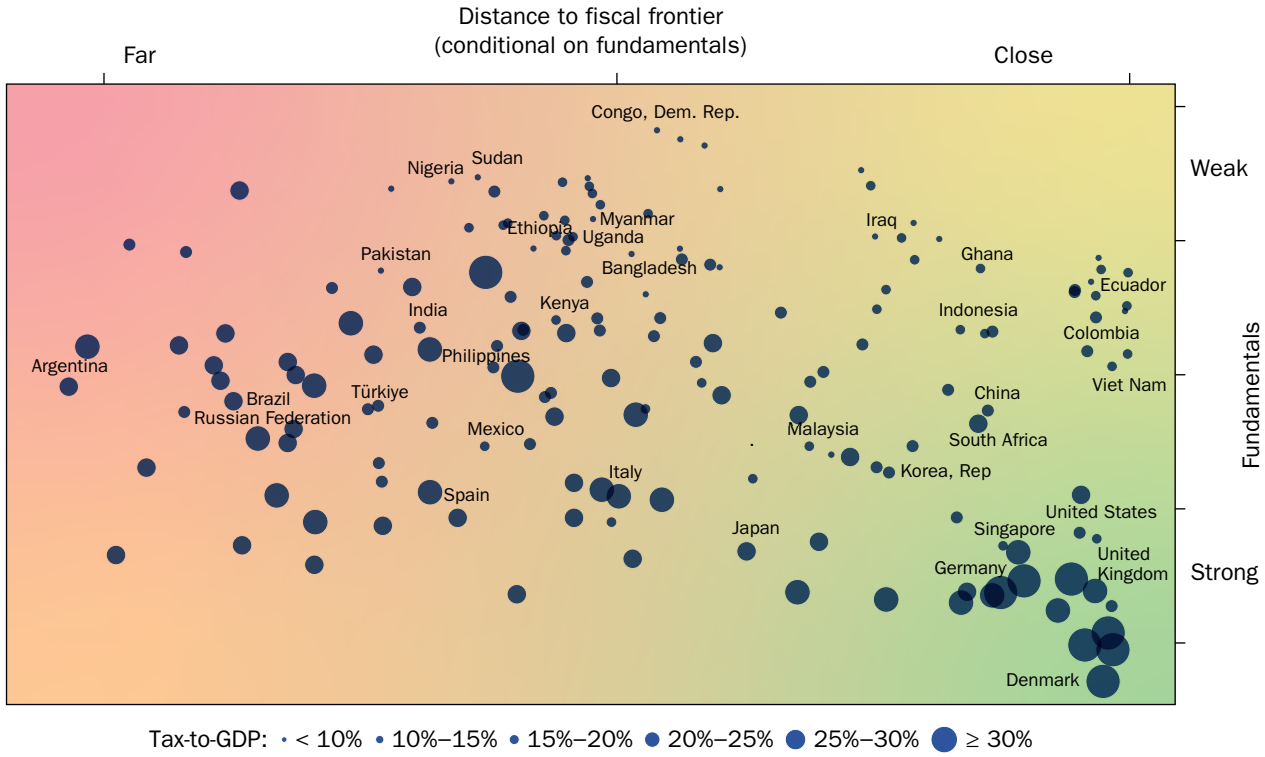
- Although reforms can improve both equity and efficiency—especially in countries far from the fiscal frontier—it is important to identify the primary objective of a reform to ensure that its impact is targeted at closing the underlying performance gap. Moving forward, this framework will refer to countries as either far or near the fiscal frontier of their country grouping to guide policy prioritization.

Linking feasibility and performance: The reform space

Combining the two diagnostic steps helps policy makers identify where their country stands and what types of reforms to prioritize. Countries with weak fundamentals and weak tax system performance fall in the red group, pointing to constraints on both reform capacity and performance. Weak fundamentals but relatively strong performance place a country in the yellow group, while stronger fundamentals but persistent tax system weaknesses place it in the orange group. Countries combining strong fundamentals with strong performance fall in the green group.

Figure 9.1 maps the location of countries within the reform space, based on the measures of structural fundamentals and tax system performance described earlier. Most countries are located some distance from the estimated fiscal frontier, suggesting scope for improving tax system performance along the dimensions captured by the diagnostic. The figure also shows that tax-to-GDP ratios vary widely both near and far from the frontier, reinforcing the point that revenue levels alone provide an incomplete picture of tax system performance.

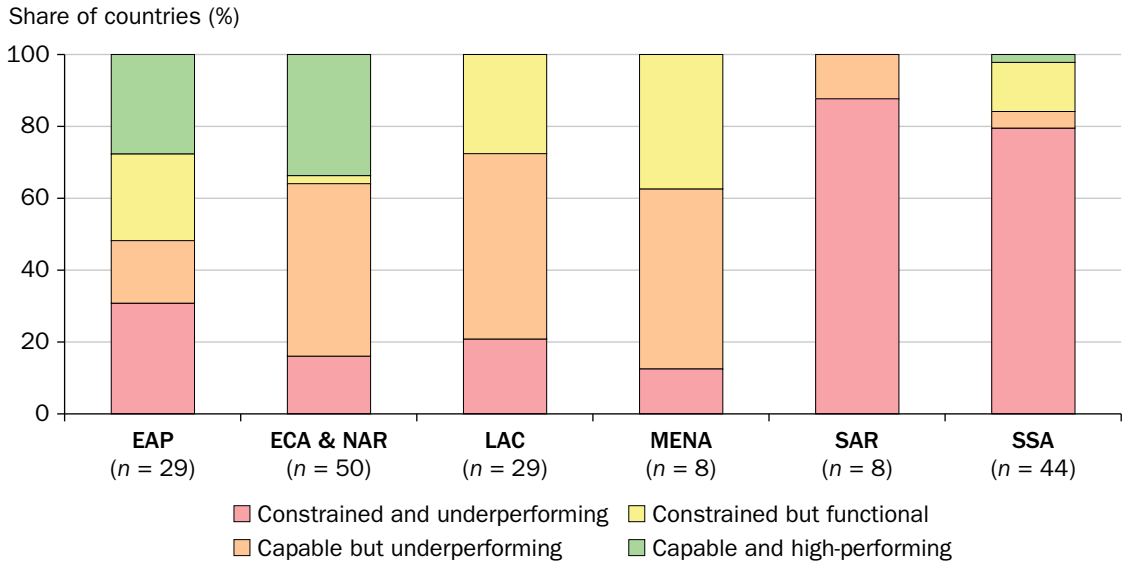
Figure 9.1 **Locating countries in the reform space**



Sources: Original figure for this publication based on data from the United States Agency for International Development, the Research School of International Taxation–International Tax Institutions, the World Bank Enterprise Surveys, the World Inequality Database, the International Monetary Fund's World Revenue Longitudinal Database, the World Development Indicators, the Worldwide Governance Indicators, the International Survey on Revenue Administration, and the Harvard Growth Lab's Atlas of Economic Complexity.

Note: This figure shows the location of countries within the reform space. In step 1, fundamentals are constructed via principal component analysis, including six indicators: share of employees, economic complexity, control of corruption, taxpayer registration coverage, tax staff per capita, and an innovation in tax administration score. In step 2, distances to the efficiency–equity fiscal frontiers are calculated separately for countries with strong fundamentals and weak fundamentals. Refer to box 1.3 in chapter 1 for details on the construction of efficiency and equity scores. GDP = gross domestic product.

Figure 9.2 **Locating countries in the reform space: Regional classification**



Sources: Original figure for this publication based on data from the United States Agency for International Development, the Research School of International Taxation–International Tax Institutions, the World Bank Enterprise Surveys, the World Inequality Database, the International Monetary Fund's World Revenue Longitudinal Database, the World Development Indicators, the Worldwide Governance Indicators, the International Survey on Revenue Administration, and the Harvard Growth Lab's Atlas of Economic Complexity.

Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; NAR = North America; LAC = Latin America and the Caribbean; MENA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

Figure 9.2 presents the share of countries in each of the four country groups—*constrained and underperforming*, *constrained but functional*, *capable but underperforming*, and *capable and high-performing*—across regions. The figure reveals clear regional differences in the distribution of country types. South Asia and Sub-Saharan Africa are dominated by *constrained and underperforming*, while East Asia and Pacific, Europe and Central Asia, and Latin America and the Caribbean exhibit a more diverse mix of country groups, reflecting greater variation in fundamentals and tax system performance.

Table 9.3 summarizes the priorities for each of the four country groups and highlights tailored reforms with empirical evidence of effectiveness.

Table 9.3 Reform pathways toward the fiscal frontier

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming*** **Status:** Poor tax design and weak administrative systems. **Priority: Build foundations.** Establish core tax capacity and enforcement with technology. **Successful examples** • Roll out electronic tax filing.[a] • Strengthen the large taxpayer office.[b] • Back property enumeration by credible enforcement.[c]	***Constrained but functional*** **Status:** Functional tax design, but persistent informality and modest administrative capacity. **Priority: Expand coverage.** Broaden the tax net with technology. **Successful examples** • Roll out electronic billing machines.[d] • Use data analytics for compliance monitoring.[e] • Strengthen property valuation systems.[f]
Strong fundamentals	***Capable but underperforming*** **Status:** Strong administrative tools, but inefficiencies in tax design, political economy barriers, and lack of fairness. **Priority: Simplify and build trust.** Streamline policy design and improve fairness with transparency and trust. **Successful examples** • Unify fragmented consumption taxes.[g] • Couple a tax amnesty program with credible enforcement.[h] • Evaluate and remove ineffective tax incentives.[i]	***Capable and high-performing*** **Status:** Broad-based taxes and data-driven administration. **Priority: Deepen transparency and coordination.** Optimize performance and future-proof the system with technology and transparency. **Successful examples** • Use automatic exchange of financial information.[j] • Connect tax bases through beneficial ownership data.[k] • Use automatic pre-filling of tax returns.[l]

Source: Original table for this publication.

Note:
a. For more information, refer to Okunogbe and Pouliquen (2022).
b. For more information, refer to Basri et al. (2021).
c. For more information, refer to Okunogbe (forthcoming).
d. For more information, refer to Mascagni et al. (2021).
e. For more information, refer to Almunia et al. (2024).
f. For more information, refer to Knebelmann et al. (2026).
g. For more information, refer to Barreix et al. (2025).
h. For more information, refer to Londoño-Vélez and Tortarolo (2025).
j. For more information, refer to Johannesen et al. (2026).
i. For more information, refer to Cali et al. (2025).
k. For more information, refer to Brounstein et al. (2026).
l. For more information, refer to Saez and Seim (2025).

How can the 3*T*s strengthen core tax instruments?

The framework yields guidance for the main tax instruments: taxes on income, consumption, and property. For each instrument, we outline key design principles and show how reform priorities vary depending on a country's structural fundamentals and tax system performance, using the 2 × 2 framework presented in Table 9.3. We then illustrate how technology, transparency, and trust can help address these priorities and move countries closer to their respective fiscal frontiers.

Income taxation

Taxes on personal income (PIT) and corporate income (CIT) raise most revenue in advanced and many middle-income countries, adapt to individual circumstances, and are progressive when well designed and enforced. While some income tax limitations are inherent, many stem from limited information and enforcement capacity, which create opportunities for avoidance, concealment, and profit shifting. The 3*T*s reduce these constraints, giving rise to several broad principles.

- **PIT 1.** Broaden the base by limiting deductions and, in some cases, lowering exemption thresholds.
- **PIT 2.** Ensure that progressive income taxes extend to the top of the income distribution.
- **PIT 3.** Reduce disparities in the taxation of labor and capital income.
- **CIT 1.** A simple, broad, and moderately rated corporate tax remains indispensable.
- **CIT 2.** Rationalize corporate tax incentives to broaden the base and level the playing field.
- **CIT 3.** Strengthen the taxation of multinational enterprises (MNEs) through domestic reforms and global cooperation.

Table 9.4 summarizes priority income tax reforms for each country group.

Constrained and underperforming

Income taxation is narrow and fragmented, reaching few taxpayers. Exemptions, special regimes, and weak enforcement facilitate avoidance and income shifting and reduce revenue and progressivity.

The priority is to build the foundations of effective income taxation by using technology to simplify compliance, broaden the base, and strengthen administration. Examples include expanding large and medium taxpayer units (refer to the case of Indonesia in the section "Strategically Assign Tax Officials to Taxpayers" in chapter 5), requiring comprehensive PIT filing by top taxpayers to obtain a fuller view of income across sources (refer to the case of Senegal in the

Table 9.4 Reform pathways for income taxation

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming*** Build foundations. • Simplify CIT exemptions and special regimes, and prioritize broad bases and moderate rates. • Expand PIT filing among top earners, consolidate income across sources under moderate rates. • Strengthen large taxpayer units and oversight of multinational firms and high-risk taxpayers.	***Constrained but functional*** Expand coverage. • Broaden PIT reporting: Mandate filing, include capital income, and consider reducing the the exemption threshold. • Participate in international tax coordination and the exchange of information. • Invest in risk analysis, interoperable data systems, and digital compliance tools.
Strong fundamentals	***Capable but underperforming*** Simplify and build trust. • Eliminate unjustified CIT provisions and tax expenditures to free fiscal space. • Restore effective taxation and progressivity at the top of the income distribution with transparency tools. • Regularly evaluate and publish the costs and distributional effects of tax incentives.	***Capable and high-performing*** Deepen transparency and coordination. • Cooperate internationally to limit profit shifting and harmful tax competition. • Move toward comprehensive income taxation integrating income sources while addressing capital income timing. • Leverage data for real-time policy evaluation, risk-based enforcement, and transparency on tax incidence.

Source: Original table for this publication.

Note: CIT = corporate income tax; PIT = personal income tax.

section "Opportunities to Tax Top Economic Actors" in chapter 4), and evaluating special regimes to eliminate those with limited economic benefits (refer to Tunisia's investment tax incentives case in the section "Efficiency and Equity of Tax Incentives" in chapter 6).

Constrained but functional

Income taxation is relatively simple and broad based, with some alignment between personal and corporate taxes, yet raises limited revenue. Coverage remains incomplete among top earners and capital income recipients, while information constraints weaken compliance.

The priority is to expand the reach of income taxation with technology and transparency. Examples involve using integrated administrative data for risk-based audits (refer to the case of Senegal in the section "Essential Ingredients for Successful Technology Reforms" in chapter 3),

participating in the automatic exchange of financial information to tax offshore income and assets (refer to the case of South Africa in the section "*A* Is for Automatic Exchange of Information on Offshore Financial Wealth" in chapter 4), and adopting beneficial ownership registries to increase the transparency of business income and ownership structures (refer to the case of Ecuador in the section "*B* Is for Beneficial Ownership: Corporate Control and Benefits" in chapter 4).

Capable but underperforming

Income taxation is supported by strong administrative capacity, but tax design remains overly complex. Preferential regimes and uneven treatment across income sources create distortions, compliance costs, and inequities. The tax system falls short of desired levels of progressivity and fairness.

The priority is to simplify compliance and strengthen trust in the tax system. Examples include using third-party information exchange to better assess top incomes (refer to the case of Argentina in the section "*A* Is for Automatic Exchange of Information on Offshore Financial Wealth" in chapter 4), developing one-stop taxpayer portals and pre-filling tax returns (refer to the case of South Africa in the section "Use of Technology for Core Tax Functions" in chapter 3), and communicating who bears the tax burden and who benefits from tax expenditures (refer to the case of Brazil in the section "HNWIs and Income Taxation" in chapter 4).

Capable and high-performing

Income taxation is broad based and supported by strong administration, but gaps remain at the top of the income distribution and in the taxation of capital. A growing share of income accrues through corporations, financial assets, and cross-border structures that are difficult to observe and tax domestically, while international tax competition continues to erode the corporate tax base.

The priority is to move toward comprehensive taxation of income by strengthening transparency and international coordination. Examples include participating in automatic exchange of financial information and emerging frameworks for crypto assets, obtaining integrated views of income through beneficial ownership registries and linked data, and cooperating on taxation of multinationals and the digital economy (refer to chapter 4). Together, these reforms can support deeper integration across income sources and closer alignment between personal and corporate income taxation.

Consumption taxes

Indirect consumption taxes are the revenue workhorses in most emerging market and developing economies (EMDEs), but their potential remains underexploited. Where administrative capacity is limited, the main policy challenge is a compliance gap: Weak enforcement, high registration thresholds, and fraud leave large portions of the base untaxed. Where capacity is stronger, the policy challenge is a policy gap: Exemptions, reduced rates, delayed refunds, and special regimes narrow the base and distort economic decisions. The 3*T*s create opportunities to address both gaps. Several principles apply broadly:

- Maintain a broad tax base and a uniform rate, and avoid ad hoc transaction taxes on turnover or digital payments.
- Calibrate value-added tax (VAT) thresholds and simplified regimes to balance compliance costs with the integrity of the VAT chain.
- Use digital tools to strengthen enforcement and reduce compliance costs, and adopt artificial intelligence progressively as capacity develops.
- Address equity through targeted transfers and VAT cashbacks rather than exemptions.
- Regularly evaluate and communicate the revenue, efficiency, and distributional effects of tax expenditures, applying Marginal Value of Public Funds (MVPF) analysis where feasible.

Table 9.5 presents a set of priority actions for the countries in our taxonomy based on their fundamentals and distance to the fiscal frontier.

Constrained and underperforming

Consumption taxation is fragmented. The VAT is narrowed by exemptions and relies on a few easily observable taxpayers. Governments often rely on tariffs, turnover taxes, or mobile money levies because they are administratively simple, while digital compliance infrastructure remains limited.

The priority is to build a simple, broad-based VAT supported by core digital capabilities. A uniform rate with few exemptions should be complemented by investments in electronic filing (e-filing), taxpayer registries, third-party cross-checks, and electronic sales reporting. Ethiopia's experience with electronic sales registration machines illustrates the potential gains (refer to the section "Verifying Tax Liabilities" in chapter 3). Digital payments should serve as a tax infrastructure rather than a tax base. Even simple artificial intelligence (AI) tools such as risk scoring and taxpayer service chatbots can strengthen enforcement and accessibility. Clear communication about who pays and who benefits is essential to sustain reform.

Table 9.5 Reform pathways for consumption taxation

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming*** Build foundations. • Simplify consumption tax system: Move toward a single rate with minimal exemptions. • Establish basic e-filing and e-payment to lower compliance costs and reduce discretion. • Explore simple digital and AI tools for risk scoring and taxpayer services.	***Constrained but functional*** Expand coverage. • Gradually lower VAT registration thresholds as the compliance infrastructure expands, guided by tax data. • Invest in interoperable data systems, risk analysis, and AI tools to improve enforcement and taxpayer experience. • Expand digital filing and payment tools, ensuring accessibility for small and newly covered firms.
Strong fundamentals	***Capable but underperforming*** Simplify and build trust. • Rationalize VAT exemptions and reduced rates, and redirect savings to targeted assistance for those in need. • Leverage tax data with AI-powered risk analysis for systematic audits, cross-checks, and faster refund processing. • Evaluate consumption tax expenditures regularly to reveal who benefits from exemptions and build support for reform.	***Capable and high-performing*** Deepen transparency and coordination. • Use AI and advanced analytics for real-time risk-based VAT compliance and fraud detection. • Deploy personalized VAT cashbacks where digital infrastructure permits. • Publish distributional analyses, including the equity effects of cashbacks and excises.

Source: Original table for this publication.

Note: AI = artificial intelligence; e-filing = electronic filing; e-payment = electronic payment; VAT = value-added tax.

Constrained but functional

The VAT is simple and moderately rated, but coverage is limited: High registration thresholds, informality, and weak enforcement keep firms outside the tax net.

The priority is to protect simplicity while gradually broadening coverage through technology. Expanding electronic invoicing (e-invoicing), strengthening risk analysis, and deploying AI for audit selection and taxpayer assistance can improve compliance without overburdening small firms. Rwanda's phased e-invoicing rollout illustrates this approach (refer to the section "Verifying Tax Liabilities" in chapter 3). As capacity improves, tax authorities can gradually lower thresholds and emphasize that broader participation enables fairer treatment across firms.

Capable but underperforming

The system is burdened by exemptions, reduced rates, special regimes, delayed refunds, and other distortions that narrow the base, raise compliance costs, and weaken trust by treating similar taxpayers differently. Digital infrastructure exists but remains underutilized, while tax expenditures are large and rarely evaluated.

The priority is to rationalize exemptions and rates while using technology and transparency to build support for reform. Brazil's VAT reform illustrates this approach, combining the simplification of multiple cascading taxes with technology-enabled cashbacks for low-income people (refer to box 1.1 in chapter 1). In many countries where VAT rates are high but compliance is weak, the natural reform path is to close the compliance gap through digital enforcement and use the resulting revenue gains to lower rates while maintaining revenue neutrality. Publishing tax expenditure reports can help reveal who benefits from exemptions and shift political incentives. Accelerating VAT refunds is equally important, as delays undermine trust. Malaysia's repeal of the goods and services tax (GST) in 2018 illustrates that even well-designed reforms can fail without sustained public support.

Capable and high-performing

The tax base is broad, rates are simple, and compliance systems are strong. The main challenges are strengthening equity and safeguarding integrity through advanced data analytics.

The priority is to fully leverage existing data. AI can sharpen risk-based audits, personalized VAT cashbacks can improve progressivity without narrowing the base, and transparent distributional analysis can strengthen trust and support for broad-based consumption taxation.

Property taxes

Taxes on immovable property can be an efficient and equitable source of local revenue if designed well. In many EMDEs, however, property taxation remains underutilized due to incomplete property registries, outdated valuations, weak enforcement, and political resistance. Advances in digital cadastres, geospatial technologies, and administrative data integration, together with greater attention to building trust, are creating new opportunities to address the technical and political barriers to effective property taxation. The following policy recommendations apply to most countries:

- Give local governments responsibility for administering property taxes, with central governments setting standards and providing support where local capacity is weak.
- Use digital and geospatial technologies to expand coverage and improve compliance.

- Manage revaluations carefully by phasing them in where appropriate, communicating their benefits clearly, and providing targeted relief for vulnerable households.
- Build stronger property tax administration by investing in staff skills, incentives, and effective audit and compliance systems.

Table 9.6 presents a set of priority actions based on our country taxonomy. The main characteristics of each group and the illustration of how the 3*T*s can help overcome country-specific constraints to expand the role of property taxation are described as follows.

Constrained and underperforming

Property taxation is limited by incomplete property information and low administrative capacity. Thus, large numbers of properties remain outside the tax net, valuations are often absent or highly outdated, and collection rates are low. Governments struggle to expand coverage or increase liabilities due to political resistance.

Table 9.6 Reform pathways for property taxation

	Far from Fiscal Frontier	Close to Fiscal Frontier
Weak fundamentals	***Constrained and underperforming*** Build foundations. • Establish or modernize basic property cadastres and taxpayer registries. • Simplify valuation methods using area-based or standardized approaches where markets are thin. • Build local tax officials' capacity through basic training in property registration, valuation methods, and digital record management.	***Constrained but functional*** Expand coverage. • Expand property registration using digital mapping tools, and gradually update outdated valuations. • Improve coordination and data sharing among land registries, municipal records, and tax administration systems. • Develop specialized audit, GIS, and data management skills within tax administrations.
Strong fundamentals	***Capable but underperforming*** Simplify and build trust. • Rationalize exemptions and preferential treatments, while protecting vulnerable households through targeted relief. • Regularly update property valuations to reflect market conditions and reduce inequities. • Strengthen political support for reform by linking revenues to visible local infrastructure and services.	***Capable and high-performing*** Deepen transparency and coordination. • Use advanced analytics to improve valuation accuracy, detect underreporting, and identify properties missing from the tax roll. • Link property taxation with urban planning, land use, and climate resilience. • Regularly assess taxpayer responses and the accuracy and cost of property valuation.

Source: Original table for this publication.

Note: GIS = Geographic Information System.

The priority is to establish the basic infrastructure for property taxation. Examples include creating or digitizing property registries (refer to the case of Liberia in the section "Identification of Taxpayers and the Taxbase" in chapter 3), using satellite imagery and geospatial technologies to identify unregistered properties (refer to the case of Senegal in box 3.4 in chapter 3), and introducing simple area-based valuation methods where market data are scarce.

Constrained but functional

Basic property tax systems are in place, but coverage remains incomplete and assessments often diverge from market values. Administrative systems allow for tax collection, but compliance is uneven and enforcement capacity is limited. While property taxation generates revenue, it remains well below its potential.

The priority is to use technology to improve coverage, valuation, and compliance. Examples include using data to value properties more consistently, making tax payments easier through digital systems, and targeting enforcement where noncompliance is most likely. This should be complemented by strengthening tax administration staff capacity (refer to the case of Pakistan in the section "Politicians and Bureaucrats" in chapter 5).

Capable but underperforming

Administrative capacity is relatively strong and most properties are covered, but valuation systems are often outdated, complex, or inconsistently applied. Exemptions and preferential treatments reduce equity and revenue, and public opposition limits reforms to increase liabilities.

The priority is to strengthen trust and transparency while improving valuation systems. Examples include simplifying exemption regimes, improving taxpayer appeals processes, and increasing transparency regarding the use of local property tax revenues. These measures can help build support for more difficult reforms, such as regular revaluations. Policy makers can also time reforms strategically with electoral cycles and term limits (refer to the case of Brazil in box 5.4 in chapter 5).

Capable and high-performing

Property tax systems have broad coverage, up-to-date valuations, and strong compliance. However, revenue may still be constrained by political resistance to revaluations, limits on property tax increases, or exemptions that disproportionately benefit high-value properties.

The priority is to ensure that property taxation keeps pace with changes in property values. Examples include using market transaction data and automated valuation tools to update property valuations regularly.

How should countries balance the tax mix?

The previous sections examined income, consumption, and property taxes separately. In practice, governments must decide how much to rely on each. Box 9.2 explains how governments can use the best-available evidence to inform these choices while strengthening their capacity for policy evaluation over time. While the MVPF provides the appropriate framework for evaluating the tax mix, broad lessons can, nevertheless, be drawn from a country's administrative foundations and distance from the fiscal frontier.

- **Consumption taxes dominate in most EMDEs, making well-targeted transfers important for equity.** Where informality is widespread and income is hard to verify, taxing transactions at observable points such as borders, digital platforms, and large firms is often easier than taxing income. But because indirect taxes have limited redistributive capacity and can increase poverty, much of the redistributive role falls on the spending side of the budget.
- **The 3*T*s can shift the balance toward direct taxation.** Technology lowers the cost of direct taxation. Transparency increases the visibility of income, assets, and profits, while trust strengthens compliance and support for reform. As the 3*T*s expand tax capacity, countries can shift from distortionary but easy-to-collect taxes—such as tariffs, turnover taxes, and mobile money taxes—toward income and property taxes. Consumption taxes remain essential, but their equity concerns are often better addressed through targeted transfers than reduced rates. As constraints ease, the tax mix can shift toward more progressive instruments.
- **Group specific tax mix priorities.**
  - **Constrained and underperforming:** Replace distortionary transaction taxes with a broader-based VAT. Redistribution is best achieved via transfers.
  - **Constrained but functional:** Complement VAT with a gradual expansion of income and property taxation among the top earners.
  - **Capable but underperforming:** Reallocate revenue collection toward the more effective instruments; simplify underperforming taxes.
  - **Capable and high-performing:** Increase the role of taxation of top earners supported by international coordination to protect mobile tax bases.

How can countries build the tax systems of the future?

AI is likely to reshape both tax capacity and the tax mix, requiring governments to adapt tax policy and administration to a rapidly changing economic environment.

- **Prepare for a different tax mix.** AI may reduce the labor share of income while expanding digital commerce and electronic payments, making transactions easier to trace and reinforcing the role of broad-based consumption taxes. If labor income becomes a smaller share of the tax base, governments may need to rely more heavily on consumption taxes to sustain revenues, particularly where income taxes fail to effectively capture nonlabor income. At the same time, stronger information systems and administrative capacity may expand the scope for taxing capital and business income.
- **Protect capital taxation through coordination.** AI-intensive production relies on intangible assets, data, and platform-based business models, increasing the concentration and mobility of profits. As capital income becomes more important and harder to tax, preserving the CIT requires stronger international coordination on multinationals, digital activities, and cross-border capital income.
- **Invest in the 3*T*s regardless of how AI evolves.** Technological change increases the value of flexibility in tax systems. Governments should avoid locking themselves into narrow tax bases, excessive exemptions, or sector-specific incentives that may quickly become obsolete. The key investment is not in predicting how AI will reshape the economy but in building the capacity to adapt. Countries that can better observe economic activity, evaluate policies, and maintain taxpayer confidence will be better positioned to adjust their tax mix as new forms of income, consumption, and business organization emerge. In this sense, the 3*T*s are less a response to any particular technological scenario than a way to preserve fiscal capacity amid uncertainty.

Box 9.2 Evidence-based fiscal policy

Evidence-based fiscal policy requires both using the best-available evidence to guide current revenue and spending choices and building the data and analytical capacity to evaluate their effects and inform future decisions.

- **Use evidence to guide revenue and spending choices.** The Marginal Value of Public Funds (MVPF) framework provides a rigorous way to compare taxes and expenditures by weighing

(Continued)

Box 9.2 Evidence-based fiscal policy *(continued)*

their revenue and welfare effects. While few countries currently have sufficient evidence to estimate MVPFs systematically across a broad range of policies, the framework can still inform decisions by combining local data with behavioral parameters from other settings. It encourages policy makers to be explicit about policy goals and to evaluate reforms against these goals in a transparent and comparable manner.

- **Build the foundations for policy evaluation.** The expansion of administrative tax data creates unprecedented opportunities to monitor economic activity and evaluate policy. Realizing this potential requires investments in interoperable data systems, analytical capacity, and secure data sharing. Tax and spending reforms should also be designed with evaluation in mind, including clear objectives, measurable outcomes, and provisions for data collection. Over time, these investments and practices can help tax administrations play a greater role as policy laboratories, generating evidence to improve the design of fiscal policy.

References

Almunia, Miguel, Jonas Hjort, Justine Knebelmann, and Lin Tian. 2024. "Strategic or Confused Firms? Evidence from 'Missing' Transactions in Uganda." *Review of Economics and Statistics* 106 (1): 256–65. https://direct.mit.edu/rest/article-abstract/106/1/256/109918/Strategic-or-Confused-Firms-Evidence-from-Missing?.

Barreix, Alberto Daniel, Melina De Souza Rocha Lukic, and José Barroso Tostes Neto. 2025. *The Three Innovative Features of VAT in Brazil's Indirect Tax Reform*. Inter-American Development Bank. https://publications.iadb.org/en/three-innovative-features-vat-brazils-indirect-tax-reform.

Basri, M. Chatib, Mayara Felix, Rema Hanna, and Benjamin A. Olken. 2021. "Tax Administration versus Tax Rates: Evidence from Corporate Taxation in Indonesia." *American Economic Review* 111 (12): 3827–871. https://www.aeaweb.org/articles?id=10.1257/aer.20201237.

Brounstein, Jakob, Pierre Bachas, and Alex Bajana. 2026. "The Transparency Tax: Discouraging Firm Ownership via Tax Havens in Ecuador." Unpublished Paper. https://tinyurl.com/TransparencyTaxEcuador.

Calí, Massimiliano, Giorgio Presidente, and Thiago Scot. 2025. *The Elusive Impact of Corporate Tax Incentives*. Policy Research Working Paper 11061. World Bank. https://openknowledge.worldbank.org/entities/publication/4a0277e4-beab-46df-af96-e24ffa5702c4.

Johannesen, Niels, Lauge Larsen, and Nadine Riedelet. 2026. "Does Global Financial Transparency Improve Tax Compliance in Developing Countries?" WIDER Working Paper 2026/58. United Nations University–World Institute for Development Economics Research. https://sa-tied.wider.unu.edu/article/does-global-financial-transparency-improve-tax-compliance-in-developing-countries.

Knebelmann, Justine, Victor Pouliquen, and Bassirou Sarr. 2026. "Discretion versus Algorithms: Bureaucrats, Tax Equity, and Acceptability." IFS Working Paper 26/34. Institute of Fiscal Studies. https://ifs.org.uk/sites/default/files/2026-05/WP202634-Discretion-versus-algorithms-bureaucrats-tax-equity-and-acceptability.pdf.

Londoño-Vélez, Juliana, and Dario Tortarolo. 2025. "Revealing 21% of GDP in Hidden Assets: Evidence from Argentina." *Journal of Public Economics* 250: 105471. https://www.sciencedirect.com/science/article/pii/S0047272725001690.

Mascagni, Giulia, Andualem T. Mengistu, and Firew B. Woldeyes. 2021. "Can ICTs Increase Tax Compliance? Evidence on Taxpayer Responses to Technological Innovation in Ethiopia." *Journal of Economic Behavior and Organization* 189: 172–93. https://www.sciencedirect.com/science/article/pii/S0167268121002407.

Okunogbe, Oyebola. Forthcoming. "Becoming Legible to the State: The Necessary but Not Sufficient Role of Identification in Taxation." *American Economic Review*. https://www.aeaweb.org/articles?id=10.1257/aer.20230586.

Okunogbe, Oyebola, and Victor Pouliquen. 2022. "Technology, Taxation, and Corruption: Evidence from the Introduction of ElectronicTax Filing." *American Economic Journal: Economic Policy* 14 (1): 341–72. https://www.aeaweb.org/articles?id=10.1257/pol.20200123.

Saez, Emmanuel, and David G. Seim. 2025. "Wealth Tax Enforcement in Sweden: Filing Requirements and Pre-Populated Returns." NBER Working Paper 33419. National Bureau of Economic Research. https://www.nber.org/papers/w33419.

A WORLD BANK POLICY RESEARCH REPORT

Raising revenue right is a defining challenge for emerging market and developing economies as they seek to mobilize sufficient revenue while limiting efficiency distortions and ensuring fairness.

Raising Revenue Right: A Roadmap for Domestic Resource Mobilization offers an integrated framework and practical policy guidance for balancing efficiency and fairness in revenue collection. It draws on public finance research and country case studies to show that the 3*T*s—technology and better use of tax data, transparency and cross-border information sharing in taxing top economic actors, and stronger trust between citizens and the state—can improve tax policy, tax administration, and compliance. The book also provides a practical toolkit covering environmental and industrial tax policy, the Marginal Value of Public Funds framework, and the use of administrative tax data for policy insights.

"A clear-headed roadmap . . . informed by the latest research findings, while being grounded in the realities of tax collection in the developing world."

—JOEL SLEMROD, Professor of Economics and Paul W. McCracken Collegiate Professor of Business Economics and Public Policy at the Stephen M. Ross School of Business, University of Michigan

"This volume provides a terrific framework and a workable roadmap for countries to act. From my experience as a former finance minister struggling to fix tax administration and mobilize domestic revenues in Nigeria, I find the book of great practical use for policy makers."

—NGOZI OKONJO-IWEALA, Director–General of the World Trade Organization, former Finance Minister of Nigeria, and former Managing Director of Operations at the World Bank

"Raising Revenue Right makes a compelling case that domestic resource mobilization is not simply about collecting more, but about collecting better. . . . Particularly welcome is its emphasis on protecting poor and vulnerable households while ensuring that those with greater ability to pay contribute their fair share."

—NORA LUSTIG, Professor Emerita and Founding Director, Commitment to Equity Institute, Tulane University, and Professor, Office of the President, El Colegio de Mexico

"This report goes past the familiar benchmark of a target tax-to-GDP ratio to ask which reforms are actually feasible, and where. . . . Bachas, Okunogbe, Shaukat, and Tortarolo have produced the rare synthesis that consolidates frontier research and still tells practitioners where to start."

—ADNAN KHAN, Professor, School of Public Policy, London School of Economics and Political Science, and former Chief Economist to the Foreign, Commonwealth and Development Office of the United Kingdom

ISBN 978-1-4648-2034-2

9 781464 820342 90000

SKU 212034

WORLD BANK GROUP