The Office of the Chief Economist of the South Asia Region

APRIL 2025

South Asia Development Update

Taxing Times

WORLD BANK GROUP

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Foreword

The global economy is entering uncharted territory, presenting heightened challenges for South Asia. Trade is becoming less open, policy uncertainty is soaring, and downside risks are rising.

Although the region continues to grow faster than any other region, its growth prospects are dimming. Forecasts have been downgraded in almost all South Asian countries. Growth could be further set back by bouts of financial market turbulence, increasing trade restrictions, declining capital inflows, and reform setbacks.

With an external environment presenting mounting risks, how can South Asia prepare for potentially taxing times ahead?

This report recommends that the region tackle some of its greatest vulnerabilities: fragile fiscal positions, susceptibility to climate damage, and a growing labor force with insufficient jobs. Because policy distortions and inefficiencies in these three areas are sizable, targeted reforms would not only build resilience but also offer potentially large economic gains.

***Build fiscal buffers*:** For most South Asian countries, increased domestic revenue mobilization is a prerequisite for strengthening fiscal positions and building resilience amid uncertainty. Compared with the average for emerging market and developing economies, tax rates in the region are often higher and tax revenues lower. On average during 2019–23, South Asia collected government revenues totaling about 18 percent of GDP—well below the 24 percent average for emerging market and developing economies. But South Asian countries have ample room to raise revenues by eliminating loopholes, streamlining tax codes, tightening enforcement, and facilitating tax compliance.

***Help the private sector in climate adaptation*:** South Asia is one of the most vulnerable regions to rising global temperatures. Because of the region's already high average temperatures and high reliance on rain-fed agriculture, further warming will cause greater damage in South Asia than in other developing countries. But if allowed to respond flexibly, South Asia's private sector could reduce about one-third of the climate damages by 2050. Countries can remove obstacles that hinder households and firms from shifting across activities and locations.

***Leverage the benefits of migration*:** South Asia's rapidly growing labor force is an economic opportunity if enough jobs can be created. Many will find jobs in South Asia while others may seek opportunities abroad. South Asia's large diaspora can be a source of skills, entrepreneurship, investment networks and trade ties. Countries can harness their diasporas by negotiating bilateral agreements, incentivizing the return of migrants, and removing obstacles to investment and trade.

Three decades of robust growth through many ups and downs of the global economy have demonstrated the underlying strength of South Asia's development path. By strengthening the most fragile parts of their economies, the countries of South Asia can chart a path through today's uncertainties, too.

Martin Raiser
Vice President, South Asia Region

Executive Summary

Growth prospects for South Asia are dimming. The global economic environment has become more challenging and is a source of heightened downside risks. After a decade of repeated disruptions, South Asia's buffers to cushion new shocks are slim. Tackling some of its greatest inefficiencies and vulnerabilities could help South Asia navigate this unusually uncertain outlook: unproductive agriculture sectors, pressures from rising global temperatures, and fragile fiscal positions. For most South Asian countries, increased revenue mobilization is a prerequisite for strengthening fiscal positions. Even taking into account the particular challenges of collecting taxes in South Asian economies—such as widespread informal economic activity and large agriculture sectors—South Asian economies face larger tax gaps than the average emerging market and developing economy (EMDE). This suggests the need for improved tax policy and administration. Until fiscal positions have strengthened, the burden of climate adaptation will disproportionately fall on the private sector. If allowed sufficient flexibility, private sector adaptation could offset about one-third of the likely climate damage by 2050. This may, however, require governments to remove obstacles that prevent workers and firms from moving across locations and activities. As growth prospects dim, the challenge grows to create jobs for South Asia's rapidly expanding working-age population. South Asia's large diasporas could become a source of strength if their knowledge, networks, and other resources can be better tapped for investment and trade.

Chapter 1. A precarious path: Building resilience amid uncertainty. Growth prospects are dimming across South Asia. Tariffs, policy uncertainty, and financial market volatility have increased substantially. After an unexpectedly weak outturn of 6.0 percent in 2024, growth in South Asia is expected to soften further to 5.8 percent in 2025—0.4 percentage point below October forecasts—before ticking up to 6.1 percent in 2026. The region's economies face heightened downside risks, including from a highly uncertain global landscape. After a decade of shocks, South Asian economies have limited capacity to cushion new ones. In particular, South Asia's high debt remains a source of vulnerability to rising borrowing costs or declining funding inflows from private or official sources. The more challenging global environment, combined with domestic fragilities, could be navigated more easily if the region tackled areas of particularly large inefficiency or vulnerability. Domestic revenue mobilization could lessen South Asia's vulnerability to fiscal and external pressures. The region's unproductive agriculture sectors could benefit from more efficient pricing of inputs, as well as broader access to modern technologies and practices.

Box 1.1. Branching out: The economic potential of South Asians abroad. Dimming growth prospects across South Asia amplify the challenge of creating jobs. Many in South Asia's rapidly growing workforce are likely to continue to seek opportunities abroad. Migrants from South Asian countries—mainly to countries outside the region—account for about 3 percent of South Asia's working-age population. About one-half of them work in Gulf Cooperation Council countries, are typically low-skilled, and on short-term contracts. Another one-quarter work in advanced economies and tend to be highly skilled and longer-term migrants. While the challenges of emigration have been well documented, South Asian countries' large diasporas also bring economic benefits to the home countries, both while workers are abroad and after they return home—through remittances, improved skills, investments, and trade ties.

Spotlight. Clear the way: Climate resilience in South Asia's private sector. While South Asia has better growth prospects than other EMDE regions, it is also one of the regions that is most vulnerable to rising global temperatures and most affected by extreme weather events. Because of South Asia's already high average temperature and reliance on rain-fed agriculture, rising global temperatures

could lead to output and per capita income losses by 2050 that are larger than those in the average EMDE. Higher temperatures would cause large damage in the most vulnerable sectors, such as agriculture, but more limited damage in the most resilient sectors, such as services. About one-third of the total climate damage could be reduced if the private sector could flexibly shift resources across activities and locations in response to these climate -induced changes in relative prices and incomes. Even South Asia's fiscally constrained governments have scope to facilitate these shifts, including by expanding access to finance, improving transport and digital connectivity, and providing well-targeted and flexible social benefit systems.

Chapter 2. Bridging the gap: Revenue mobilization in South Asia. South Asian governments need to raise revenues to shore up their fiscal positions. Although tax rates in South Asia are often above the EMDE average, most tax revenues are lower. On average during 2019–23, South Asian government revenues totaled 18 percent of GDP—well below the 24 percent of GDP average in EMDEs. Controlling for tax rates and the size of potential tax bases, tax revenues in the region are 1–7 percentage points of GDP below potential, with shortfalls in five of the region's eight countries larger than in the average EMDE. Revenue shortfalls are particularly pronounced for consumption taxes but are also sizable for personal income taxes and, in the larger economies, corporate income taxes. Weak revenue collection has only partly reflected country characteristics, such as widespread informal activity outside the tax net and large agriculture sectors. Even after accounting for these characteristics of South Asian economies, sizable tax gaps remain—highlighting the need for improved tax policy and administration. There is scope to raise tax revenues by eliminating loopholes, streamlining tax codes, strengthening enforcement, and facilitating compliance. The introduction of pollution pricing could also both boost revenues and help address the region's high pollution.

Abbreviations

ACS	American Community Survey
ADV	Rest of Advanced Economies, containing Canada and New Zealand
AEs	Advanced Economies
AFG	Afghanistan
ASPI	All Share Price Index
AUS	Australia
BGD	Bangladesh
BRA	Brazil
BTN	Bhutan
CAN	Canada
CAPE	Cyclically Adjusted Price-to-Earnings
CEP	The Council on Economic Policies
CEPII	Centre d'Etudes Prospectives et d'Informations Internationales
CHELEM	Comptes Harmonisés sur les Echanges et L'Economie Mondiale
CHN	China
CIT	Corporate income tax
COD	Chemical Oxygen Demand
COVID-19	Coronavirus (SARS-CoV2)
CPI	Consumer Price Index
DSEX	Dhaka Stock Exchange
EAP	East Asia and Pacific
ECA	Europe and Central Asia
ECB	European Central Bank
EEM	Emerging Markets ETF
EMBI	Emerging Market Bond Index
EM-DAT	International Disaster Database
EMDE	Emerging Market and Developing Countries
EU	European Union
EUW	Western Europe
FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
FOMC	The Federal Open Market Committee
FRED	Federal Reserve Economic Data
FY	Fiscal Year
GCC	Gulf Cooperation Council
GCE	General Certificate of Education
GCSE	General Certificate of Secondary Education
GDP	Gross Domestic Product
GED	General Educational Development
GL	Global
ICAP	International Carbon Action Partnership
ICRG	International Country Risk Guide
IDN	Indonesia
IDOS	German Institute of Development and Sustainability

Abbreviations (continued)

IEA	International Energy Agency
IIF	Institute of International Finance
ILO	International Labour Organization
IMF	International Monetary Fund
IND	India
IPCC	Intergovernmental Panel on Climate Change
IPO	Initial Public Offering
JPN	Japan
kg/ha	kilograms per hectare
KNOMAD	Global Knowledge Partnership on Migration and Development
KOR	Korea, Republic of
KSE 100	Pakistan Stock Exchange
LAC	Latin America and the Caribbean
LCOE	Levelized Cost of Energy
LHS	Left hand side
LKA	Sri Lanka
MDV	Maldives
MEX	Mexico
MFN	Most-Favored-Nations
MNA	Middle East and North Africa
MONA	International Monetary Fund Monitoring of Fund Arrangements
MPI	Multidimensional Poverty Index
MPO	Macro Poverty Outlook
MSCI	Morgan Stanley Capital International
MWh	Megawatt hour
MYS	Malaysia
NEPSE	Nepal Stock Exchange
NPISHs	Non-Profit Institutions Serving Households
NPL	Nepal
NSE	National Stock Exchange of India
ODA	Official Development Assistance
OECD	Organization of Economic Co-operation and Development
OLS	Ordinary Least Squares
OPHI	Oxford Poverty and Human Development Initiative
PAK	Pakistan
PHL	Philippines
PIT	Personal income tax
PM2.5	Particulate Matter less than 2.5 micrometers in diameter
PMI	Purchasing Managers' Index
R&D	Research and Development
RCP	Representative Concentration Pathway
RHS	Right hand side
ROA	Rest of Asia
S&P	Standard & Poor's
SAR	South Asia Region

Abbreviations (continued)

SFA	Stochastic Frontier Analysis
SMA	Survey of Monetary Analysts
SPF	Survey of Professional Forecasters
SSA	Sub-Saharan Africa
TADAT	Tax Administration Diagnostic Assessment Tool
TFP	Total Factor Productivity
THA	Thailand
UM	University of Michigan
UN	United Nations
UNCTAD	United Nations Trade and Development
UNFCCC	United Nations Framework Convention on Climate Change
UNU-WIDER	United Nations University World Institute for Development Economics Research
USA	United States of America
USAID	United States Agency for International Development
USMCA	United States-Mexico-Canada Agreement
VAT	Value-added tax
VIX	Chicago Board Options exchange volatility index
VNM	Viet Nam
WHO	World Health Organization
WTO	World Trade Organization

CHAPTER 1

A Precarious Path:

Building Resilience amid Uncertainty

Chapter 1. A Precarious Path: Building Resilience amid Uncertainty

Growth prospects are dimming across South Asia. Tariffs, policy uncertainty, and financial market volatility have increased substantially. After an unexpectedly weak outturn of 6.0 percent in 2024, growth in South Asia is expected to soften further to 5.8 percent in 2025—0.4 percentage point below October forecasts—before ticking up to 6.1 percent in 2026. The region's economies face heightened downside risks, including from a highly uncertain global landscape. After a decade of shocks, South Asian economies have limited capacity to cushion new ones. In particular, South Asia's high debt remains a source of vulnerability to rising borrowing costs or declining funding inflows from private or official sources. The more challenging global environment, combined with domestic fragilities, could be navigated more easily if the region tackled areas of particularly large inefficiency or vulnerability. Domestic revenue mobilization could lessen South Asia's vulnerability to fiscal and external pressures. The region's unproductive agriculture sectors could benefit from more efficient pricing of inputs, as well as broader access to modern technologies and practices.

Introduction

Global growth is showing signs of widespread weakness in 2025. Tariffs, policy uncertainty, and financial market strains have increased substantially, and are weighing on activity (figure 1.1).

In South Asia too, growth prospects are dimming. Growth outcomes for 2024 have disappointed and forecasts for 2025 have been downgraded for most countries in the region. Fiscal consolidation is expected to continue, especially in countries implementing programs supported by the International Monetary Fund (IMF). South Asia's growth was unexpectedly weak at 6.0 percent in 2024, and is expected to weaken further to 5.8 percent in 2025—0.4 percentage point below October forecasts—before ticking up to 6.1 percent in 2026.

After several years of synchronous decline, inflation dynamics have started to diverge across countries. Inflation rebounded in many countries in late 2024 and early 2025, and surveys point to increasing concerns about further acceleration. In South Asia, inflation differences across countries have widened, with Sri Lanka tipping into deflation and Bangladesh struggling with persistently above-target inflation.

Global financial markets are increasingly affected by heightened policy uncertainty. Rising tariffs, shifting government priorities, and conflicting signals about the state of the economy have led to significant volatility in exchange rates, stock market valuations, and bond yields. A severe global downturn has become a possibility.

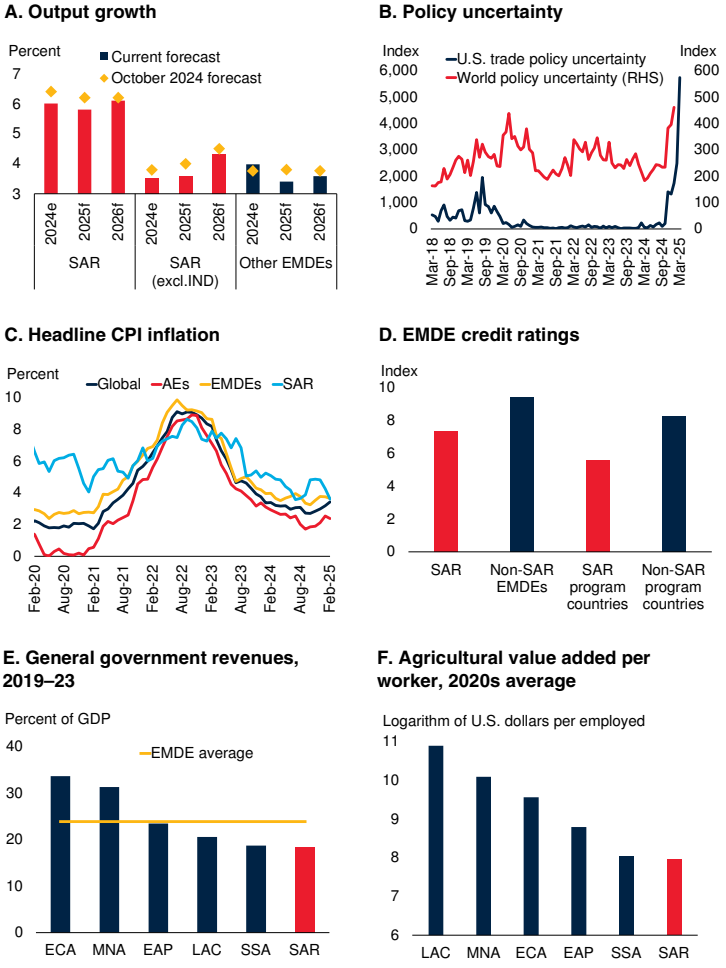
Financial market movements in South Asia have been more muted than elsewhere, in part because of more limited direct exposures to the global economy and central bank interventions. Nonetheless, South Asian economies face heightened downside risks and, after a decade of shocks, their ability to cushion new shocks is limited. Large government debt stocks and below-average international reserves depress the credit ratings of South Asian countries and render their economies vulnerable to financial stress. Half the countries in the region are undertaking reforms with IMF support. Failure to implement these reforms as planned could delay IMF financing, reignite capital outflows, and add to fiscal pressures. The region would also suffer slower growth if its exporters faced higher tariffs abroad—although in the short term the slowdown would be less than in regions that are more open to foreign trade.

The more challenging global environment, against the backdrop of domestic fragilities, could be navigated more easily if the region tackled some of the areas of particularly large inefficiency or vulnerability. Low revenues are at the root of South Asian countries' fiscal fragilities; they could be increased by streamlining tax systems, better

Note: This chapter was prepared by Patrick Kirby.

FIGURE 1.1 Overview

After a disappointing 2024, growth in South Asia is expected to weaken further in 2025 and tick up only slightly in 2026. The outlook is subject to downside risks, including from a potential global recession. The synchronous decline in global inflation has ended. Higher borrowing costs would add to fiscal pressures, especially in South Asia where credit ratings are lower than in other EMDEs. Revenue mobilization will be critical to restore and preserve fiscal sustainability. A more dynamic non-agriculture sector could help raise labor productivity in agriculture, which is currently low by international standards.



Sources: Baker, Bloom, and Davis (2016); Eurostat; Fitch Ratings; FRED (database); Haver Analytics; Moody's Ratings; S&P Global; UNU-WIDER; World Bank Macro Poverty Outlook; World Bank Fiscal Survey (database); World Bank.

Note: AEs = advanced economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging markets and developing economies; IND = India; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa.

A. Real GDP-weighted (at 2010–19 average prices and market exchange rates) average real GDP growth rates for 8 South Asian economies and 139 other EMDEs. October 2024 forecasts exclude Afghanistan.

B. Last observation is March 2025 for U.S. trade policy uncertainty, and January 2025 for world policy uncertainty.

C. Median year-on-year inflation for each aggregate. Last observation is April 15, 2025.

D. Credit ratings from S&P, Moody's, and Fitch were mapped to a unified 1–22 scale (1 = lowest, 22 = highest), and a simple average was computed for each country. The sample includes South Asian countries (Bangladesh, India, Maldives, Pakistan, Sri Lanka), South Asian program countries (Bangladesh, Pakistan, Sri Lanka), 96 non-SAR EMDEs, and 40 non-SAR program countries. Last observation is April 15, 2025.

E. Total revenue excludes grants. EMDE average is nominal GDP-weighted average of 140 EMDEs. Regions are nominal GDP-weighted average of country group.

F. Annual averages from 2020 to latest available data. Sample includes 14 economies in EAP, 22 in ECA, 24 in LAC, 17 in MNA, 7 in SAR, and 38 in SSA. Bars show logarithm of real GDP-weighted ratio of real GDP in agriculture (at 2010–19 average prices and market exchange rates) relative to number of people employed in agriculture.

enforcing collection, and facilitating compliance. South Asia's agriculture sector, which accounts for 16 percent of GDP but employs 42 percent of the workforce, suffers from particularly low labor productivity. A more efficient agriculture sector, combined with a more buoyant non-agriculture sector, could help shift workers, private finance, and government resources into more productive and climate-resilient activities.

Global developments and outlook

The U.S. administration announced new tariffs of 145 percent on imports from China, and 10 percent on most imports from the rest of the world (figure 1.2). Effective U.S. tariffs have increased to a level not seen in a century, and further tariff increases are a possibility. Some trading partners have responded with tariffs of their own on U.S. exports. In particular, China has raised tariffs on imports from the United States to 125 percent.

Policy uncertainty has soared to unprecedented levels. The global economy grew steadily at 2.7 percent in 2023 and 2024, but consensus forecasts point to a sharp deceleration in global growth in 2025. Many major economies had already been expected to slow at the beginning of this year, but the degree of anticipated deceleration has increased significantly in recent weeks, according to most forecasters. Business and consumer confidence have fallen (figure 1.3).

Global financial markets have been roiled by volatility. Stock market indexes have fallen sharply around the world, and measures of volatility have spiked, particularly in the United States. Many categories of borrowing cost have increased, with a notable uptick in yields on U.S. treasuries. Risk spreads on high yield debt, including both below investment-grade corporates and sovereigns, were generally narrow at the beginning of the year, but have expanded significantly in recent weeks. A growing share of debt has become distressed, and a growing share of borrowers have been locked out of markets by prohibitive lending rates.

The U.S. dollar and many EMDE currencies have depreciated, while other advanced-economy currencies have generally appreciated. This is

consistent with continued weakness in inflows of portfolio and foreign direct investment into EMDEs (figure 1.4).

Prior to the introduction of new tariffs in April, global inflation had leveled off, and national inflation was at or below target in about 60 percent of inflation-targeting economies (figure 1.5). Newly introduced tariffs will increase the price of many imported goods, however, and add to concerns about inflation that are increasingly apparent in surveys and financial market data. Inflation concerns are rising despite a sharp decline in oil prices; the Brent price stood at about US$75/bbl at the beginning of the year, but has fallen more recently.

Central banks had already slowed their pace of monetary policy easing, and now face an increasingly challenging environment of rising prices and slowing growth. In the United States, the Federal Reserve cut its policy rate by a full percentage point between September and December 2024, but it has since kept it unchanged. The pace of future cuts is expected to be gradual, with policy rates staying well above their pre-pandemic levels. In the euro area, similarly, the pace of policy cuts by the European Central Bank is expected to slow sharply.

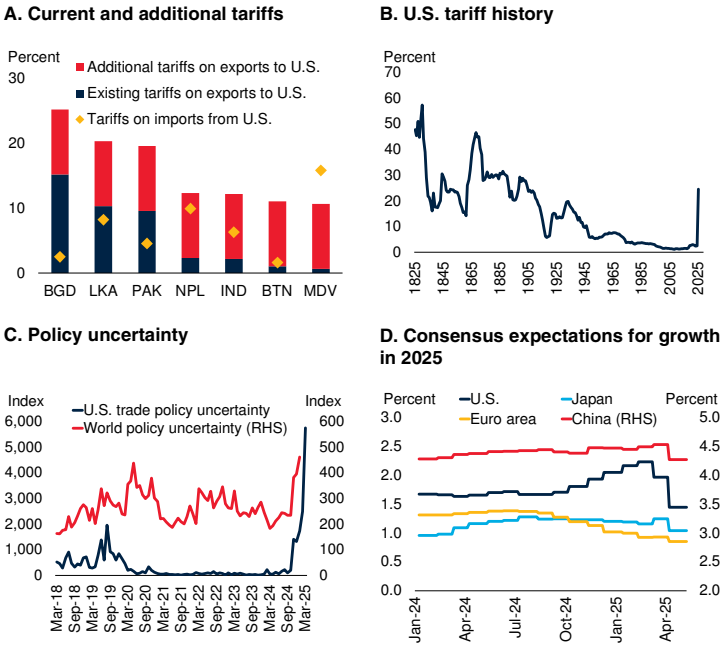
In the *United States*, activity at the beginning of the year appeared robust, but more recent indicators point to a sharp slowdown in economic activity as a result of tariffs, policy uncertainty, and the depletion of consumer savings. Some forecasters anticipate the economy will experience a recession (defined as two consecutive quarters of negative growth) in 2025. Consumer price inflation stood at 2.4 percent in March, slightly above the Federal Reserve's 2 percent target, prior to the introduction of new tariffs in April.

Growth in the *euro area* has been anemic, and consensus forecasts are for growth of around 1 percent in 2025 and 2026. Consumption and exports grew by about 1 percent in 2024, while investment contracted sharply. Consumer confidence has remained weak, despite growth in real incomes since the October edition of this report. In the area's largest economy, Germany, the manufacturing sector has contracted steadily since mid-2023 in the face of weak domestic demand, increased competition from EMDE exporters, and high energy prices.

In *China*, domestic demand has been dampened by persistent weakness in the property sector. Mortgage lending has remained stagnant, and property prices had been declining for several years before a recent rebound. Consumer price inflation has remained well below the official target of 3 percent a year. The government's announcement of a stimulus package in September was followed by signs of recovery. Prior to the recent increase in tariffs, exports had been growing rapidly, largely offsetting weakness in domestic demand, so that output growth reached 5 percent in 2024, only slightly less than the 5.2 percent increase in 2023. For 2025–26, growth is expected to slow further as global trade tensions add to the continuing weakness in domestic demand.

FIGURE 1.2 Global economic activity

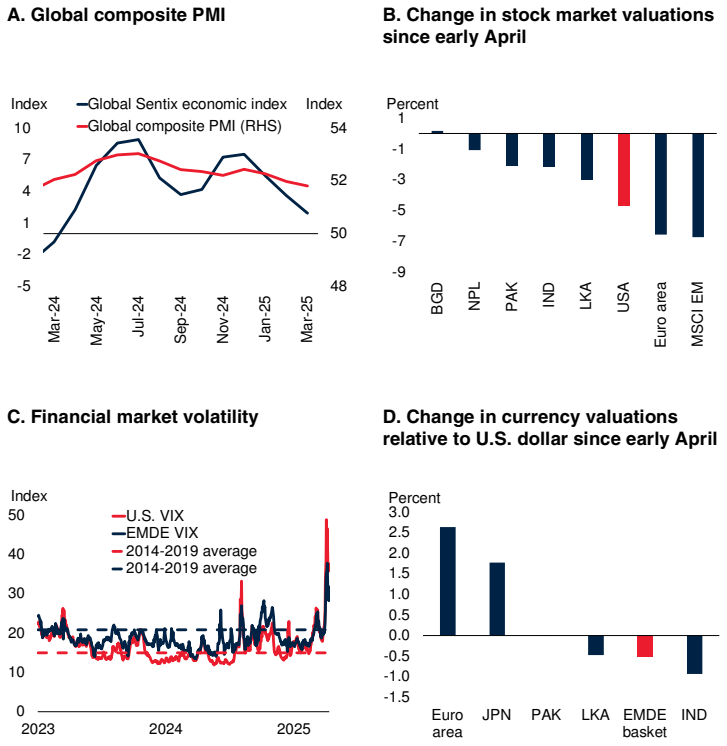
Tariffs have been increased sharply. Policy uncertainty has increased to historic highs. Forecasts for growth in several major economies in 2025 have been downgraded.



Sources: Baker, Bloom, and Davis (2016); Budget Lab at Yale; CEIC; Consensus Economics; Haver Analytics; U.S. Bureau of Economic Analysis; WTO Tariff Analysis Facility; World Bank.
Note: BGD = Bangladesh; BTN = Bhutan; IND = India; LKA = Sri Lanka; NPL = Nepal; MDV = Maldives; PAK = Pakistan; RHS = right scale.
A. "Existing tariffs" and "Tariffs on imports from U.S." refer to effectively applied tariffs in 2023. "Additional tariffs" are the 10 percent tariffs imposed in April.
B. 2025 value is average effective tariff rate on April 15, 2025, estimated by the Budget Lab at Yale.
C. Last observation is March 2025 for U.S. trade policy uncertainty, and January 2025 for world policy uncertainty.
D. Figure shows the evolution of GDP growth forecasts for 2025 from Consensus Economics. The April value for China is the moving average of latest changed forecasts. Last observation is on April 15, 2025.

FIGURE 1.3 Global financial conditions

Falling global confidence has coincided with falling stock market valuations in many countries, elevated volatility, and significant moves in exchange rates.



Sources: CEIC; Haver Analytics; Morgan Stanley; Trading Economics; World Bank.

Note: AEs = advanced economies; BGD = Bangladesh; ECB = European Central Bank; EMDEs = emerging market and developing economies; EUR = Euro; EMDEs = emerging market and developing economies; IND = India; JPY = Japanese Yen; LKA = Sri Lanka; MSCI EM= Morgan Stanley Capital International Emerging Markets Index; NPL = Nepal; PAK = Pakistan; PMI = purchasing managers' index; VIX = Chicago Board Options Exchange volatility index.

A. Sentix economic index and global composite PMI series show 3-month moving averages; for PMI, readings above (below) 50 indicate expansion (contraction). Last observation is April 15, 2025.

B. Figure shows the changes of stock market price indexes since April 2, 2025. Latest data for Bangladesh and Nepal is April 10, 2025, for India and Sri Lanka is April 11, 2025 and all others are April 14, 2025. "USA" is the S&P 500 (1941-43=10), "Euro area" is the S&P Euro (Dec-31-97=1000), "PAK" is the KSE 100 (Nov-91=1000), "BGD" is the DSEX (Jan-17-08=2951.91), "IND" is the NSE Nifty (Nov-3-95=1000), "NPL" is the NEPSE (Feb-12-94=100), and "LKA" is the ASPI (Jan-1-85=100). The last observation is April 15, 2025.

C. The VIX captures 30-day volatility of the S&P500. The EMDE VIX is 30-day volatility of returns on the MSCI EEM index. Last data point is from April 14, 2025.

D. Figure shows the change in value of currencies relative to the U.S. dollar since April 3, 2025. The last observation is from April 11, 2025 for all currencies.

Growth in other emerging market and developing economies (EMDEs) has generally been healthy. Solid consumption and investment activity have been supported by continued monetary easing, growing real incomes, and strong industrial activity. High-frequency indicators, however, point to a deceleration in early 2025, especially in services activity.

Developments in South Asia

Financial conditions have tightened in South Asia, as in other parts of the world. Stock market booms in *Sri Lanka* and *India* ended and equity valuations in the rest of the region remained largely flat. As in other EMDEs, net foreign direct investment and portfolio inflows into South Asia have weakened since mid-2024. Inflows of remittances, however, have remained robust.

Overall, the South Asian economy grew by 6.0 percent in 2024, 0.4 percentage points below the rate projected in the October edition of this report. Growth outcomes fell short of forecasts in most countries, particularly in Bangladesh as a result of anti-government protests and the abrupt change in government in August (figure 1.6).

South Asia remained the fastest-growing EMDE region, but the gap with other EMDEs has narrowed as the region's growth has decelerated. The region's relative strength reflected above-average policy support in 2024, as macroeconomic stabilization allowed monetary policy easing (in Pakistan) and fiscal deficits widened in most countries. In most of South Asia, as in the median EMDE outside the region, fiscal deficits and monetary policy rates were well above pre-pandemic (2010–19) averages.

The synchronous rise and fall of global inflation during the pandemic and the post-pandemic recovery has given way to widely divergent price dynamics, including in South Asia. Sri Lanka has tipped into deflation while in Bangladesh inflation is persistently above target. The divergence of inflation across the region has been accentuated by idiosyncratic movements in food inflation, with food prices falling in Afghanistan, Pakistan and Sri Lanka, and rising elsewhere.

Meanwhile, after several years of balance-of-payments pressures, current account deficits across the region (except in Maldives) have narrowed or stabilized, reflecting robust remittance inflows, slowing import growth, and a long-awaited rebound in tourism. These developments, combined with limited exposure to the U.S. economy and, in some cases, exchange rate management, have resulted in smaller movements of most South Asian currencies against the U.S. dollar than those of other EMDEs.

Country developments

After two years of sharp contraction, *Afghanistan's* economy grew by 2.3 percent in FY23/24 and an estimated 2.5 percent in FY24/25. Growth was driven by agriculture, mining, construction and commerce. Modest gains in private consumption and real estate investment contributed to growth; however, rising imports widened the trade deficit, increasing external vulnerabilities. The recovery in activity has been accompanied by the first signs of positive inflation after two years of falling prices.

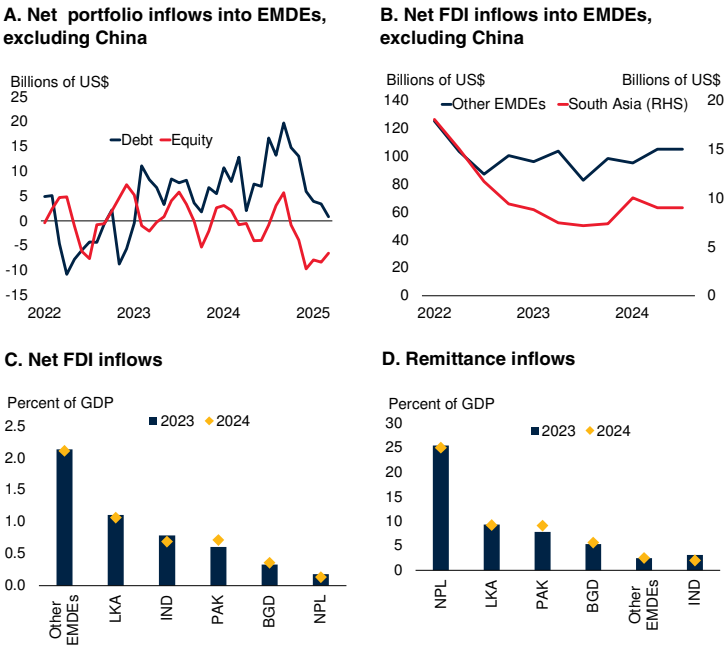
In *Bangladesh*, real GDP growth moderated to 4.2 percent in FY23/24 from 5.8 percent in FY22/23, primarily driven by a sharp decline in exports. Supply chain disruptions, combined with currency depreciation and rising domestic energy prices, added to inflation pressures in 2024. Consumer price inflation peaked at 11.7 percent in July and remained elevated at 9.3 percent in February 2025. The current account balance has improved as a result of rising exports and strong remittance inflows, which have increasingly been channeled through the formal financial system as the curb market premium has narrowed.

As a result of persistent inflationary pressures, Bangladesh's central bank has continued tightening monetary policy when other countries have been lowering policy rates. Since the tightening phase began in May 2022, the policy rate has been increased by 5.25 percentage points to 10 percent. Monetary policy transmission, however, is impaired by financial system weaknesses. Non-performing loans, which are concentrated in state-owned banks, have risen significantly in recent years, reaching 17 percent of all loans in September. The government is providing occasional liquidity support to some crisis-hit banks. Meanwhile, the transition from a managed to a fully flexible exchange rate has been delayed.

In *Bhutan,* the economy grew by 4.9 percent in FY23/24, about the same as in FY22/23. Services sector growth was broad-based, with strong rebounds in finance and tourism—supported by the reopening of borders following the COVID-19 pandemic. But agriculture yields grew modestly and hydropower exports declined because of growing domestic electricity consumption by energy-intensive cryptocurrency mining operations. Robust

FIGURE 1.4 Capital flows

The slowdown in capital flows to EMDEs, including to South Asia, since mid-2024 has continued.



Sources: Haver Analytics; IIF Portfolio Flow Tracker; IMF Balance of Payments and International Investment Position Statistics; World Bank.
Note: BGD = Bangladesh; BTN = Bhutan; EMDEs = emerging market and developing economies; FDI = foreign direct investment; IND = India; LKA = Sri Lanka; NPL = Nepal; MDV = Maldives; PAK = Pakistan.
A. Three-month rolling average of net inflows of debt and equity into up to 23 EMDEs. Data available for 3 South Asian countries (India, Pakistan, Sri Lanka). Last available data is for March 2025.
B. "Other EMDEs" includes 78 economies and excludes China . Last available data is for 2024Q3.
C-D. "Other EMDEs" includes 103 economies in 2023 and 72 economies in 2024. 2024 data are estimated based on available quarterly data for FDI, remittances, and GDP.
@Xiaoou Zhu , did you change this so it is no longer a 3-quarter rolling average?
It was not 3-quarterly rolling average in the first place. Sorry I didn't know why the 3-quarterly moving average was there.

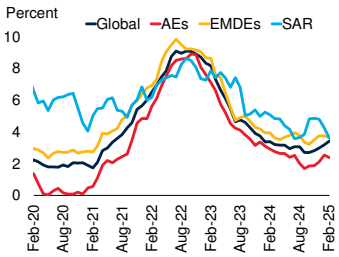
growth momentum continued in the early part of FY24/25, boosted by the removal of policy measures that had previously been implemented to support the balance of payments (such as a moratorium on the import of vehicles and a ban on construction loans). Inflation fell from 5.0 percent in early 2024 to 3.1 percent in January 2025, in part due to slowing non-food inflation. The current account deficit has remained elevated, at an estimated 17.6 percent of GDP in FY24/25. Nevertheless, robust growth in remittances increased gross international reserves to the equivalent of just under 5 months of imports in June 2024.

In *India,* growth slowed from 9.2 percent in FY23/24 to an estimated 6.5 percent in FY24/25—the slowest pace in four years, although broadly in line with the economy's long-term average. The economy was unexpectedly weak

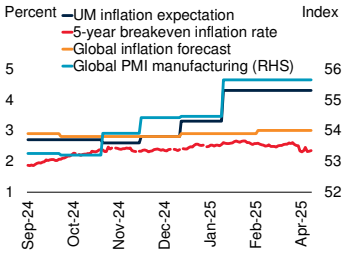
FIGURE 1.5 Inflation and monetary policy

The synchronous decline in inflation around the world has ended, and inflation expectations in some countries have increased. Central banks are generally still easing policy, but many have paused or slowed their rate cuts.

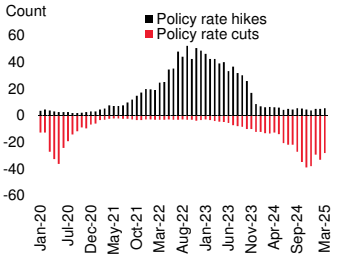
A. Headline inflation



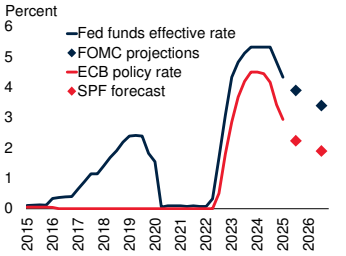
B. Inflation indicators



C. Count of global monetary policy hikes and cuts



D. U.S. and Euro area monetary policy rates



Sources: Board of Governors of the Federal Reserve System; CEIC; Consensus Forecast; ECB Survey of Monetary Analysts (SMA); Haver Analytics; World Bank.

Note: AEs = advanced economies; BGD = Bangladesh; BTN = Bhutan; ECB = European Central Bank; EMDEs = emerging market and developing economies; IND = India; LKA = Sri Lanka; FOMC = Federal Open Market Committee; NPL = Nepal; MDV = Maldives; PAK = Pakistan; PMI = purchasing manager's index; SAR = South Asia;.

A. Median year-on-year inflation for each aggregate. Last observation is April 15, 2025.

B. The chart shows three indicators of inflation expectations. These are the University of Michigan's inflation expectation ("UM inflation expectation"), which is the median expected price change over the next 12 months based on consumer surveys; the Federal Reserve Bank of St. Louis's breakeven inflation rate, which is a measure of expected inflation derived from 5-year Treasury constant maturity securities and 5-year Treasury inflation-indexed constant maturity securities; and the evolution of global Consensus Forecast consumer prices for 2025. We also show the global manufacturing new input prices Purchasing Managers' Index which is a survey-based economic indicator of the manufacturing sector. Values above 50 mean improving economic conditions.

C. 3-month average count of monetary hikes (above X axis) and cuts (below X axis) for global 107 economies, the last available data is from March 2025.

D. "SPF" is the ECB's Survey of Professional Forecasters. Last data points for ECB and Fed policy rates are from the first quarter of 2025. FOMC projections are those of the March 2025 meeting.

around the middle of 2024 but regained its footing by the end of the year. Manufacturing growth was sluggish and public investment growth fell short of budget projections. Consumption growth accelerated thanks to robust employment growth and increasing real wages, particularly in rural areas. Declining food price inflation helped lower headline inflation to 3.6 percent in February 2025, close to the middle of the Reserve Bank of India's 2–6 percent target range and substantially below the recent peak of 6.2 percent in October 2024. The current account deficit has narrowed to about 1 percent of GDP. Moderating inflation and limited external financing needs allowed the Reserve Bank to support domestic demand by cutting its policy rate by 25 basis points in February—its first policy cut in almost five years. The Indian rupee's value in terms of the U.S. dollar held steady between mid-2022 and end-2024, partly supported by foreign exchange market intervention by the central bank. It has fallen by about 2 percent so far this year, more than the average depreciation of the currencies of EMDEs with flexible exchange rates.

India's equity markets have grown rapidly in recent years, in terms of both listings and valuations, and have attracted significant, although volatile, net inflows. In 2024, India led the world in the number of initial public offerings (IPOs) and was second only to the United States in the value of new listings. Equity derivatives markets have grown particularly quickly, prompting interventions from regulators concerned about investor protection. Since peaking late last year, however, stock market valuations have undergone a correction. For now, this has not had broader ripple effects, but the decline in equity prices could dampen private consumption or investment over the medium term.

In *Maldives,* tourist arrivals remained strong throughout 2024, and annual GDP growth increased to an estimated 5.5 percent. However, despite strong tourism revenues, the estimated current account deficit remained elevated at about 20 percent of GDP in 2024, and the economy has been subjected to severe financial pressures.

Rising external debt service obligations have led to a sharp decline in official reserves to critically low levels. Last October, a US$400 million currency swap agreement with the Reserve Bank of India lifted gross official reserves to US$614.6 million, equivalent to only 1.4 months of imports. Usable reserves (total reserves net of predetermined short-term drains such as debt payments) are even lower, at a precarious level. The fiscal deficit is forecast to increase further to 13 percent of GDP in 2024. Spending on subsidies remained high, which has thus far helped keep inflation low, at 1.4 percent in 2024. Several ratings agencies downgraded Maldives' sovereign credit rating in 2024, citing rising liquidity concerns. Although some pandemic measures, such as monetization of the government deficit, have been phased out, the

exposure of the domestic financial sector to sovereign and state-owned enterprise debt continued to increase in 2024: more than one-third of bank assets are sovereign or state-owned enterprise debt.

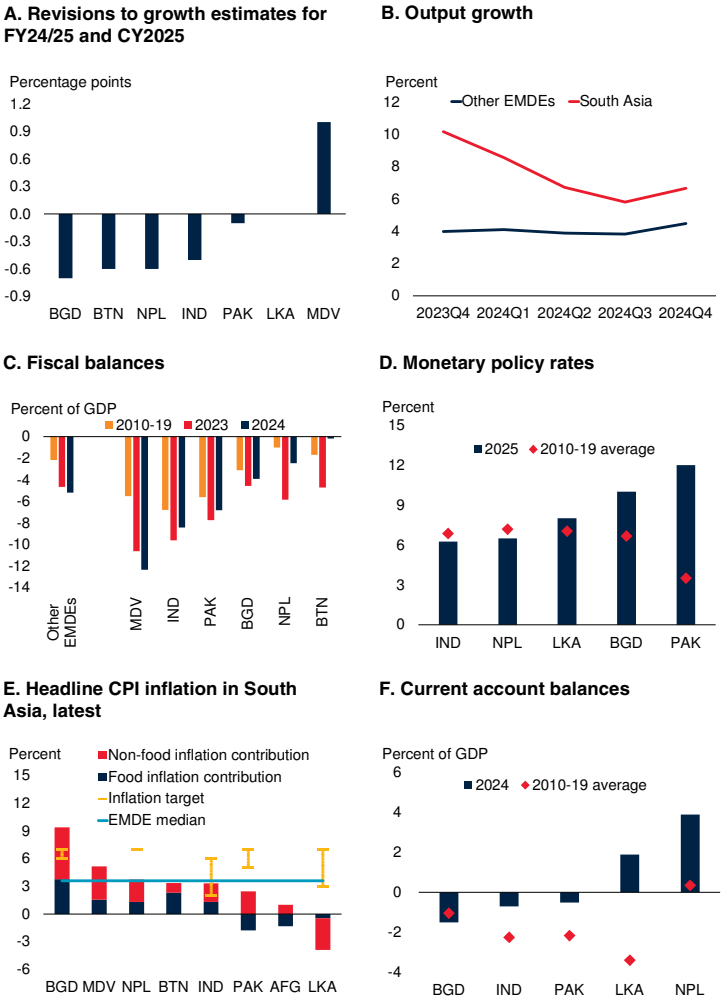
In *Nepal*, GDP growth accelerated to 3.9 percent in FY23/24 from 2.0 percent in FY22/23. The strengthening of growth was driven mainly by increased hydroelectric capacity and the effect of a favorable monsoon on paddy production. This was partially offset by weakening activity in construction and financial services. A sharp decline in non-food and services inflation helped lower headline inflation to about 5 percent in the second half of 2024.

Meanwhile, robust remittance inflows led to a sharp turnaround in the current account balance, from a deficit of 12.5 percent of GDP in FY22/23 to a surplus of 3.9 percent of GDP in FY23/24—the first surplus in eight years. This helped increase official foreign reserves to the equivalent of more than 14 months of imports. The country's IMF program is on track to be completed in 2025.

In *Pakistan,* GDP grew by 2.5 percent in FY23/24, after a small contraction in FY22/23. Robust remittance inflows supported private consumption, but private investment growth continued to be weak, dampened by double-digit real interest rates and political uncertainty. On favorable weather conditions, agricultural growth reached a 19-year high while industrial activity contracted and services growth remained muted. Weak growth has carried over to first half of FY24/25. Output increased by an average of 1.5 percent y-o-y in the first half of FY24/25, slower than the 2.1 percent expansion in the first half of the previous year. After last year's surge, agriculture posted muted growth in the first half of FY24/25 amid drought-like conditions and pest infestations. Industrial output contracted, driven by high input costs, increased taxes, and lower government development spending, and services growth was dampened by spillovers from weak agricultural and industrial activity. The government achieved a primary surplus in the first half of FY24/25, with fiscal consolidation efforts supported by an IMF program. The current account was in surplus at the end of 2024, helped by higher remittances, stemming from reduced political uncertainty and exchange rate stability, that more than offset the wider trade and primary income deficits.

FIGURE 1.6 Regional economic activity

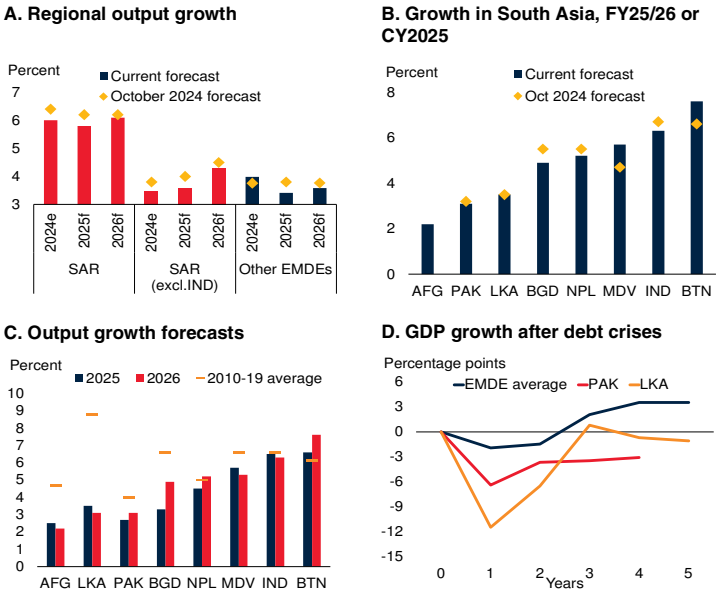
Growth in most South Asian countries has been weaker than expected. The region is still growing more rapidly than other EMDEs, but the gap has narrowed. Fiscal and current account balances improved across the region but fiscal deficits remain well above pre-pandemic averages. In most South Asian countries, inflation has fallen below the upper bounds of target ranges. Monetary policy rates have fallen from post-pandemic highs but in several countries remain well above pre-pandemic averages.



Sources: CEIC; Haver Analytics; IMF *Fiscal Monitor*; World Bank *Macro Poverty Outlook*; World Bank.
Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; EMDEs = emerging market and developing economies; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan.
A. Revisions relative to forecasts from October 2024 South Asia Development Update. Maldives and Sri Lanka use calendar year.
B. Year-on-year growth. "South Asia" consists of countries with available quarterly data: Bangladesh, India, and Sri Lanka. "Other EMDEs" include 61 economies. Real GDP-weighted averages (at 2010–19 average market exchange rates).
C. 2024 data are estimates from Macro Poverty Outlook. "Other EMDEs" include 132 economies. Real GDP-weighted averages (at 2010–19 average market exchange rates). Among South Asian countries, the data for Maldives is for the calendar year, while other countries show the fiscal year.
D. The data point for 2025 refers to the monetary policy rate for each country as of April 15, 2025.
E. Data for Afghanistan, Sri Lanka, Bhutan and Maldives correspond to February 2025; all other countries correspond to March 2025. The EMDE median (February 2025, year-on-year) covers 92 economies. The last observation is April 15, 2025.
F. Figure shows the 24/25 fiscal year for all countries except Sri Lanka, which uses calendar years.

FIGURE 1.7 Economic activity in South Asian countries

In the majority of South Asian countries, growth prospects have dimmed as policy support is withdrawn and sentiment weakens.



Sources: Haver Analytics; World Bank Macro Poverty Outlook.

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

A. Real GDP-weighted average real GDP growth rates for 8 South Asian economies and 139 other EMDEs. October 2024 forecasts exclude Afghanistan.

C. For countries that use fiscal rather than calendar years, "2025" and "2026" represent FY24/25 and FY25/26, respectively.

D. Percentage points represent the difference in GDP growth compared with the initial year.

The agreement reached in September 2024 on an IMF-supported policy program helped stabilize the exchange rate and reduce the risk of debt default, as reflected in ratings upgrades from several credit rating agencies and a narrowing of borrowing spreads. With depreciation pressures on the currency subsiding, a robust agricultural harvest, and administrative prices stabilizing, inflation declined steadily to 0.7 percent in March 2025 from its peak of nearly 40 percent in mid-2023. This allowed the central bank to lower its policy rate by 10 percentage points since June 2024 to 12 percent in January.

Sri Lanka has restored macroeconomic stability following the severe economic crisis of 2022–23, but the recovery remains tenuous. Output grew by 5.0 percent in 2024, driven by a rebound in the industrial sector and strong performance in tourism. Current account and fiscal balances improved during the year, aided by the suspension of external debt servicing, strong tourism activity, and robust remittance inflows. As the economy stabilized, usable official reserves increased to the equivalent of 3.4 months of imports by the end of October 2024, compared with 1–2 weeks in the depths of the crisis in late 2022. Deflation set in from September 2024; prices declined 4.2 percent year-on-year in February 2025 due to reductions in administered prices and a gradual appreciation of the currency. The central bank cut its policy rate again in November 2024 but has held it steady at 8 percent since then.

Progress in restructuring external debt has followed the domestic debt restructuring that was completed in 2023. Formal agreements were signed in 2024 with the Export-Import Bank of China, the China Development Bank, and other official creditors. An ad hoc group of bondholders (representing about 50 percent of outstanding bonds) also agreed in September 2024 to restructure holdings of the country's international sovereign bonds. By the end of 2024, about 98 percent of the country's international sovereign bonds had been restructured. Bilateral debt negotiations have concluded, with only the finalization of formal agreements still pending.

Outlook for South Asia

After growing at a weaker-than-anticipated pace of 6.0 percent in 2024, growth in the region is forecast to slow to 5.8 percent in 2025 (figure 1.7). The deceleration in 2025, and the 0.4 percentage point downgrade relative to the October forecast, in part reflects prospects of weakening global trade, rising global inflation, and tightening global financial conditions.

The region is more insulated from global trade shocks than most other EMDEs, as nearly all the region's economies are among the quarter of EMDEs least open to global trade and investment and have some of the highest tariff and non-tariff barriers to trade. With energy imports averaging about 4 percent of GDP, South Asia is also benefiting from weakening oil prices. Nonetheless, trade barriers and policy uncertainty are expected to weigh on both exports and investment across the region.

After several years of large swings in growth caused by the pandemic and the post-pandemic recovery, three countries in the region—Bhutan, India, and Nepal—are now growing at rates broadly consistent with their 2010–19 averages. The other

TABLE 1.1 Growth in South Asia

Country fiscal year		Real GDP growth at constant market prices (Percent)				Revision to forecast from October 2024 (Percentage points)		
Calendar year basis		**2023**	**2024(e)**	**2025(f)**	**2026(f)**	**2024(e)**	**2025(f)**	**2026(f)**
South Asia region		**7.4**	**6.0**	**5.8**	**6.1**	**-0.4**	**-0.4**	**-0.1**
South Asia region excluding India		**2.8**	**3.5**	**3.6**	**4.3**	**-0.3**	**-0.4**	**-0.2**
Maldives		4.7	5.5	5.7	5.3	0.8	1.0	0.7
Sri Lanka		-2.3	5.0	3.5	3.1	0.6	0.0	0.0
Fiscal year basis		**22/23**	**23/24(e)**	**24/25(f)**	**25/26(f)**	**23/24(e)**	**24/25(f)**	**25/26(f)**
Afghanistan	mid-March to mid-March	-6.2	2.3	2.5	2.2	N/A	N/A	N/A
Bangladesh	July to June	5.8	4.2	3.3	4.9	-1.0	-0.7	-0.6
Bhutan	July to June	5.0	4.9	6.6	7.6	-0.4	-0.6	1.0
India	April to March	7.6	9.2	6.5	6.3	+1.0	-0.5	-0.4
Nepal	mid-July to mid-July	2.0	3.9	4.5	5.2	0.0	-0.6	-0.3
Pakistan	July to June	-0.2	2.5	2.7	3.1	0.0	-0.1	-0.1

Sources: Macro Poverty Outlook (World Bank); World Bank staff calculations.
Note: (e) = estimate; (f) = forecast. GDP measured in average 2010–19 prices and market exchange rates. Pakistan is reported at factor cost. To estimate forecasts for regional aggregates in the calendar year, fiscal year forecasts for Bangladesh, Bhutan, Nepal and Pakistan are converted by averaging two consecutive fiscal years, and fiscal year forecast for Afghanistan are converted by taking 25 percent and 75 percent of two consecutive fiscal years, as quarterly GDP forecasts are unavailable.

five countries—Afghanistan, Bangladesh, Maldives, Pakistan, and Sri Lanka—are recovering from, or in the midst of, economic stress or political uncertainty. Macroeconomic stability has taken hold in Pakistan and Sri Lanka, but both countries are returning to their average growth rate before their debt crises more slowly than other EMDEs affected by debt crises.

Inflation is expected to remain stable and near official targets in most South Asian countries, assuming continued stability in commodity prices and exchange rates. Risks to the inflation projections include a resumption of currency depreciations and failures to maintain exchange rate pegs.

Fiscal balances remain in deficit across the region, particularly in Maldives and Pakistan. These deficits are expected to narrow over the projection period, although at differing paces. Current account deficits have narrowed in most countries, and have almost disappeared in some cases. They are expected to remain close to historical averages in the forecast period. Inflation is expected to moderate in countries where it is currently unusually high (Bangladesh) or low (Sri Lanka) as the impact of temporary factors such as tax rate changes or currency depreciations fades.

Outlook for South Asian countries

For *Afghanistan*, economic projections have been prepared for the first time since official data publication was halted in 2021. Agriculture will remain the key growth driver, outpacing other sectors. The economy grew by an estimated 2.5 percent in 2024/25 and is forecast to remain weak in 2025/26 due to aid disruptions, growing 2.2 percent. With annual population growth of about 2.4 percent, this implies stagnant per capita incomes. Official development assistance has been declining in recent years but remains substantial and further reductions would weigh on growth.

In *Bangladesh*, growth is expected to slow from 4.2 percent in FY2023/24 to 3.3 percent in FY2024/25 before rebounding to 4.9 percent in FY2025/26. The projections have been downgraded since October for both years. This primarily reflects the disruptions arising from last summer's social unrest and political tensions. It also reflects the trade disruptions, the persistence of inflation, worsening bank health, governance challenges, and general uncertainty about the country's political future, all of which will contribute to an expected decline in investment.

Real GDP is expected to gradually rise in the medium term, however, driven by critical reforms.

In *Bhutan*, growth is forecast to accelerate to 6.6 percent in FY24/25 and 7.6 percent in FY25/26. The forecast upgrade in the latter year is largely due to stronger construction activity related to a large hydropower project for which planning was recently finalized. This is partially offset by weak growth in the agriculture sector as the transition to export-oriented agribusiness proceeds more slowly than expected. The government deficit is expanding because of higher capital expenditures, weaker-than-expected revenue collection as a result of goods and services tax reform, and increasing interest payments on commercial loans.

In *India,* growth in FY24/25 disappointed because of slower growth in private investment and public capital expenditures that did not meet government targets. In its budget for FY24/25, the government announced fiscal consolidation but also tax cuts to support private consumption and regulatory streamlining to spur private investment. GDP growth is expected to slow from 6.5 percent in FY24/25 to 6.3 percent as in FY25/26. The benefits to private investment from monetary easing and regulatory streamlining are expected to be offset by global economic weakness and policy uncertainty. Private consumption is expected to benefit from tax cuts, and the improving implementation of public investment plans should boost government investment, but export demand will be constrained by shifts in trade policy and slowing global growth.

In *Maldives*, tourism accounts for about 70 percent of the economy, directly and indirectly, and strong growth of tourist arrivals is expected to continue. The completion of a new airport terminal in the second half of the year is contributing to growth accelerating to an expected 5.7 percent in 2025. Activity is forecast to moderate to 5.3 percent in 2026. The country's challenges in meeting its external debt obligations continue to pose a significant downside risk to projected growth.

In *Nepal*, the economy is expected to grow 4.5 percent in FY24/25 and 5.2 percent in FY25/26—for both years, less than expected in the October edition of this report. The downgrade is due to persistent weakness in the financial system. Private sector credit has been contracting as a share of GDP, and many financial sector cooperatives have suffered losses or gone bankrupt because of nonperforming loans, particularly to the real estate sector. Nepal has also been relisted by the Financial Action Task Force, for the second time, on the grey list of countries that require greater financial monitoring due to not fully implementing money laundering and terrorist financing reforms.

In *Pakistan*, the economy continues to recover from a combination of natural disasters, external pressures, and inflation. Inflation has slowed more quickly than expected, providing room for further monetary easing. Incoming data on economic activity have been weaker than expected, but strong imports of capital goods and high consumer confidence suggest accelerating private sector growth. Banking sector lending to the private sector has picked up substantially as government borrowing needs have declined. Economic growth is projected to continue gradually gathering strength, rising to 2.7 percent in FY24/25 and 3.1 percent in FY25/26.

In *Sri Lanka*, the modest growth forecast reflects the scarring effects of the crisis, structural impediments to growth, and global economic uncertainty. Progress with debt restructuring has contributed to a normalization of financial markets and will allow a resumption of large infrastructure projects funded by bilateral lenders. Overperformance of revenues relative to targets after a large increase in the value-added tax in 2024 has improved fiscal balances, but this is being somewhat offset by significant increases in government salaries.

Risks and vulnerabilities

The uncertain global environment presents heightened downside risk to South Asia's growth prospects. Rising tariffs, policy uncertainty, and financial turmoil could result in a severe global downturn. South Asia may be more insulated from global shocks than other EMDE regions because of its limited trade integration with the rest of the world, but domestic vulnerabilities could amplify any direct impacts. High government debt and

debt service burdens, limited international reserves in some countries, and reliance on official development assistance in others make several countries in the region vulnerable to shifts in international financial market sentiment. Financial pressures could also arise from policy surprises abroad as well as slippages in the implementation of key domestic reforms, which could erode confidence and threaten macroeconomic stability.

Severe global downturn

The two countries facing the highest new tariff barriers are the United States and China. These are the world's two largest economies, accounting for more than 40 percent of global GDP and 20 percent of global trade.

Any slowdown affecting these countries would have substantial spillovers to the rest of the world. In 2023, the United States was the most important export destination for about one-fifth of countries and China was the most important destination for almost another fifth. U.S. financial markets can also transmit domestic shocks abroad through their impact on portfolio and credit flows. China is deeply embedded in global value chains, particularly with other countries in the East Asia and Pacific region. The country is also a major importer of commodities, such that a slowdown in activity can weigh on demand and prices for metals and energy.

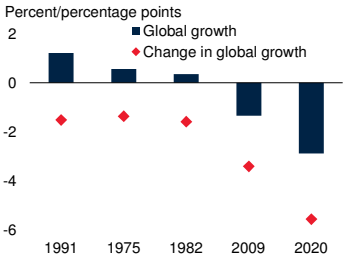
Market participants believe the probability of the United States falling into recession has increased substantially. All five global recessions over the past 50 years have coincided with recessions in the United States. Only twice in this time has the United States fallen into recession without the global economy doing the same but, even in those years, the global economy tipped into severe downturns.

Consensus forecasts point to a moderate global growth slowdown, but not a severe one, let alone a global recession. But an intensification in global financial strains, a broadening of tariff increases, and persistent and rising policy uncertainty could eventually combine to tip the global economy into a severe slowdown or even recession (figure 1.8).

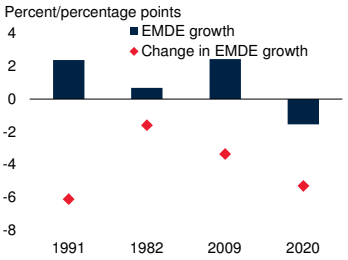
FIGURE 1.8 Severe global downturn

Tariff increases, policy uncertainty, and financial market volatility in an environment of elevated debt could result in a severe global downturn. There have been five global recessions and three severe global downturns in the past 50 years. Monetary and fiscal policy have supported activity during past global recessions, but the inflationary effect of tariffs and sizable fiscal deficits may now limit this response. Weakening activity in the United States and China would have widespread spillovers, given the size of these economies. South Asia has slowed during some global recessions and emerged largely unscathed from others. The region's lack of openness limits its exposure to global shocks, but also limits opportunities to benefit from productivity-enhancing foreign technology and practices.

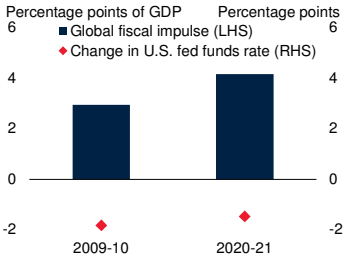
A. Global growth and change in global growth in global recessions



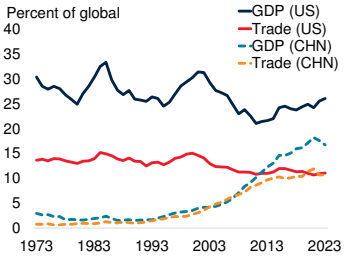
B. EMDE growth and change in EMDE growth in global recession years



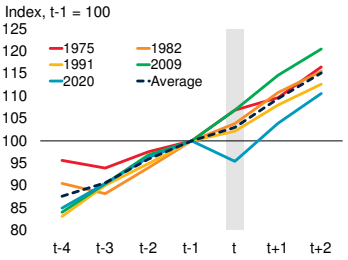
C. Global fiscal impulse and U.S. monetary policy rate cuts in global recessions



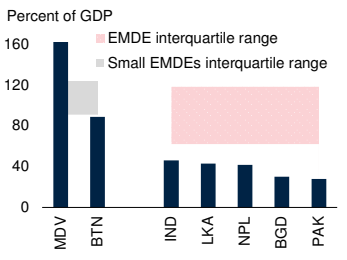
D. United States and China as a share of global GDP and trade



E. Output in South Asia during global recessions



F. Trade openness, 2023



Sources: IMF World Economic Outlook (database); Kose, Sugawara, and Terrones (2020); World Development Indicators (database); World Bank.

Note: BGD = Bangladesh; BTN = Bhutan; CHN = China; EMDEs = emerging market and developing economies; IND = India; LKA = Sri Lanka; MEX = Mexico; MDV = Maldives; NPL = Nepal; PAK = Pakistan; US = United States.

A. B. Real GDP-weighted averages (at 2010-19 average market exchange rates and prices). Data for EMDE growth not available for 1975.

C. Nominal U.S. dollar GDP-weighted averages for fiscal impulse; fiscal impulse defined as the decline in the structural fiscal balance for 84 and 85 countries between 2008-10 and 2019-21. Change in U.S. federal funds rate over two year period from June 2008 and from December 2019.

E. The chart shows an index equal to 100 in global recession years (shaded in gray). Average refers to the average of the last five global recessions.

F. Trade is defined as the sum of goods and services exports and imports. For Maldives, 2022 data are shown. "Other EMDEs" includes 72 economies, and "Small EMDEs" includes 13 economies.

The world economy has fallen into recession—defined as a contraction in per capita GDP—five times over the past 50 years: 1975, 1982, 1991, 2009, and 2020. These episodes were characterized by highly synchronized downturns in global trade, industrial production, and capital flows, alongside financial crises (Kose and Ohnsorge 2019). In global recession years, global growth slowed sharply by more than 2 percentage points, on average, and EMDE growth slowed even more, with the most severe recessions being the two most recent ones in 2009 and 2020. Global inflation and oil prices typically fell. In the three global downturns over the past five decades (1998, 2001, and 2012), global growth slowed by 1.4 percentage point, on average.

Policy makers responded to previous downturns and recessions with significant monetary and fiscal stimulus. Governments around the world supported economic activity with fiscal stimulus: in the last two global recessions of 2009 and 2020, global fiscal stimulus averaged 3.5 percent of GDP over a two-year period. Central banks, too, provided monetary stimulus. For example, the U.S. Federal Reserve cut policy rates by more than 1 percentage point in the last two global recessions and maintained low rates for the subsequent two years or longer.

Currently, however, the scope for significant fiscal and monetary policy support is limited in many countries. Monetary policy may be constrained by the inflationary impact of tariffs, and by the fact that inflation concerns were rising in many economies even prior to the latest tariffs. Fiscal policy provided considerable support during the pandemic and many countries still have fiscal deficits that are considerably wider than their pre-pandemic level. Further increases may be difficult to finance, particular given rising borrowing costs.

Growth in South Asia slowed considerably during past global recessions, although the region only fell into outright contraction in 2020. Nearly all the region's economies are among the quarter of EMDEs least open to global trade and investment, and have some of the highest tariff and non-tariff barriers to trade. The closed nature of the region's economies limits its exposure to adverse global spillovers, such as those stemming from increasing tariffs or slowing growth in major economies, but these would still be considerable. Being less open also limits opportunities to benefit from trade or investment diversion (World Bank 2024b).

The damage from tariff increases also has long-term impacts. If trade tensions lead to the fragmentation of global trade into separate blocks, it would weaken an important engine of growth and technology transfer for many EMDEs. In a scenario in which global trade fragments into two blocks centered on the United States and China, the losses from trade inefficiencies and capital accumulation have been estimated to be as large as 7 percent of global GDP (IMF 2023b). Whether South Asia would suffer below-average or above-average losses in such a scenario would depend on the degree to which the region can benefit from the rerouting of trade between the world's two largest economies.

Policy uncertainty and financial stress

Some indicators point to improved macroeconomic resilience since the October 2024 edition of the *South Asia Development Update*. For most countries in the region, current account deficits have largely been closed, currencies that had been under pressure have stabilized, foreign exchange reserves have been bolstered, and borrowing spreads have narrowed (figure 1.9).

But these improvements are built on fragile foundations. Many countries in South Asia have only recently exited crises and needed external support to do so. The region is still the most heavily indebted among EMDEs, with particularly high levels of public debt. Even after the recent improvements, foreign exchange reserves remain limited in many cases. Current financial market stability and anticipated improvements in fiscal balances are predicated upon ambitious reform programs that may prove difficult to implement fully, especially if they trigger social unrest.

Policy uncertainty in major economies could generate financial market gyrations and discourage economic activity. In times of uncertainty, firms may postpone investments and be more cautious in hiring (Bloom et al. 2014; Schaal 2017). Households may postpone purchases of durable goods and increase their savings. Commercial banks may increase lending rates to compensate for the risk of increased defaults (Segal, Shaliastovich, and Yaron 2015).

Both global financial shocks and global uncertainty shocks can have strong and persistent contractionary

effects on output in individual countries (Cesa-Bianchi, Pesaran, and Rebucci 2020). In the past, a 1-standard-deviation increase in global economic policy uncertainty is estimated to have lowered global output by more than 1 percent over two to three years (Ahir, Bloom, and Furceri 2022).

South Asia has limited exposure to global *trade* shocks. But the region's high debt stocks, low foreign exchange reserves, and reliance on official development assistance make it vulnerable to *financial* shocks.

An abrupt flight of capital from riskier to safer assets could have significant consequences for most countries in South Asia. Such events could be triggered by a global increase in risk aversion, policy uncertainty, or shifting trade policy. Capital flight could also result from domestic developments, such as an unexpected increase in inflation or a failure to satisfy the conditions for IMF support of a policy program.

Governments in *India*, *Maldives*, *Pakistan*, and *Sri Lanka* are already liable for above-average net interest payments relative to GDP, and will seek to finance fiscal deficits of between 7 and 17 percent of GDP in 2025. In some countries, growing debt service pressures could generate cycles of rising risk premia and debt distress.

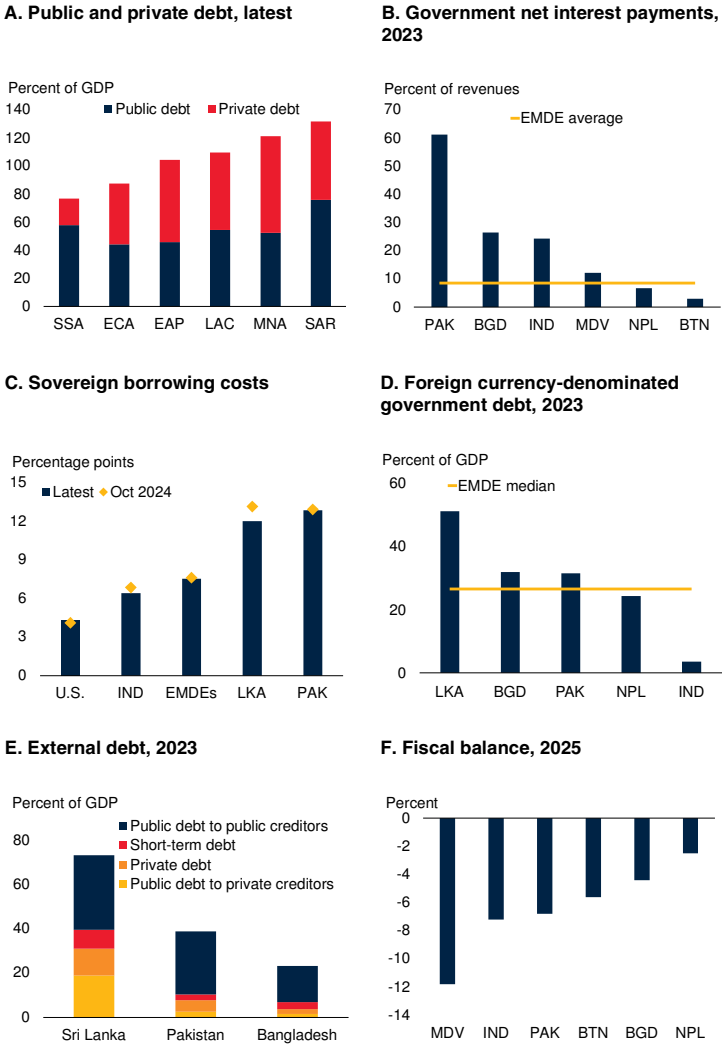
Some countries in the region could experience financial pressures from policy changes in major donor countries that result in a slowdown or sudden stop in official financing. Several advanced economies have recently announced budget reductions for development assistance.

Several countries in South Asia are highly dependent on official development assistance (figure 1.10). This is especially true for Afghanistan, which had development assistance inflows equivalent to more than one-quarter of its economy in 2022, though donors have scaled down their engagement more recently. Five of the region's eight countries—Afghanistan, Bangladesh, Bhutan, Maldives, and Nepal—have aid inflows equivalent to at least 1 percent of GDP. For all South Asian countries except India, Maldives, and Sri Lanka, aid inflows are substantially larger than inflows from foreign direct investment.

Currency instability has been associated with an increased probability of balance-of-payments crises

FIGURE 1.9 Policy uncertainty and financial stress

South Asian countries are more indebted than those in any other EMDE region, on average, and need to finance sizable fiscal deficits in 2025. They also have limited foreign exchange reserves and above-median shares of foreign currency-denominated government debt. These features make the region particularly vulnerable to financial stress.



Sources: CEIC; IMF Global Debt Database; IMF Staff Country Reports 2024; IMF World Economic Outlook (database); Kose et al. (2022); Macro Poverty Outlook; Trading Economics; World Bank Macro Poverty Outlook; World Bank Debt Statistics; World Bank.

Note: BGD = Bangladesh; BTN = Bhutan; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; IND = India; LAC = Latin America and the Caribbean; LKA = Sri Lanka; MDV = Maldives; MNA = Middle East and North Africa; NPL=Nepal; PAK= Pakistan; SAR = South Asia; SSA = Sub-Saharan Africa.

A. Public debt refers to the total liabilities of the central government, while private debt includes loans and securities. Both reflect the median country level for each region in 2022, with Sri Lanka data from 2019 and Bhutan data from 2021 in the South Asia region.

B. Bars show government interest spending, derived from the difference between the overall and the primary balance. Orange line shows the GDP-weighted EMDE average. Data for Maldives is calendar year, while the rest is fiscal year.

C. Figure shows the 10-year government bond yield. "EMDEs" refers to the median for 17 EMDEs. Last observation is April 16, 2025.

D. For India, proxied by nonresident-held debt. EMDEs include 39 economies.

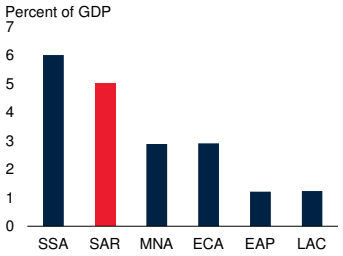
E. Public debt to public creditors includes long-term public debt to bilateral and multilateral creditors as well as IMF and SDR allocations. Public debt to private creditors is long-term. Private debt is long-term private external debt to any creditor. Short-term debt cannot be decomposed.

F. Data not published for Sri Lanka. 2025 refers to calendar year for Maldives, fiscal year 2024/25 for Pakistan, Bhutan, Bangladesh and Nepal, and fiscal year 2025/26 for India.

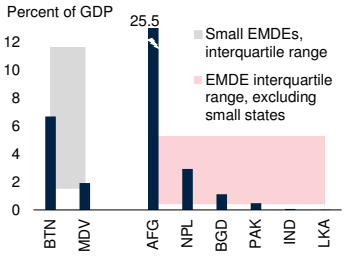
FIGURE 1.10 Official development assistance

Many countries in South Asia are dependent on inflows of official development assistance. These inflows are often larger than inflows of foreign direct investment.

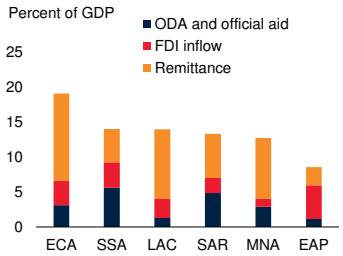
A. Net official development assistance by region, 2022



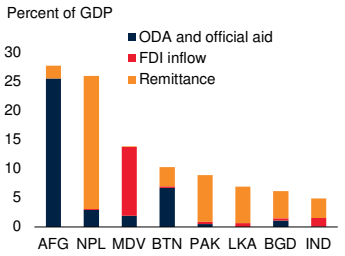
B. Net official development assistance by country, 2022



C. Composition of foreign exchange inflows, 2022, by region



D. Composition of foreign exchange inflows, 2022, by country



Sources: World Development Indicators (database); World Bank.

Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; FDI = foreign direct investment; IND = India; LAC = Latin America and the Caribbean; LKA = Sri Lanka; MDV = Maldives; MNA = Middle East and North Africa; NPL = Nepal; ODA = official development assistance; PAK = Pakistan; SSA = Sub-Saharan Africa; SAR = South Asia.

A. Regional aggregates use simple average and exclude small states. SAR includes Afghanistan, Bangladesh, India, Nepal, Pakistan, and Sri Lanka. Sample includes 17 countries in LAC, 11 in EAP, 10 in MNA, 39 in SSA, and 17 in ECA.

B. "Small EMDEs" includes 23 economies, and "EMDEs excluding small states" includes 100 economies. ODA flows to Afghanistan have declined substantially since 2022 according to estimates based on engagement with donors and UN agencies.

C. Sample includes 16 economies in ECA, 35 in SSA, 16 in LAC, 8 in SAR, 10 in MNA and 10 in EAP. Regional aggregates use simple average. Economies with missing values for any type of foreign exchange flow in 2022 are excluded. South Asia aggregation uses Sri Lanka's data for 2021 to avoid the temporary disruption in inflows caused by the country's debt default in 2022, and has no data for Afghanistan's FDI in 2022.

in EMDEs (IMF 2023a). Currency depreciations could result from slowing inflows of capital, and would push up inflation and increase servicing costs on debt denominated in foreign currencies. In countries with pegged exchange rates, a depletion of foreign exchange reserves could culminate in an abrupt devaluation, which could have particularly severe consequences for those that have borrowed in foreign currencies on the assumption that the exchange rate would remain stable. Interest rate hikes by EMDE central banks to contain currency and capital outflows would tighten domestic borrowing conditions and slow the growth of credit and domestic demand. Higher borrowing costs could prolong a decade of private investment weakness in South Asia (World Bank 2024a).

Reform slippage

Many countries in South Asia have recently struggled with some combination of weak growth, high inflation, sizable current account deficits, fiscal pressures, and financial sector weakness. In 2024, these pressures caused three countries in the region to experience debt distress. To reduce their vulnerabilities and build resilience, governments have embarked on reform programs, often supported by the IMF. Half of the countries in the region are in IMF programs—*Bangladesh, Nepal, Pakistan*, and *Sri Lanka*—which is a higher proportion of the total in South Asia than any other EMDE region except Sub-Saharan Africa (figure 1.11).

These programs come with reform commitments and conditions designed to restore or preserve macroeconomic stabilization—in particular by undertaking fiscal consolidation and increasing foreign exchange reserves—while also enhancing social protections. Foreign exchange buffers have increased in some program countries since last year, even though they remain low. All four South Asian countries with IMF programs have narrowed or closed their current account deficits, and are also expected to show greater improvements in their fiscal positions than non-program countries.

The specifics of each program differ by country. In *Pakistan*, the government has committed to raising tax revenues by the equivalent of 4–5 percentage points of GDP, reforming the energy sector, and allowing the exchange rate to be flexible. *Bangladesh* entered a program to strengthen the financial sector and modernize its macroeconomic framework. *Sri Lanka*'s program aimed to restore debt sustainability, growth, and financial sector stability. *Nepal*'s program is an older vintage, as it was introduced to address the effects of the pandemic and is on track to conclude in 2025.

In the medium term, estimates of the effect of IMF programs on growth vary widely. In principle, bolstering macroeconomic stability should support output growth, but this may be partly offset by the negative effect on growth from the austerity measures required in the IMF program. A plurality of studies find positive effects from IMF programs, but a substantial minority find no effect or even

negative effects (Balima and Sokolova 2021; Bird and Rowlands 2017; Dreher 2006; ECB 2019).

In the short term, however, IMF programs help protect South Asian countries from financial turmoil. South Asian countries—particularly those in IMF programs—tend to have lower credit ratings than other EMDEs. Furthermore, their credit-rating assessments more often explicitly reference the IMF program.

Historically, countries in South Asia have met program conditions about as often as other EMDEs. Inability to implement program-critical reforms can delay or interrupt the flow of IMF support. This could reignite exchange rate depreciations and capital outflows, which would raise borrowing costs and add to fiscal pressures.

Implementing structural reforms is not only about avoiding a financial crisis, however. In the longer term, the successful implementation of planned reforms can help countries unlock stronger structural growth alongside macroeconomic stability.

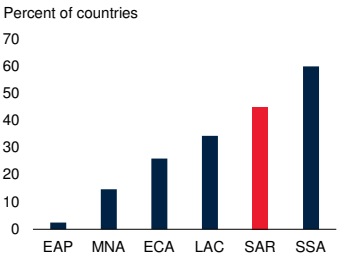
Policy challenges

South Asian governments could seize the opportunity provided by the current upheaval in global trade to make their economies more attractive for trading partners interested in diverse and stable supply chains. This would require a readiness to sharply lower tariff and non-tariff trade barriers to trade as part of ongoing or new bilateral or regional trade negotiations. Given how closed South Asian economies currently are, and given the region's demographic potential and growing domestic markets, opening up could generate substantial productivity and employment benefits over the medium-term. In the short term, however, it could temporarily weigh on employment and output growth if South Asian product, labor, and capital markets are too rigid to allow for a quick expansion of more profitable activities and reduction in less profitable ones. The disruption could be particularly large in agriculture (Gulati et al. 2025). The sector is sheltered by average tariffs of 24 percent in 2022 (compared with a global average of 15 percent) and it employs 42 percent of South Asia's workforce.

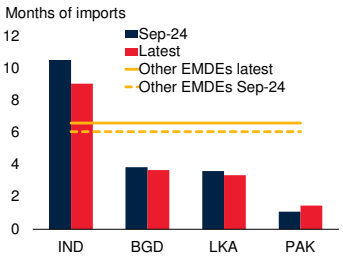
FIGURE 1.11 Reform slippage

Half of the countries in South Asia are implementing IMF-supported policy programs. These have helped to contain currency pressures, stabilize or improve fiscal balances, and reduce inflation. Countries remain vulnerable to slippages in their policy programs—not only because slippages tend to weaken economic performance, but also because credit ratings often depend on IMF support. South Asian countries have in the past met program conditions about as often as other EMDEs.

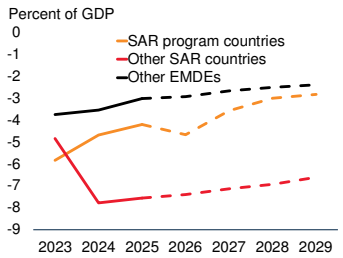
A. EMDEs in IMF-supported programs



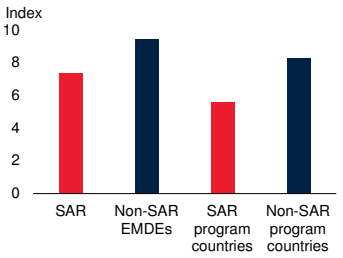
B. International reserves



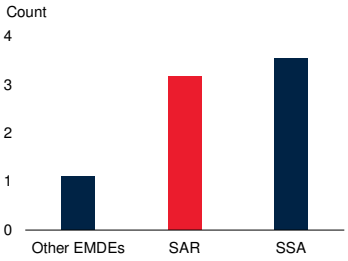
C. Fiscal balances in South Asia and other EMDEs



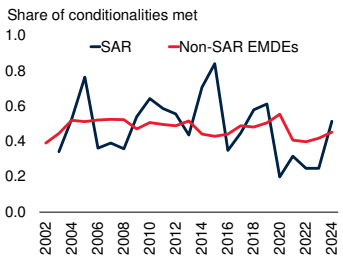
D. EMDE credit ratings



E. Average mentions of "IMF" in credit rating assessments



F. Share of program conditions met



Sources: Bloomberg; Oxford Economics; World Development Indicators (database); WTO Tariff Sources: Fitch Ratings; Haver Analytics; IMF Monitoring of Fund Arrangements (MONA) database; IMF Fiscal Monitor; Moody's; S&P Global; World Bank.

Note: BGD = Bangladesh; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; IND = India; LAC = Latin America and the Caribbean; LKA = Sri Lanka; MNA = Middle East and North Africa; PAK = Pakistan; SSA = Sub-Saharan Africa; SAR = South Asia.

A. Figure shows the average share of countries in IMF programs between 2020 and 2024, by region.

B. "Other EMDEs" includes 37 countries. Latest data are from January 2025. Comparison data is from September 2024.

C. South Asian program countries are Bangladesh, Nepal, Pakistan, and Sri Lanka. Other EMDEs include 74 economies. Data from October 2024 IMF Fiscal Monitor.

D. Credit ratings from S&P, Moody's, and Fitch were mapped to a unified 1–22 scale (1 = lowest, 22 = highest), and a simple average was computed for each country. The sample includes South Asian countries (Bangladesh, India, Maldives, Pakistan, Sri Lanka), South Asian program countries (Bangladesh, Pakistan, Sri Lanka), 96 non-SAR EMDEs, and 40 non-SAR program countries. Last observation is April 15, 2025.

E. Counted mentions of "IMF" in the credit assessment reports for EMDE countries and regional aggregates use simple averages; South Asian countries include Bangladesh, India, Maldives, Nepal, Pakistan and Sri Lanka; Sub-Saharan Africa region includes 28 economies, and "other EMDEs" includes 64 countries. Last observation is April 10, 2025.

F. The unit of observation in the MONA dataset is the Arrangement/loan-conditionality-review round. Each arrangement/loan has several conditionalities. A conditionality is counted as a reform in all years where it is met. Figure shows the share of conditionalities met in each review round. The share ranges from 0 to 1.

BOX 1.1 Branching Out: The Economic Potential of South Asians Abroad[a]

Dimming growth prospects across South Asia amplify the challenge of creating jobs. Many in South Asia's rapidly growing workforce are likely to continue to seek opportunities abroad. Migrants from South Asian countries—mainly to countries outside the region—account for about 3 percent of South Asia's working-age population. About one-half of them work in Gulf Cooperation Council countries, are typically low-skilled, and on short-term contracts. Another one-quarter work in advanced economies and tend to be highly skilled and longer-term migrants. While the challenges of emigration have been well documented, South Asian countries' large diasporas also bring economic benefits to the home countries, both while workers are abroad and after they return home—through remittances, improved skills, investments, and trade ties.

Introduction

Among emerging market and developing economy (EMDE) regions, South Asia is the second-largest source of international migrants after Europe and Central Asia. In 2020, the number of international migrants from South Asian countries to other countries, mainly outside but also within the region, was equivalent to 3 percent of South Asia's working-age population. For example, the number of Nepalis living abroad was equivalent to 14 percent of Nepal's working -age population, and the corresponding proportion for Afghanistan was 27 percent. The remittances sent by migrants are a critical source of income for households and a source of foreign exchange inflows for financial systems (World Bank 2024b). During 2020–23, remittance inflows from international migrants averaged 4 percent of GDP in South Asia and, in Nepal, 24 percent. The largest source of remittance inflows to the region was Gulf Cooperation Council (GCC) countries (Ratha, Plaza, and Kim 2022).

Globally, almost half of all migrants return home (World Bank 2023a). Both returnees and those who remain abroad can benefit their home economies, in different ways. This box reviews evidence and the literature to answer the following questions:

- What are the characteristics of South Asia's migrant population abroad?
- How can South Asia's governments better leverage the economic potential of their large diasporas?

This box reports the following findings.

First, the GCC countries host one-half of South Asian migrants, while advanced economies host about one-quarter. On average, South Asian migrants in advanced economies are better educated than both the average South Asian and the average migrant from South Asian countries to other EMDEs. More than half of South Asian migrants in advanced economies have received tertiary education, compared with less than one-third of all South Asians and one-fifth of South Asian countries' migrants in other EMDEs.

Second, international experience suggests that international migrants can benefit their origin economies both while they are abroad and after they return home. Returning migrants bring home enhanced human capital and savings, and diaspora networks foster knowledge spillovers, trade, and investment. Formal agreements—such as those arranged by the Philippines as an origin country, and by New Zealand and the Republic of Korea as host countries—can help improve predictability and working conditions.

Third, South Asian governments could better harness the potential of lower-skilled, temporary migrants abroad by ensuring better working conditions and formal training through bilateral agreements, facilitating remittance flows, and supporting entrepreneurship among returning migrants. To unlock greater benefits from highly skilled, long-term migrants, South Asian countries could leverage existing networks through policies that attract foreign direct investment (FDI) or joint ventures and remove obstacles to trade between host and home countries.

South Asia: Migration trends and patterns

Migration trends. About 40 million people born in South Asian countries lived abroad in 2020—equivalent to about 3 percent of the region's working-age population (McAuliffe and Oucho 2024). Migrant populations from Afghanistan, Bhutan, Nepal, and Sri Lanka were especially large relative to their populations,

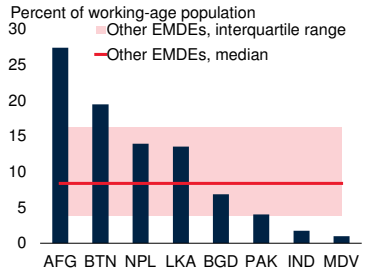
[a] This box was prepared by Hagen Kruse and Zoe Xie.

BOX 1.1 Branching Out: The Economic Potential of South Asians Abroad (*continued*)

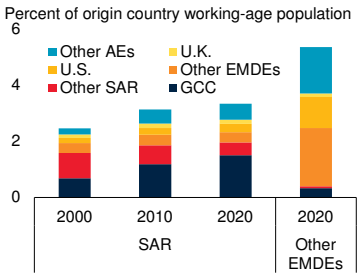
FIGURE B1.1 Migration trends and patterns

The number of international migrant workers was equivalent to about 3 percent of South Asia's working-age population in 2020. The most common destinations are countries in the Gulf Cooperation Council.

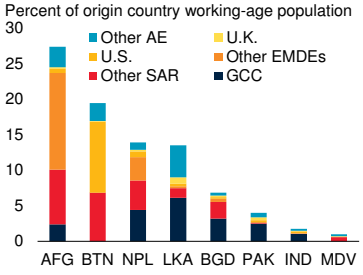
A. Migrant population overseas, by country of origin, latest



B. Host country of migrant population from South Asia versus other EMDEs, latest



C. Host country of migrant population from South Asia, by country of origin, latest



Sources: Global Bilateral Migration Matrix 2000–2020 (database); World Development Indicators (database); World Bank.

Note: AEs = advanced economies; AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; EMDEs = emerging market and developing economies; GCC = Gulf Cooperation Council (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates); IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan; SAR = South Asia. Migrant population from South Asia include South Asian migrants in other South Asian countries. EMDE and South Asia aggregates exclude small states (population below 1.5 million). Migrants are defined as people born in a country that is different from the country where they currently reside. Numbers for Afghanistan include family refugees, including children who have not yet reached working age. People who were born in India and are living in Pakistan, and vice versa, are excluded from the migrant population, due to historical reason.

A. Red horizontal line is the median of other EMDEs. Shaded region represents the inter-quartile range of other EMDEs. EMDEs exclude small states (population below 1.5 million). Latest data are for 2020.

C. Latest data are for 2020.

and much larger than the EMDE median (figure B1.1). In contrast, Maldives is a major migrant host country, with immigrants constituting one-third of the country's working-age population (Maldives Bureau of Statistics 2024). In Nepal and Sri Lanka, the pace of net emigration during 2010–20 was well above the EMDE median, amid job market weakness and, in 2020, the COVID-19 pandemic, which stranded many migrants abroad (World Bank 2022). Since 2020, emigration from Bhutan, Nepal, and Sri Lanka appears to have surged further due to continued weakness in labor markets (Alaref et al. forthcoming; World Bank 2024c, 2025). The number of South Asians living abroad grew by 13 percent between 2020 and mid-2024.

Migration destinations. The main destinations of South Asian migrants in 2020 were GCC countries—in particular, Qatar, Saudi Arabia, and the United Arab Emirates. After efforts in several GCC countries in the late 2000s to better protect immigrant workers, these countries' share as a destination for South Asian nationals living abroad increased from 28 percent in 2000 to 45 percent in 2020. At least one-third of the migrant populations from Bangladesh, India, Nepal, Pakistan, and Sri Lanka lived in GCC countries, compared with less than 10 percent of migrants from other EMDEs. Meanwhile, the number of intra-regional migrants declined from 37 percent of South Asian countries' nationals living abroad in 2000 to 15 percent in 2020.[b] This decline has been attributed to the lack of job opportunities in South Asia and the acceleration in demand for low-skilled labor in the GCC countries (Ahmed and Bossavie 2022; World Bank 2024a). South Asian migrants have been hosted by a number of advanced economies, and mainly Anglophone ones. In 2020, about 20 percent of Indian migrants were in either the United States or the United Kingdom, about 20 percent of Sri Lankan migrants were in either Australia, Canada, or the United Kingdom, and about 20 percent of Pakistani migrants were in either Canada, the United Kingdom, or the United States.

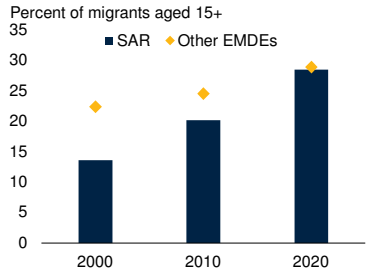
[b] People who were born in India but are living in Pakistan, and vice versa, are excluded from the migrant population as these are legacies from the partition in 1947. The decline in intra-regional migration, therefore, is not related to the aging of those people.

BOX 1.1 Branching Out: The Economic Potential of South Asians Abroad (*continued*)

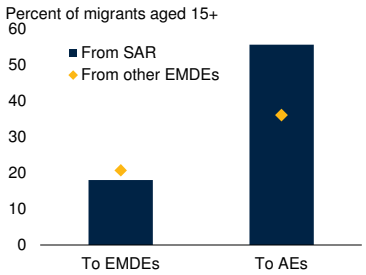
FIGURE B1.2 Migrant skills

South Asian migrants in advanced economies are better educated than both South Asians in EMDEs and non-South Asian migrants in advanced economies.

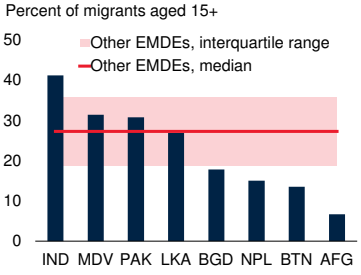
A. Migrants with tertiary education from South Asian countries, latest



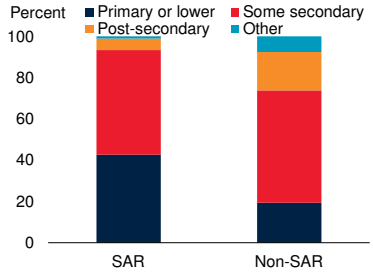
B. Migrants with tertiary education from South Asia versus other EMDEs, by host country type, latest



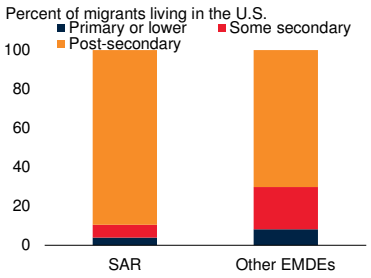
C. Migrants with tertiary education from South Asian countries, latest



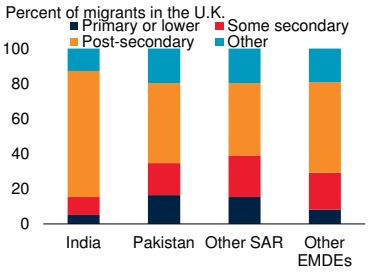
D. Education level of migrant workers in GCC by country of origin, 2014–15



E. Education level of migrants in the United States by country of origin, 2019



F. Education level of migrants in the U.K. by country of origin, 2023



Sources: American Community Survey 2009, 2019; Bossavie and Özden (2023); Global Bilateral Migration Matrix 2000–2020 (database); KNOMAD-ILO Migration Costs Surveys 2015 and 2016; U.K. Annual Population Survey 2019, 2023; U.S. Census 2000 5 percent sample data; World Development Indicators (database); World Bank.

Note: AEs = advanced economies; AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; EMDEs = emerging market and developing economies; GCC = Gulf Cooperation Council (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and United Arab Emirates); IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan; SAR = South Asia. Migrant population from South Asia include South Asian migrants in other South Asian countries. EMDE and South Asia aggregates exclude small states (population below 1.5 million). Migrants are defined as people born in a country that is different from the country where they currently reside. People who were born in India and are living in Pakistan, and vice versa, are excluded from the migrant population, due to historical reason.

A.B. Numbers showing migrants aged at least 15 years old with tertiary education as a percent of all migrants who are at least 15 years old, by origin and destination country group.

C. Numbers showing migrants aged at least 15 years old with tertiary education as a percent of all migrants who are at least 15 years old, by origin country group.

D. "Primary or lower" indicates no education, primary incomplete, and primary complete. "Some secondary" indicates secondary incomplete and secondary complete. "Post-secondary" indicates post-secondary technical, some tertiary, university and higher. "Other" indicates adult education and literacy programs.

E. Bars show the percentage of immigrants aged 18 and older living in the United States in 2000, 2010, or 2020, by the highest education attainment. "Primary or lower" indicates no education, pre-primary, and up to grade 6. "Some secondary" indicates grade 7 to 12 with or without a high school diploma or GED. "Post-secondary" indicates some college, associate's, bachelor's, master's, professional, and doctoral degrees.

F. "Other EMDEs" indicates immigrants with country of birth as European Union EU2 (Bulgaria and Romania), Middle East and Central Asia, North Africa, Southeast Asia, Sub-Saharan Africa, Central and South America, Other Europe (non-European Union), and Poland. China and Mongolia (part of East Asia), Hungary (part of EU8), and Mexico (part of North America) are not included in "Other EMDEs" because they are not separately identified in the data. Bars show the percentage of immigrants in the United Kingdom by highest qualification. "Primary or lower" indicates no qualification. "Some secondary" indicates GCSE grades A*–C and GCE-A level or equivalent. "Post-secondary" indicates high education and degree or equivalent. "Other" indicates other qualifications.

Migrants' skills. South Asian migrants are less well-educated than those from other EMDEs, although the gap has been shrinking (figure B1.2). Across destinations, South Asian migrants in advanced economies are more educated than those from other EMDEs: more than half of the former have tertiary education, compared with 40 percent of the latter. For example, in 2023, almost 60 percent of South Asian migrants—and 72 percent of migrants from India—in the United Kingdom had a post-secondary education, compared with about 50 percent of migrants from other EMDEs. In contrast, South Asian migrants living in other EMDEs are, on average, slightly less educated than migrants from other EMDEs. The latest available

BOX 1.1 Branching Out: The Economic Potential of South Asians Abroad (*continued*)

data for South Asian migrant workers in GCC countries, which are for 2014–15, show that they were overwhelmingly low-skilled—with 90 percent having, at most, a secondary education, compared with 70 percent for migrants in GCC countries from other EMDEs. Among South Asian countries, migrants from India have the highest share with tertiary education—40 percent, which is above the EMDE median. Migrants from Afghanistan, Bangladesh, Bhutan, and Nepal are the least educated, with shares of migrants having received tertiary education below those of migrants from three-quarters of other EMDEs.

Duration of migrants' stays. The duration of the stays of South Asian migrants in advanced economies has resembled that of migrants from other EMDEs. For example, among South Asian migrants living in the United Kingdom in 2023, the median length of stay had been 13 years, similar to that for migrants from other EMDEs (Office for National Statistics 2024). In contrast, low-skilled labor migration from South Asian countries, especially to the GCC countries, is usually temporary by design, with migrants returning home upon contract completion (World Bank 2022). The most recent multi-country survey of migrant workers, conducted in 2014–15, indicates that almost all of the migrant workers from South Asia in GCC countries were on short-term visas, compared with about one-quarter of migrants from other EMDEs (KNOMAD and ILO 2021). In 2019, one-quarter of Bangladeshi migrants had been abroad for less than two years, with a median stay of 4.7 years (Bossavie et al. 2025).

International experience with large diasporas

International migration can benefit origin economies both while workers are abroad and after they return home. Returning migrants bring home enhanced human capital and savings; diaspora networks foster knowledge spillovers, trade, and investment. Particularly given the differences in educational backgrounds and skills between South Asian migrants living in other EMDEs and those living in advanced economies, South Asian countries require different strategies to better leverage the economic potential of these two kinds of migrants (Bossavie and Özden 2023). This includes negotiating bilateral migration agreements to improve the working conditions for low-skilled workers abroad—for example, by establishing legal frameworks for the protection of labor rights, formalizing training programs, and reducing visa fees (Ahmed and Bossavie 2022).

Returning low-skilled migrants. Temporary migrants, particularly low-skilled ones, tend to have a stronger motivation to accumulate savings and send home remittances than permanent migrants (World Bank 2023a). For instance, migrants from EMDEs who entered the Netherlands between 1999 and 2007 were more likely to return to their origin country after they had met a savings target; this tendency was particularly strong among low-skilled migrants (Bijwaard and Wahba 2014). Savings and remittances have also been the primary benefits of temporary migrants from South Asia to GCC countries. Among returning Bangladeshi and Pakistani workers, savings were later often used to finance entrepreneurial activities at home, which in turn increased family income (Bossavie et al. 2025; Bossavie and Wang 2022).

Returning highly skilled migrants. More than 20 percent of highly skilled workers born in low-income countries work abroad (World Bank 2019). This has been characterized as a "brain drain"—a term used to describe the negative effects of highly skilled emigration on production, research and development, the provision of public services, such as health or education, tax revenues, and political institutions in the origin countries (for example, Agrawal et al. 2011; Docquier and Rapoport 2012; Gibson and McKenzie 2011). But when migrants return home with improved skills, this brain drain can turn into a "brain gain" because of these workers' transfer of knowledge from advanced economies (Harrington and Seabrooke 2020; Kerr et al. 2016). Highly skilled refugees from the former Yugoslavia, for instance, became "guest workers" in Germany in the 1990s, and upon their return home, productivity in the Yugoslav industries employing them increased as a result of the new practices and knowledge they brought, with a resulting boost to export performance (Bahar et al. 2024).

Incentivizing the return of highly skilled migrants. Given the longer average stays of highly skilled migrants abroad, several EMDEs have launched targeted government programs to incentivize their return. For example, the Chinese *Thousand Talent Program*, launched in 2008, has resulted in the return

BOX 1.1 Branching Out: The Economic Potential of South Asians Abroad (*continued*)

of more than 7,000 scientists previously working abroad, using tax exemptions, housing subsidies, and preferential access to start-up and research grants (Jia 2018). Besides incentivizing the return of highly skilled workers, the program's research-related financial benefits have also raised productivity more than among their overseas research peers (Shi, Liu, and Wang 2023).

Highly skilled diasporas: Knowledge and business spillovers. The permanent return of highly skilled migrants is not a necessary condition for positive spillovers to origin countries. The large group of Indian -born, U.S.-educated engineers working in Silicon Valley on the U.S. H1-B visa program, for instance, have in many cases maintained professional and business connections with their home country and contributed to the upgrading of its information technology industries (Docquier and Rapoport 2012; Saxenian 2023). Strong knowledge network effects between Indian and U.S. cities have also been associated with a higher likelihood of innovation in the origin city (Agrawal et al. 2011). Similarly, the recent migration of European innovators to the United States not only improved their own productivity, but also increased the innovation rate of their former colleagues in Europe by 16 percent (Prato 2025). And the prospects of working in the United States increased the incentive to invest in information technology-specific education in India and elsewhere (Khanna and Morales 2024).

Diasporas: Trade and FDI. Diaspora networks have been associated with deeper trade and investment ties. After the United States lifted its trade embargo on Viet Nam in 1994, trade with Viet Nam grew 5 to 14 percent more in those U.S. states with 10 percent larger populations of former Vietnamese refugees than in other states during the period 1995–2010 (Parsons and Vézina 2018). Similarly, immigrant populations are a strong predictor of U.S. regions' outward FDI flows to origin countries, with historically large effects for diasporas from the former Soviet Union and Viet Nam and highly skilled immigrant groups (Javorcik et al. 2011; Mayda et al. 2022). In the first two decades after China started reforms to open its economy in 1979, FDI inflows were dominated by Chinese diaspora from high-income neighboring economies (Chen, Xiong, and Zhang 2023).

Circular migration

A special case of temporary migration is circular migration, referring to repeated movements between a migrant's origin and host countries. This type of temporary migration is most common among low-skilled migrants from origin countries with relatively weak domestic labor markets and host countries that provide some degree of legal certainty for re-entry (Constant and Zimmermann 2011; Dustmann and Görlach 2016; World Bank 2025). Common examples of circular migrants include seasonal workers in agriculture and construction.

The role of formal agreements. In contrast to highly skilled migrants—who are often directly recruited by international companies under formal contracts with clearly specified working conditions—low-skilled migrants often face substantial risks of financial exploitation, poor working conditions, and high migration costs (Kerr et al. 2016; McAuliffe and Oucho 2024).[c] For example, in 2015–16, Pakistani migrants on average paid US$4,500—more than 10 months' worth of their monthly destination wage—to work temporarily in Saudi Arabia (Ahmed and Bossavie 2022). Bilateral migration agreements between countries provide a systematic and institutionalized approach to reduce the uncertainty of workers in low-skilled occupations abroad and improve their working conditions (Adhikari et al. 2024; World Bank 2025).

Formal agreements: Philippines. In 2022, the Philippines' government efforts to protect and negotiate the interests of Filipinos who temporarily work abroad culminated in the establishment of a Department of Migrant Workers. Negotiations included a temporary ban on migration of workers to Saudi Arabia until commitments to improve working conditions were made in 2022 (McAuliffe and Oucho 2024). Among other services, the Department of Migrant Workers provides migrants with a list of licensed international recruitment agencies. As a result, Filipino workers have come to be employed in more skill-intensive occupations in GCC countries and face

[c] In "Global Skill Partnership" agreements, destination countries—often aging, advanced economies—even invest into the origin countries' education and training systems to mitigate brain drain concerns (Acosta et al. 2025).

BOX 1.1 Branching Out: The Economic Potential of South Asians Abroad (*continued*)

substantially lower migration costs than South Asian migrants (Bossavie and Wang 2022). Filipinos' average cost to start working in Saudi Arabia, for instance, was less than 10 percent of the cost for Pakistani migrants. The vast majority of this cost difference can be explained by lower visa fees negotiated for Filipino workers through formal migration agreements (Ahmed and Bossavie 2022).

Formal agreements: New Zealand. New Zealand's Recognized Seasonal Employer program, introduced in 2007, facilitates temporary, low-skilled migration from small neighboring island countries. This increased migrant households' long-run income, consumption, savings, and human capital investment upon their return home (Gibson and McKenzie 2014).

Formal agreements: Korea. The Republic of Korea's Employment Permit System for temporary, low-skilled immigrants was introduced in 2004. Since then, Korea has signed bilateral agreements with 16 EMDEs—including Bangladesh, Nepal, Pakistan, and Sri Lanka—and has hosted about 56,000 migrants annually in recent years, with about one-third being return migrants. The program features mandatory training, a guaranteed minimum wage, health insurance, and a transparent legal framework for disputes between workers and employers (CGD 2025; Cho et al. 2018).

Policy priorities

International experience suggests that the policy approaches needed in origin countries to optimize their benefits from lower-skilled, temporary migrants—for example, to GCC countries—are different from those needed in the case of highly skilled, long-term migrants to advanced economies. For lower-skilled migration, government-negotiated bilateral agreements could be prioritized to improve working conditions, increase knowledge spillovers, and boost remittances, which in turn can support entrepreneurship in the home country. For more highly skilled and longer-term migration, which tends to create diaspora networks, greater benefits may be unlocked through incentives to return and by policies that remove obstacles to trade and investment between home and host countries, including the creation of platforms for cross-border collaboration and knowledge exchange.

The more challenging global environment could also more easily be navigated if the region prioritized reforms to tackle areas of particularly large inefficiency or vulnerability. *First*, low domestic revenue mobilization and fragile fiscal positions have been a source of macroeconomic instability in the past, and have absorbed financing that might have been more productively used for private investment. *Second*, the agriculture sector is unusually unproductive, and exceptionally vulnerable to climate damage. Policies to boost its productivity could unlock growth and structural transformation. *Third*, weaker growth prospects will amplify the long-standing challenge of creating jobs for South Asia's rapidly growing populations. Emigration pressures are therefore unlikely to ease but policies could aim to achieve greater benefits from South Asia's large diasporas (box 1.1).

Increasing revenues

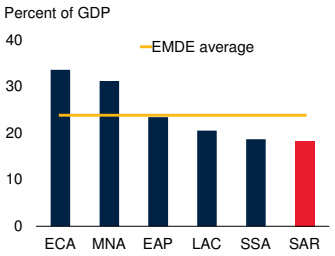
Low revenues are the root of South Asia's fiscal problems that have repeatedly threatened macroeconomic stability over the past decade. In 2023, government revenues in the region averaged 18 percent of GDP, well below the EMDE average of 24 percent of GDP, and well below the region's expenditures of 27 percent of GDP (figure 1.12). Other than Maldives all countries had government revenues that were 2 to 18 percentage points of GDP less than the average for EMDEs.

The effect of low revenues can be seen in the region's large public debt and debt service burdens. Government debt in 2023 averaged 77 percent of GDP in South Asia, compared with an EMDE average of 64 percent of GDP. South Asian governments spent an average of 26 percent of their revenues on interest payments—almost three times the EMDE average of 9 percent. These fiscal pressures are broad-based across South Asia: Nepal is the only South Asian country whose government debt-to-GDP ratio and share of revenues committed to interest payments are below the EMDE average.

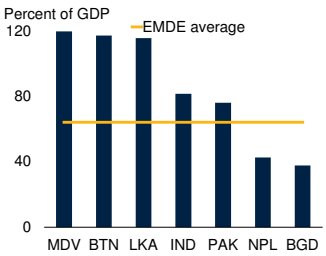
FIGURE 1.12 Government revenues

Low revenues lie at the root of South Asia's high public debt levels and low spending on health and education. Despite high tax rates, shortfalls in revenues are particularly large in consumption taxation and can only partially be explained by the characteristics of South Asian economies, such as pervasive informality. Revenues could be bolstered in a variety of ways, including reforms that strengthen tax administration.

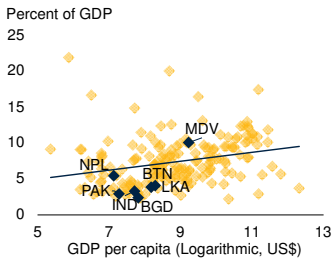
A. General government revenues, 2019–23



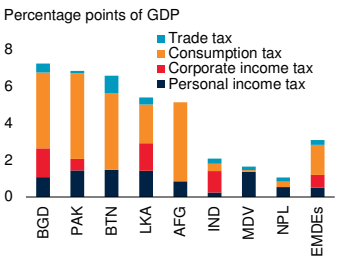
B. General government debt, end-2023



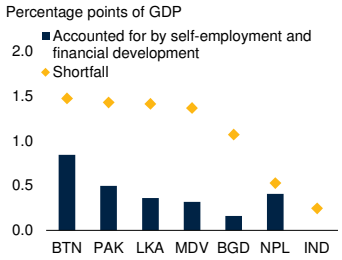
C. Health spending and per capita GDP, 2021



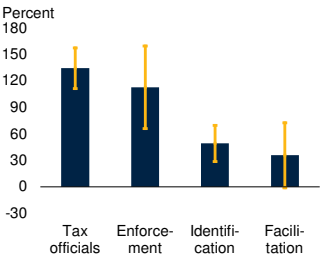
D. Total tax revenue shortfalls



E. Personal income tax revenue shortfall accounted for by country characteristics



F. Revenue increase from tax administrative interventions



Sources: Haver Analytics; IMF Financial Development Index (database); IMF Government Finance Statistics (database); International Labour Organization; Haver Analytics; UNU-WIDER; USAID Collecting Taxes Database; Vegh and Vuletin (2015); World Development Indicators (database); World Bank Fiscal Survey; World Integrated Trade Solution Database; World Bank.

Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; IND = India; LAC = Latin America and the Caribbean; LKA = Sri Lanka; MDV = Maldives; MNA = Middle East and North Africa; NPL=Nepal; PAK= Pakistan; SAR = South Asia; SSA = Sub-Saharan Africa.

A. Total revenue excludes grants. EMDE average is nominal GDP-weighted average of 140 EMDEs. Regions are nominal GDP-weighted average of country group.

B. "EMDE average" is nominal U.S. dollar GDP-weighted averages for 135 EMDEs. For Bhutan, around two-thirds of general government debt is in hydropower debt.

C. Latest available data are for 2021. Per capita income in nominal U.S. dollars. Straight line represents linear relationship between GDP per capita and health or education spending. Sample includes 146 EMDEs and 37 advanced economies.

D. Estimated shortfall for trade tax revenue does not include the shortfall accounting for para-tariffs. Estimated shortfall for corporate income tax revenue is available for four South Asian countries (Bangladesh, India, Pakistan, and Sri Lanka).

E. Personal income tax rate is the average of the highest and lowest tax rates. Potential tax base for personal income tax revenue is labor income (percent of GDP). Robustness check and estimation results can be found in chapter 2.

F. Blue bars indicate average revenue impact of 87 interventions in 17 countries, estimated in 26 studies. Yellow whiskers indicate 95 percent confidence intervals.

Low revenues make it difficult to deliver basic government services. All South Asian countries except Maldives spend less on healthcare than would be expected based on their per capita incomes. Three of the four South Asian countries with the highest interest burdens spend less than half as much as the average EMDE on education—and much less than would be expected based on their per capita incomes.

South Asian countries' consumption tax rates, corporate tax rates, and tariff rates are in line with, and often above, EMDE averages. Given these tax rates and their potential tax bases, South Asian countries' revenues from these taxes fall short of their potential by 1–7 percentage points of GDP (chapter 2). Shortfalls are particularly pronounced in consumption tax revenues, but are also sizable in personal income tax revenue and, in the larger economies, corporate income tax revenue.

No more than half of these shortfalls can be explained by the particular features of South Asia's economies—such as widespread informality and large agriculture sectors. The sizable tax gap that remains illustrates the scope for improving tax revenues by streamlining tax policy, strengthening enforcement, and facilitating compliance.

An unusually large share of South Asian income earners is exempt from personal income taxation entirely. In all South Asian countries except Sri Lanka and Nepal, tax thresholds for personal income tax are above GDP per capita. These income tax thresholds are among the highest of all EMDEs. Exemptions from other types of taxes are also pervasive. In all South Asian countries, the paring back of tax exemptions is a priority. In fact, this is the most frequently mentioned policy recommendation in recent World Bank and IMF documents on improving tax systems in South Asia.

South Asian governments' revenues could also be raised by tax policy measures to unify, simplify, and harmonize tax rates. Such streamlining could help both compliance and enforcement. Reduced exemptions and streamlined rates would also curtail tax evasion and opportunities for corruption in tax enforcement. Efforts to strengthen

enforcement, including through increased incentives for tax officials, have proven successful in raising revenues in countries in other regions.

Pollution pricing—through pollution taxation or pollution trading schemes that are increasingly used around the world—offers another means of raising South Asian governments' revenues. It would also help to address another of the region's critical challenges: severe air pollution, which is the worst among all EMDE regions.

Agricultural reform for climate adaptation

Agriculture is critical to South Asian economies. But it is also an area of particularly pronounced inefficiencies.

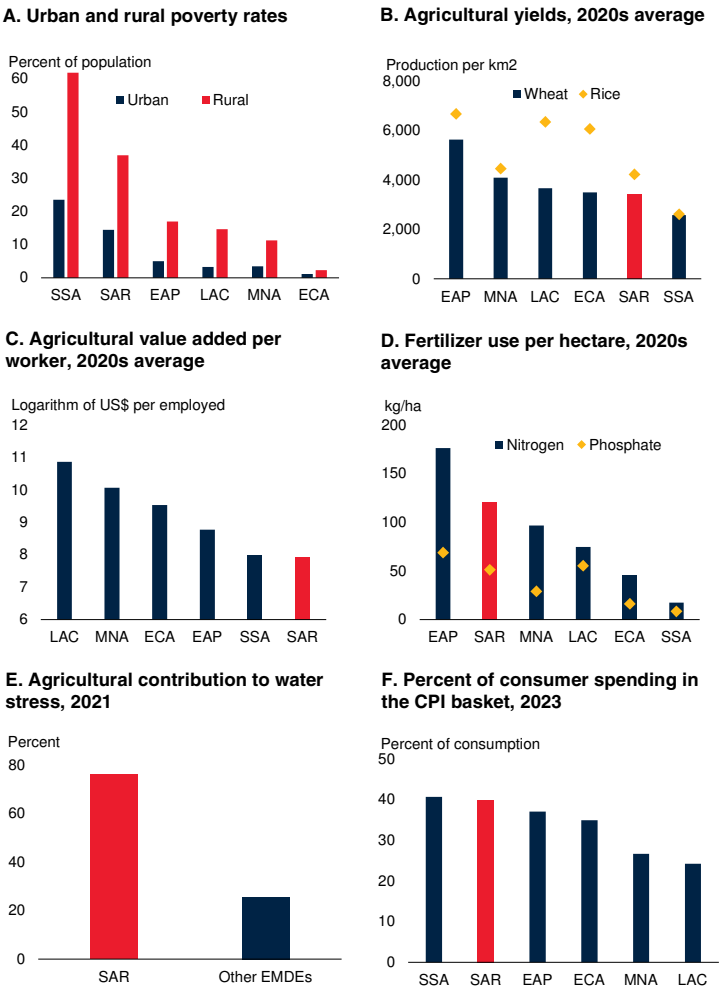
The sector generates 16 percent of the region's GDP and employs 42 percent of its workforce, including a disproportionate share of women. Agricultural workers are far more likely to be poor than workers outside agriculture (figure 1.13).

South Asia's agricultural land generates yields that are broadly in line with those in the Middle East and North Africa, and Latin America and the Caribbean, and are well above those in Sub-Saharan Africa. These yields, however, are achieved in a considerably more resource-intensive manner than in other EMDE regions. Many workers in the sector are under-employed and under-equipped with capital equipment, which has resulted in labor productivity in South Asian agriculture that is the lowest among EMDE regions—it was 7 percent lower than in Sub-Saharan Africa during the 2020s, for example. Inefficiencies extend to the use of fertilizers and water. South Asia's fertilizer use is the second highest among EMDE regions, much of it reportedly wasted (Damania et al. 2023). Agriculture accounts for three-quarters of water stress in South Asia, three times as much as in other EMDEs, in part because of leakage and evaporation in low-quality irrigation systems (FAO 2022).

The agriculture sector must also contend with rising global temperatures and extreme weather events. Rising global temperatures and extreme weather events have already reduced global total

FIGURE 1.13 Agriculture and climate adaptation

Poverty is concentrated in rural regions dependent on agriculture. Agricultural yields in South Asia are broadly in line with those in other EMDE regions. However, these yields are achieved less efficiently: labor productivity in agriculture is the lowest among EMDE regions, fertilizer use is the second highest, and agriculture contributes more than twice as much to water stress. More efficient resource allocation could raise productivity without jeopardizing food consumption.



Sources: Alkire, Kanagaratnam and Suppa (2024); Aquastat; FAOStat; Global Multidimensional Poverty Index (MPI) 2024, ILOStat; IMF Consumer Price Index database; OECD Agri-environmental indicators database; OECD Nutrient Balance, 2020; World Development Indicators (database); World Bank.

Note: EAP = East Asia and Pacific; EMDEs = emerging market and developing economies; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; kg/ha = kilograms/hectare.

A. Reference year is different for each country and depends on data availability. Regional calculations use available data for the period 2014–2023. South Asia includes Afghanistan, Bangladesh, India, Nepal and Pakistan. Sample includes 36 economies in SSA, 9 in EAP, 13 in LAC, 8 in MNA, and 9 in ECA.

B. Annual averages from 2020 to latest available data. Real GDP-weighted averages (at 2010-19 average prices and market exchange rates) for 13 economies in EAP, 19 in ECA, 19 in LAC, 10 in MNA, 6 in SAR, and 30 in SSA.

C. Annual averages from 2020 to latest available data. Sample includes 14 economies in EAP, 22 in ECA, 24 in LAC, 17 in MNA, 7 in SAR, and 38 in SSA.

D. Data for 151 EMDEs. Annual average of available data since 2020.

E. GDP-weighted average (at 2010–19 average prices and market exchange rates) of agriculture's contribution to water stress. "Other EMDEs" include 128 economies. The most recent data available is for 2021.

F. Chart shows the weight of food and non-alcoholic beverages on the consumer price index basket, in an unweighted average across countries. South Asia includes Bangladesh, Bhutan, Nepal, Pakistan, and Sri Lanka. Includes 35 economies in SSA, 17 in ECA, 10 in EAP, 17 in LAC and 13 in MNA.

factor productivity in agriculture by an estimated 21 percent since 1961, and by as much as 40 percent in tropical areas (Ortiz-Bobea et al. 2021). South Asia is expected to warm more than other EMDE regions, and most crops are hurt by higher maximum temperatures (special focus). Such effects are already becoming apparent: India recently experienced its hottest February in 125 years, threatening many crops and draining reservoirs. In the medium term, rising global temperatures are also expected to increase the variability of precipitation, which will have particularly severe consequences for crops that depend on rainfall, which account for most agricultural production in the region.

An increase in labor productivity in agriculture could benefit not only household incomes but also climate resilience (World Bank 2024a). Higher labor productivity would help to lower the price of food, which makes up about 40 percent of consumption baskets in the region, more than in any other EMDE region. It would also help reduce stunting and undernourishment, which are prevalent in South Asia.

More productive farms would also help the accumulation of savings, which could spur the growth of manufacturing and services (World Bank 2024d). They could also free up labor for more productive jobs in the manufacturing and services sectors. Workers freed from agricultural work could also move to jobs abroad, which could boost the domestic economy through repatriated savings and trade and investment networks (box 1.1).

To become more productive, farmers in the region must overcome problems associated with small farm size, in terms of both land area and the number of employees (Lopez-Acevedo and Medvedev 2017). Although small farms are not necessarily less productive than larger ones, land fragmentation for non-economic reasons increases cultivation costs (Deininger et al. 2017). Small farm size tends to limit economies of scale, and often results in farmers having limited resources, and limited access to credit, insurance, and extension services that could boost productivity and market access. In many cases, their small size prevents South Asian farms from utilizing the high-quality agricultural capital that accounts for a large part of higher agricultural labor productivity in other countries (Caunedo and Keller 2020).

Tenancy without legal protection is commonplace throughout the region, as are patchy land titles and records (World Bank 2024c). These undermine incentives to invest and limit farmers' access to credit. Many policy initiatives focus on formalizing and digitalizing land records to establish more secure property rights. In India, the SVAMITVA scheme was launched in 2020 to provide residents in rural villages with the equivalent of a title. The initiative has mapped millions of parcels and issued millions of titles. Punjab Province in Pakistan has made similar progress.

Even with clear titles, however, restrictions on land use and transfer can still hinder the functioning of the market for land and discourage investment. In *Bhutan*, there are restrictions on the conversion of some types of farmland to other uses. In *Nepal*, land rental markets are thin mainly because tenure laws impose a risk that rented land may be lost by the landowner if the renter stays long enough (World Bank 2017). In *Sri Lanka*, where about 80 percent of land is government-owned, land use is widely restricted to rice cultivation.

Policy makers can promote productivity growth in agriculture in a variety of ways. The redeployment of subsidies on fertilizers and water can encourage more efficient use of these inputs. For example, Pakistan provides a guaranteed price for sugarcane production, while subsidizing its consumption of water. Such subsidies that encourage the wasteful use of inputs could be replaced by direct, targeted transfers, with higher transfers for farmers that adopt sustainable land management practices (OECD 2019).

Better infrastructure has sizable positive spillovers for agricultural productivity (Burki, Shabbir, and Khan 2022). Irrigation investment programs can bring large returns, while also helping to preserve water and increase the resilience of farm yields in

the face of increasingly erratic rainfall and temperature (Morita 2021). Research into the development of more climate-resilient crops and practices can also often bring high returns, by some estimates averaging more than 40 percent of the investment (Furceri et al. 2021).

Governments can also remove impediments to the efficient operation of markets. Burdensome licensing and size restrictions, labor regulations and financial restrictions can limit growth of efficient firms. Trade policy barriers can prevent successful agribusinesses from competing in international markets. Digitizing and modernizing land records can help facilitate efficient land transfers, while also incentivizing investment by giving farmers more secure titles. Caps on foreign investment discourage foreign direct investment, and the finance and technology that come with it. Supporting the functioning of markets through smart regulations can underpin the productive re-allocation of the resources used in the agriculture sector.

Farmers can achieve many efficiency improvements without government involvement through farmer producer organizations. Such cooperative associations can unlock economies of scale in obtaining access to markets and credit for individual members and for common investments in logistics and infrastructure, such as connectivity and cold storage. The knowledge and resources shared in these networks can also facilitate diversification into the production of higher-value exportable commodities.

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SPOTLIGHT

Clear the Way:

Climate Resilience in South Asia's Private Sector

Spotlight. Clear the Way: Climate Resilience in South Asia's Private Sector

While South Asia has better growth prospects than other emerging market and developing economy (EMDE) regions, it is also one of the regions that is most vulnerable to rising global temperatures and most affected by extreme weather events. Because of South Asia's already-high average temperature and reliance on rain-fed agriculture, rising global temperatures could lead to output and per capita income losses by 2050 that are larger than those in the average EMDE. Higher temperatures would cause significant damage in the most vulnerable sectors, such as agriculture, but more limited damage in the most resilient sectors, such as services. About one-third of the total climate damage could be reduced if the private sector could flexibly shift resources across activities and locations in response to these climate-induced changes in relative prices and incomes. Even South Asia's fiscally constrained governments have scope to facilitate these shifts, including by expanding access to finance, improving transport and digital connectivity, and providing well-targeted and flexible social benefit systems.

Introduction

South Asia's vulnerability to rising global temperatures. Among emerging market and developing economies (EMDEs), South Asia is particularly vulnerable to rising global temperatures. With its glacier-fed rivers, predominantly rain-fed agriculture, low-lying river deltas and islands, high average temperatures, widespread poverty, and large population, it is ranked as the most vulnerable EMDE region according to the climate vulnerability index of the Notre Dame Global Adaptation Initiative (ND-GAIN; figure SL.1; World Bank 2023). This index captures three factors: exposure to biophysical risks such as seawater rise, reliance on highly affected sectors such as agriculture, and ability to adapt such as access to paved roads (The University of Notre Dame 2024). South Asia and East Asia and the Pacific are the EMDE regions that have experienced the most floods and extreme temperature events over the past two decades, and these events have become more frequent. Since 2015, 67 million people per year, on average, have been affected by natural disasters in South Asia. Although there has been a decline in the number of deaths caused by floods over the past decade, deaths from extreme temperatures have risen. Even in the absence of extreme weather events, an average of six hours a day are considered to be too hot for people to work safely outside in four South Asian countries (Bangladesh, India, Pakistan, and Sri Lanka) and this is expected to rise to seven or eight hours a day by 2050.

Economic impact of rising global temperatures. The economic damage caused by rising temperatures and extreme weather is well documented (annex tables SL1). Rising temperatures and extreme weather have been shown to lower agricultural and industrial output, reduce labor productivity, and damage human health and biodiversity. They have been associated with the loss of physical assets, such as buildings and infrastructure, as well as increased emigration. And they raise, or change the composition of, demand for energy and transport.

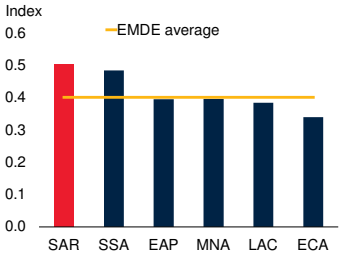
Adaptation options in South Asia. South Asia's development path will depend on its ability to adapt to rising global temperatures. However, the ability of South Asian governments to invest in adaptation, and thus the scope for government-directed adaptation, is severely constrained by fiscal pressures. On average, South Asian countries' government debt (relative to GDP) and government interest payments (relative to revenues) are the highest among EMDE regions

Note: This Spotlight was prepared by Weifeng Larry Liu, Warwick McKibbin (both Australian National University), Franziska Ohnsorge, and Siddharth Sharma.

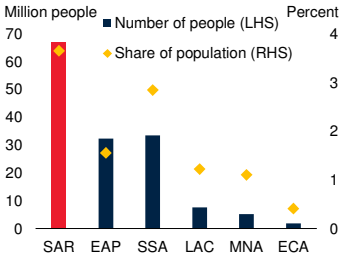
FIGURE SL.1 Climate risks in South Asia

South Asia is particularly vulnerable to rising global temperatures. It is the EMDE region with the largest number of people affected by natural disasters and has one of the highest incidences of floods and extreme temperatures. The region has a growing number of deaths from extreme temperatures, and has a large land area that regularly suffers drought.

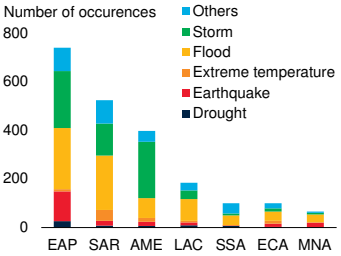
A. Vulnerability to climate risk, 2017–21 average



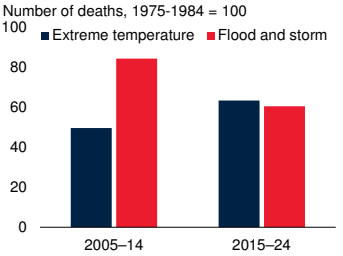
B. Number of people affected by natural disasters, 2013–22 average



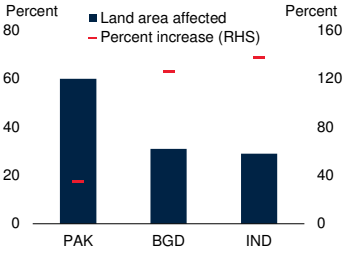
C. Number of extreme weather events, 1980–2024



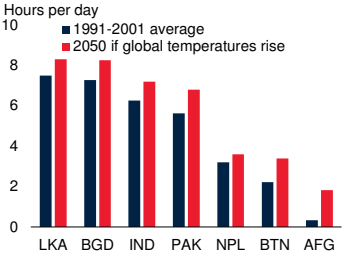
D. South Asia: Deaths by event type



E. Land area affected by extreme drought



F. Number of hours when it is too hot to work outside



Sources: International Disaster Database (EM-DAT); Lancet countdown on health and climate change data sheet (2023); Notre Dame Global Adaptation Initiative; World Bank.

Note: EMDEs = emerging market and developing economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa. AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan. RHS = right-hand side. LHS = left-hand side

A. Regional aggregates computed using 2015 GDP as weights. Values shown are average over 2017–21. Sample includes 148 EMDEs (22 in EAP, 22 in ECA, 31 in LAC, 18 in MNA, 8 in SAR, and 47 in SSA).

B. Bars show the total population affected by natural disasters, while the diamonds indicate the share of total population affected, annual averages over 2013–22. Sample includes 144 EMDEs (22 in EAP, 20 in ECA, 31 in LAC, 18 in MNA, 8 in SAR, and 45 in SSA).

C. Regional aggregates are computed as population-weighted averages of cumulative extreme weather events for 1980–2024.

D. Chart shows the number of deaths due to extreme temperature events and flood and storm events during 2005–14 and 2015–24. Numbers are indexed to 100 in the period 1975–84.

E. Figure shows total land area affected by extreme drought at least once per year, on average, during 2013–22. Horizontal lines show percent increase of at least one month of extreme drought per year from 1951–60 to 2013–22.

F. Figure shows the number of hours (average per person per day) during which high heat posed at least a moderate heat stress risk during light outdoor physical activity, based on the "moderate" heat stress risk classification, as outlined in the 2021 Sports Medicine Australia Extreme Heat Policy, which categorizes estimated heat stress risk according to ambient temperature and relative humidity. Projections for 2050 for 2°C scenarios.

(chapter 2, figure SL2). As a result, much of the burden of adaptation to rising global temperatures will fall on the private sector—households, farms, and firms—and will reflect autonomous responses to changing conditions rather than being directed by public policy. International experience suggests that, because they can access finance to invest in adaptation technologies, firms tend to be better able to mitigate climate damage than households, which are largely reliant on government services (including social benefits) and labor market adjustment such as migration or shifts to off-farm jobs (Rexer and Sharma 2024).

Questions. This spotlight addresses the following questions.

- What are the relative roles of autonomous and directed adaptation in mitigating the damage from rising global temperatures in South Asia?
- What are the policy implications?

Contribution to the literature

The literature on climate-related topics falls into three broad categories: damage caused by rising global temperature and extreme weather events, climate mitigation, and climate adaptation.

Many studies estimate *damage from rising global temperatures and extreme weather events* either using structural models (Fernando, Liu, and McKibbin 2021; Kompas, Pham, and Che 2018; Weyant 2017) or deriving econometric estimates (Dell, Jones, and Olken 2014; Hsiang 2016; Tol 2024). Damage is estimated through a wide range of channels, including agricultural output, labor productivity, human health, asset losses from sea level rise, migration, and energy demand (annex table SL1).

Studies of *mitigation,* especially in the context of nationally determined contributions and net-zero emissions targets since the 2015 Paris Agreement, examine macroeconomic policy options and design (for example, Krogstrup and Oman 2019) and macroeconomic impacts of mitigation policies (for example, Böhringer et al. 2022; Chateau et al. 2022; Liu et al. 2021; Jaumotte, Liu, and McKibbin 2021; Riahi et al. 2017).

The literature on *adaptation* and, especially economy-wide modeling of adaptation, is still sparse (Fankhauser 2017). In part, this reflects the difficulty of estimating adaptation costs and the dependence of any cost estimate on the objectives or adaptation, as well as model definitions and methods (UNEP 2021; UNFCCC 2022). As a result, there has been limited progress in developing estimates of global adaptation costs (UNEP 2023). And adaptation is poorly represented in current global modeling frameworks (Van Maanen et al. 2023).

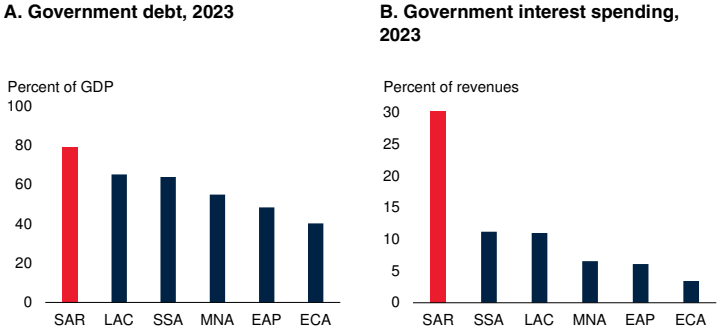
This study makes several contributions to the literature on adaptation.

First, it explores the macroeconomic effects of adaptation at the global level using a global dynamic general equilibrium model. Researchers have begun to analyze adaptation using multi-sector computable general equilibrium models (Wei and Aaheim 2023) and aggregate macroeconomic models (World Bank 2022). But most modeling studies are local, national, or regional—rather than global—and focused on agriculture, with less work on non-agricultural sectors. Another strand of the literature on adaptation has been engineering-based or focused on the distributional effects of rising global temperatures (Miyamoto 2019). In contrast to those general equilibrium studies, this analysis allows for cross-country as well as intersectoral linkages and generates dynamic macroeconomic effects over time.

Second, this study distinguishes "autonomous" from "directed" adaptation. Autonomous adaptation refers to the response of individuals and firms to relative price and income changes caused by rising global temperatures through market mechanisms. Directed adaptation refers to government or private actions specifically aimed at dampening the actual or expected effects of rising global temperatures. Both autonomous and directed adaptation play important roles in climate adaptation (Carleton et al. 2024). Autonomous adaptation allow individuals and firms to tailor their adaptation strategies to their circumstances.

FIGURE SL.2 Fiscal pressures in South Asia

South Asian governments' ability to support climate adaptation through spending is severely constrained by fiscal pressures, including high debt and interest spending.



Sources: IMF *World Economic Outlook* database, World Bank.
Note: EAP = East Asia and Pacific (21 economies); ECA = Europe and Central Asia (22 economies); LAC = Latin America and the Caribbean (32 economies); MNA = Middle East and North Africa (18 economies); SAR = South Asia (7 economies); SSA = Sub-Saharan Africa (46 economies). Unweighted averages. Interest spending is defined as the difference between primary and overall net lending/borrowing.

Directed adaptation by the public sector supports and complements private adaptation, especially in the face of large-scale, systemic climate effects.

Third, this study particularly focuses on South Asia in the global context, because the region is one of the most vulnerable to rising global temperatures. This means that the region provides a key case study for understanding risks and adaptation strategies.

Main findings

Several findings emerge from this study.

First, current trends could, without any adaptation, reduce South Asia's output and per capita income by almost 7 percent below a baseline scenario without rising global temperatures by 2050, even in the absence of extreme weather events or non-linear effects such as tipping points.

Second, rising temperatures would cause disproportionate damage to the most vulnerable sectors in South Asia and would encourage market pressures for a reallocation of resources. The resulting autonomous adaptation, through the general equilibrium response of households and

firms to changes of relative prices and incomes, would reduce the damage from rising temperatures in South Asia by 2050 by about one-third—provided workers and firms can move across locations and activities as assumed in the model.

Third, directed public investment in more weather-resilient agricultural practices, crops, and technologies, could reduce output losses further, beyond the gains from autonomous adaptation. Even if climate damage does not materialize as projected, the opportunity cost from this public investment would be modest compared with the output losses avoided if damage does materialize.

Fourth, in light of the severely constrained fiscal positions of South Asian countries, the policy priority is to support autonomous adaptation in a cost-effective way: by removing obstacles to resource reallocation at limited fiscal cost. This includes policies that allow clearer market signals and facilitate shifts of workers and capital across sectors, regions, and firms. Such policies could include broader access to finance, better connectivity, and well-targeted and flexible social benefit systems.

Methodology. To address these questions, this study develops a variant of the G-Cubed model (Liu and McKibbin 2022; McKibbin and Wilcoxen 2013) that features detailed economic disaggregation for Asian countries, including those in South Asia. The G-Cubed model has been widely used to estimate the impact of rising global temperatures and mitigation policies (Bems 2024; Fernando, Liu, and McKibbin 2021; Jaumotte, Liu, and McKibbin 2021; Liu et al. 2021). To apply this model to climate adaptation, investment in adaptation is assumed to reduce the damages from rising temperatures directly, without the feedback loop of reducing carbon emissions and slowing the global temperature increase. Two strategies of adaptation are considered: first, autonomous adaptation as households and firms adjust to climate-induced changes in market prices and, second, investment to make agriculture more resilient to changing weather patterns.

Conceptual framework for modeling climate adaptation

Particularly because there are few studies modeling adaptation, some broad concepts warrant upfront clarification, before they are applied to the modeling exercise conducted here.

Definitions. Climate damage is the damage caused by rising global temperatures and more frequent and severe extreme weather events, such as floods, droughts, and heatwaves. Climate adaptation refers to the process of adjusting to actual or expected changes in global temperatures and their effects. While mitigation aims to reduce greenhouse gas emissions and thus slow the pace of temperature increases, adaptation aims to increase resilience to rising temperatures to minimize its damaging effects (Berg, Kahn, and Shilpi 2025).

Types of adaptation. There are essentially two types of adaptation (IPCC 2001).

- ***Autonomous adaptation*** refers to endogenous responses to a changing climate and the associated changes in the economic environment. In a modeling context, autonomous adaptation is typically captured by allowing resources to move across sectors, or be reorganized within sectors, in response to rising temperatures and their effects on relative prices and incomes. Examples include increased use of household cooling in Mediterranean countries, the switch from beef to sheep farming in South America, the global shift from maize, wheat and rice farming toward soybean farming and greater global use of irrigation (Auffhammer and Mansur 2014; Eskeland and Mideksa 2010; Fankhauser 2017; Rentschler et al. 2021; Seo, McCarl, and Mendelsohn 2010; Sloat et al. 2020).
- ***Directed adaptation*** refers to deliberate government or private sector decisions, not in reaction to changing market prices, but based on actual or expected changes in global temperatures, to take the action necessary to return to, maintain, or achieve a desired state (IPCC 2001). Examples include the reorganization of supply chains among firms in Tanzania that were affected by floods, the

construction of raised roads, and better drainage of railway lines (Miyamoto 2019; Rentschler et al. 2021).

Maladaptation. Both autonomous and directed adaptation could have the perverse effect of amplifying climate damage, as has been documented in some cases. Such "maladaptation" typically involves shifting vulnerabilities across locations, time horizons, or actors (Chi et al. 2021; Juhola et al. 2016; Magnan et al. 2016). Examples include the elimination of flood plains in Bangladesh, the introduction of agricultural climate insurance in the United States, and migration out of farm employment in Ghana (Magnan et al. 2016; Schipper 2020). Maladaptation does not occur in the modeling exercise conducted here.

Cost of adaptation. Modeling climate adaptation requires estimates of its cost and benefits. Cost estimates are underdeveloped notwithstanding some efforts by IPCC (2022) and UNEP (2023, 2024). In part, this reflects the fact that costs can vary widely depending on the choice of adaptation action, the degree of ambition in adaptation, and the economic context. Adaptation action can have *direct costs* (or resource costs such as the cost of public investment), *indirect costs* (or general equilibrium effects), and *opportunity costs* (shortfalls in spending on competing needs amid uncertain damage from rising temperatures). In the modeling exercise here, *autonomous* adaptation is assumed to have no direct costs but to have indirect cost, at least in the short run, as physical capital is reallocated only gradually and real wages adjust only slowly. In the long run, these indirect costs are also eliminated. This indicates a role even for fiscally constrained governments, to smooth market functioning and thus shorten the period during which short-run costs are incurred. *Directed* adaptation is assumed to have direct costs (specifically, investment in agricultural research and development), as well as indirect costs. A stochastic model would be needed to fully capture the opportunity cost of either type of adaptation. Such a model goes beyond the scope of this study, but a thought experiment is conducted to give a flavor of this type of cost.

Methodology

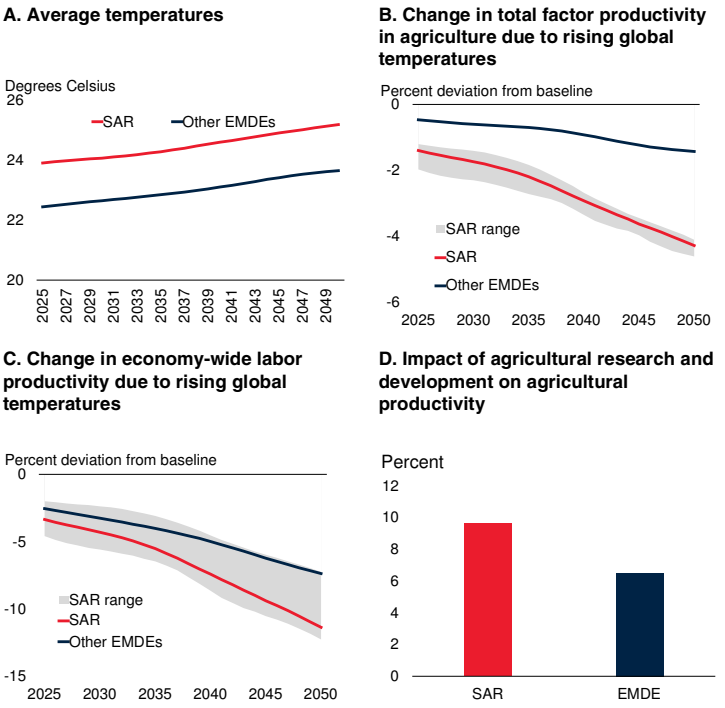
G-Cubed model. The model variant used here is a 21-country, 6-sector intertemporal general equilibrium model. Details are set out in annex SL1. The model includes four South Asian countries—India, Bangladesh, Pakistan, Sri Lanka—as well as major advanced economies and other EMDEs or EMDE regions (annex table SL2). Each of these countries or regions has six sectors of production: agriculture; durable manufacturing; non-durable manufacturing; services; mining; and energy. Households make decisions on consumption and saving by maximizing intertemporal utility subject to binding liquidity constraints; firms make decisions on investment, employment, and production based on maximizing their expected value of the firm; governments tax and spend subject to an intemporal budget constraint; and central banks follow interest rate policy rules that balance competing macroeconomic objectives (typically low inflation and high employment). The 21 countries and regions of the world trade bilaterally; financial capital is perfectly mobile internationally; physical capital is sector-specific and immobile and can only shift between sectors through depreciation and investment; and labor markets are domestic only and adjust with a lag such that labor is assumed to move between sectors within countries and only gradually.

Assumptions: Baseline scenario

Baseline outlook. South Asia's medium-term growth prospects are robust, especially compared with those of other EMDE regions. Kasyanenko et al. (2023) estimate South Asia's potential growth rate during the 2020s at around 6 percent per year, well above the EMDE average. Growth will be supported by ample potential for catch-up productivity growth, a still-growing working-age population, and a decade of strong expansion of government investment. The baseline scenario is a counterfactual one in which global temperatures remain at their 1985–2005 average levels (annex SL1).

FIGURE SL.3 Scenario assumptions

Because South Asia's temperatures are already high and the region's agriculture sectors are large and mostly rain-fed, productivity losses (in agriculture and economy-wide) are expected to be larger than in the average EMDE. But potential productivity gains from agricultural improvements would be larger in South Asia than in other regions.



Sources: Roson and Sartori (2016); World Bank.
Note: EMDEs = emerging market and developing economies; SAR = South Asia.
A. Population-weighted averages.
B.-D. "SAR" and "Other EMDEs" are GDP-weighted averages (at 2010–19 average prices and exchange rates).

Assumptions: Damage from rising temperatures

Impact channels. A large literature has identified several channels through which rising global temperatures cause economic damages (annex table SL1). Higher temperatures, especially when they rise above thresholds that are frequently exceeded in South Asia, have been associated with lower labor productivity, shortened workdays, higher mortality, poorer learning outcomes among students, and lower crop yields, especially for maize and wheat. Sea level rise and an increased frequency and intensity of floods and cyclones that are likely to accompany rising temperatures tend to cause asset losses. This study focuses on the following channels: lower labor productivity because of the impact of heat on effort and health, lower economy-wide total factor productivity because of land loss from rising sea levels, and lower total factor productivity in agriculture because of heat. These will cause output losses in the sectors directly affected but also, through intersectoral linkages, in other sectors, even apart from effects of changes in relative prices and incomes.

Temperature rise. The climate damage scenario assumes that global temperatures rise by about 2 degrees Celsius between the 1985–2005 average and 2050—or by 1.3 degrees Celsius between 2025 and 2050—in line with temperature increases in the SSP5–8.5 scenario (annex SL1; IPCC 2022). Average temperatures in South Asia, too, are expected to rise by 1.3 degrees Celsius between 2025 and 2050, broadly in line with the average EMDE, but from a higher average baseline temperature (figure SL3).

Past estimates of damage. Roson and Satori (2016) estimated the impact of global warming on sea level rise, agricultural productivity, and labor productivity for each additional degree of temperature. This study uses their damage functions to quantify the effect of assumed future temperature changes on labor productivity and total factor productivity in each sector and country. Their estimation of labor productivity losses includes two channels: heat stress and morbidity. This study expands their estimation to take into account also the effects on mortality estimated by Bosello, Roson and Tol (2006). Because all these estimates are derived from past data, they may implicitly already incorporate some degree of adaptation. For each country, the estimated effects depend on the degree of warming as mapped out by the Intergovernmental Panel on Climate Change (IPCC 2022).

Impact of rising temperatures on productivity in South Asia. The above assumptions imply that, on average in South Asia, rising temperatures will lower labor productivity by 11 percent below the baseline by 2050—the largest productivity loss of any EMDE region. Because South Asia's baseline average temperature is already about 10 percent higher than that of other EMDEs, the labor productivity loss from further temperature increases is about one-half higher than in other EMDEs. In agriculture, which is particularly sensitive to rising temperatures, the rise in temperatures is assumed to further depress yields

by lowering total factor productivity by at least 4 percent below the baseline (figure SL3). This is about three times the productivity loss in agriculture in other EMDEs, reflecting South Asia's higher baseline temperatures and greater reliance on rain-fed agriculture.

Impact of rising temperatures on output and per capita income in South Asia. Climate damage itself is defined as consisting of two components: the output loss due to direct damage in each sector and the indirect output loss through intersectoral linkages. The assumptions used here imply that climate damage, without any adaptation, could lower South Asia's output and per capita income by 2 percent below the baseline by 2030 (figure SL4). The gap would grow such that, by 2050, output losses would amount to 7 percent, even without any extreme weather. This damage would be more than one-half larger in South Asia than in the average EMDE, because of South Asia's already-high average daily temperatures and its unusually heavy reliance on agriculture. The additional damage between 2025 and 2050 would be more than twice the damage that appears to have already occurred during 1985–2024. Global temperature increases are expected to be less detrimental in the Himalayan countries but there, the poorest households tend to be most exposed to, and most hurt by, climate damage (Behrer et al. 2024; Triyana et al. 2024).

Other considerations. Several considerations go beyond the scope of the modeling exercise conducted here. First, extreme weather events are excluded; modeling them would require a stochastic model. Second, the exercise here only takes into account the damage that can be captured by labor or total factor productivity and for which data for estimation are available for a large sample of countries. Third, the estimates are based on country-level data and do not take into account regional or distributional differences within countries. Fourth, while some macroeconomic feedback loops are taken into account, the model does not take into account nonlinear effects such as tipping points or broader feedback loops such as loss of human capital because of learning losses or accelerated depreciation of physical capital owing to greater climate variability.

Assumptions: Adaptation

Autonomous adaptation. The distinction between autonomous and directed adaptation is model-specific, with more complex modeling exercises attributing more adaptation to the autonomous type (Wei and Aaheim 2023). Here, autonomous adaptation is defined as the general equilibrium responses to changes in prices and incomes that occur due to rising temperatures.

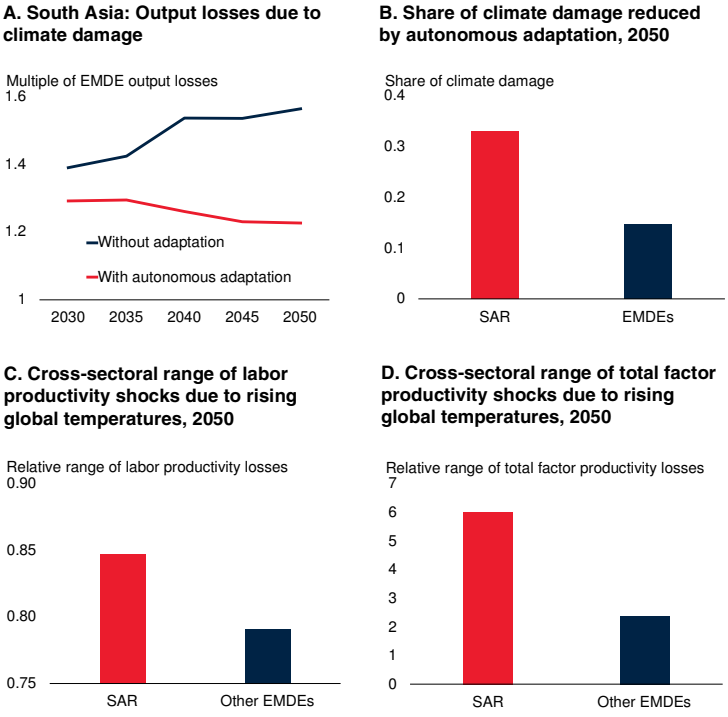
Directed adaptation: Agricultural research and development. An illustrative example of directed adaptation is investment to develop more climate-resilient agricultural crops, technologies, and practices. Through CGIAR (Consultative Group on International Agricultural Research) and National Agricultural Research Systems, countries around the world are investing in research for more weather-resilient crops and agricultural practices.

- ***Investment in agricultural research and development.*** Similar to other EMDEs, South Asia is assumed to increase investment in weather-resilient crops and practices by about 0.1 percent of 2015 GDP (for South Asia, US$1.1 billion at 2005 prices and exchange rates) per year over 2015–50.

- ***Potential productivity gains.*** This magnitude of research investment has been estimated to raise global agricultural productivity by up to 17 percent between 2015 and 2050, on average across 42 commodities (Rosegrant et al. 2017). Here, the expected productivity gains for each of these crops are prorated to the shorter forecast horizon of 2025–50. Taking into account the composition of agricultural crops, agricultural productivity in South Asia would be 10 percent higher in 2050 than without such research and development. That is well above the EMDE average because some of the largest productivity gains are expected in rice cultivation, which accounts for 30 percent of South Asia's agricultural production.

FIGURE SL.4 Impact of rising global temperatures: Autonomous adaptation

Climate damage is expected to be larger in South Asia than in the average EMDE, in part because of the region's larger agriculture sector. Climate damage is also expected to be more heterogeneous across sectors, triggering greater relative price and income changes and, therefore, more autonomous adaptation. Autonomous adaptation would reduce climate damage by about one-third.



Source: World Bank.

Note: EMDE = emerging market and developing economy; SAR = South Asia. GDP-weighted (at 2010–19 average prices and market exchange rates) averages.

A. Climate damage without adaptation is defined as the output loss from direct and indirect climate damages (including those transmitted through sectoral interlinkages), without general equilibrium effects in response to relative prices and incomes.

B. Share of climate damages remaining after accounting for direct and indirect effects (including those transmitted through sectoral interlinkages) and autonomous adaptation.

C.D. Bars indicate the difference between maximum and minimum damage relative to average damage to labor productivity (C) or total factor productivity (D) across sectors.

- ***Technology adoption by farmers.*** Farmers would only gradually phase in the new technologies needed to realize these productivity gains. In the United States, for example, it has been found that only 10 percent of farmers adopt new technology within a decade of its introduction and 25 percent of farmers within 25 years (Chen 2020). Because the average EMDE farmer has smaller land holdings and less access to finance than the average U.S. farmer, the scenario assumes that only 10 percent of farmers adopt new technologies and practices within the 25-year forecast horizon.

Directed adaptation: Weather-resilient infrastructure. Agricultural research and development is one example of sector-specific investment in weather resilience, with particularly high returns in a particularly large and climate-vulnerable sector in South Asia. An alternative assumption could be a similar amount of investment in weather-resilient infrastructure spread across all sectors. Whether this would be more or less effective than the investment assumed in agricultural research and development is unclear, given the absence of well-established estimates of productivity gains from weather-resilient infrastructure investment in the literature. This alternative assumption is therefore not explored here.

Impact of adaptation

Autonomous adaptation. Autonomous adaptation—defined as the general equilibrium response of households and firms to changing prices and incomes—could mitigate damage from rising temperatures. The estimation suggests that, by 2050, autonomous adaptation could reduce damage in South Asia by about one-third, more than twice as much as in the average EMDE. Because of South Asia's above-average initial temperatures, further temperature increases would cause above-average damage in the most vulnerable sectors, such as agriculture, and more limited damage in the most resilient sectors, such as services. These differential effects will generate larger changes in relative prices, and therefore greater pressures for reallocation of resources, in South Asian economies than in the average EMDEs. As a result, a larger share of damage is being offset by autonomous adaptation in South Asia than elsewhere.

Autonomous and directed adaptation in the private sector. Apart from its involvement in autonomous adaptation, through responses to changes in relative prices and incomes, the private sector can engage in directed adaptation by actively attempting to pre-empt expected future damage. For example, farmers in India have been found to adjust their planting decisions based on information from long-range weather forecasts (Burlig et al. 2024). A recent meta-regression

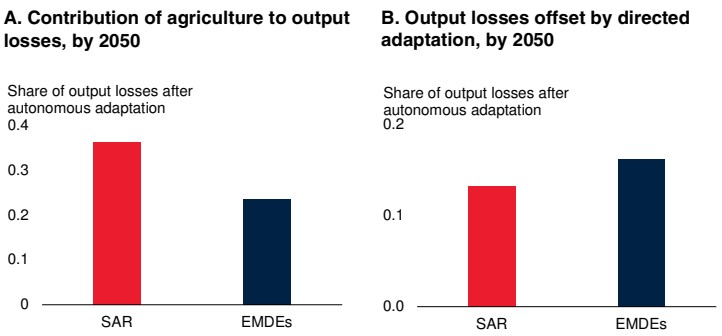
analysis of a wide range of studies from around the world found that private adaptation behaviors—both autonomous and directed—offset, on average, just under one-half of damage, but with wide variation because of such factors as access to finance and information can affect the private sector's ability to adapt (Rexer and Sharma 2024).

Directed adaptation: Agricultural research and development. Because South Asia's agriculture sectors are larger and more vulnerable to rising global temperatures than those in the average EMDE, damage in agricultures accounts for a larger share of output losses, even after autonomous adaptation: by 2050, agricultural damage would account for about one-third of overall output losses due to rising global temperatures (figure SL5). Estimates from the International Food Policy Research Institute suggest that even modest investment in agricultural research and development could uncover new technologies, crops, and practices that would generate sizable gains in agricultural yields in the event of global warming. Even if only a fraction of farmers adopted more weather-resilient crops, technologies, and practices by 2050, the resulting productivity gains could reduce output losses that remain after autonomous adaptation by just over one-tenth.

Uncertainty and the opportunity cost of directed climate adaptation. There is considerable uncertainty about the magnitude of future climate damage. This uncertainty is a challenge for fiscally constrained governments that need to choose between competing spending needs. But many public spending possibilities promote both growth and climate adaptation. These include investment in weather-resilience infrastructure (Hallegatte, Rentschler, and Rozenberg 2019; Miyamoto 2019) and weather-resilient agriculture (World Bank 2018). If weather resilience is not embedded in such investment, rising temperatures and extreme weather events will erode the productivity of the asset. Other, often equally pressing, spending needs may be largely climate-neutral and face only limited risks from climate damage. Such spending could include investment in childhood vaccination, digital connectivity, and teacher training.

FIGURE SL.5 Impact of rising global temperatures: Directed adaptation into agricultural research and development

In South Asia, the adoption of more climate-resilient agricultural practices—an example of directed adaptation—could offset some of the remaining output losses from rising global temperatures after autonomous adaptation.



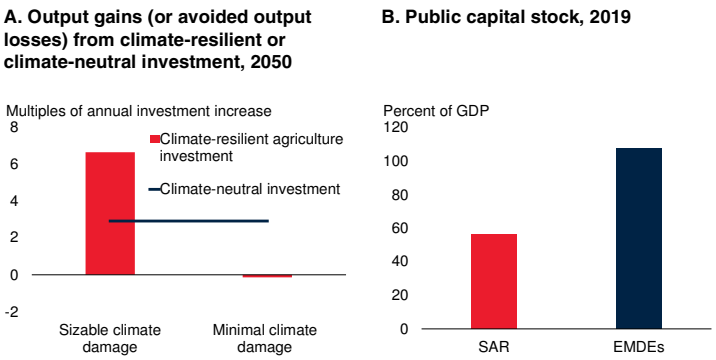
Sources: IMF *Investment and Capital Stock* database; World Bank.
Note: EMDEs = emerging market and developing economies; SAR = South Asia. GDP-weighted averages (at 2010–19 average prices and market exchange rates).
A. Output losses due to agricultural climate damage only (after autonomous adaptation) relative to output losses due to all climate damage (after autonomous adaptation).
B. Share of output losses due to climate damage (after autonomous adaptation) that are offset by agricultural productivity gains (10 percent in SAR) generated by government investment in agricultural GDP (0.1 percentage point of GDP per year). Technology adoption rate is assumed to be 10 percent.

Uncertainty and directed adaptation: A thought experiment. Consider a scenario in which there is uncertainty as to whether damage will be minimal or as assumed above. Amid this uncertainty, governments have to decide between two options for investing an additional 0.1 percentage point of GDP per year, which is small relative to South Asia's public capital stock of 56 percent of GDP in 2019. The first option is to invest in climate-resilient agriculture to avert climate damage—the directed adaptation discussed above. If climate damage materializes as assumed above, this investment will generate agricultural productivity gains. But these gains will not be realized if climate damage is minimal. The second option is to invest in climate-neutral assets that, regardless of climate damage, are assumed to generate economy-wide returns as estimated by Calderon, Moral-Benito and Serven (2015): a 10 percent increase in the public capital stock increases aggregate productivity by 0.7–1 percent over the long run. If governments invest in the first option, there are two possible outcomes.

- If climate damage materializes as modeled here, the benefit will be large (figure SL6). About one-tenth of the damage could be prevented by 2050. The GDP losses avoided

FIGURE SL.6 Impact of rising global temperatures: Uncertainty about climate damage and public choice

Governments might "overinvest" if they spend on research and development for more weather-resilient agricultural practices and climate damage turns out to be minimal. However, the overinvestment is small relative to the potential gains if climate damages are sizable.



Sources: IMF *Investment and Capital Stock* database; World Bank.
Note: EMDEs = emerging market and developing economies; SAR = South Asia.
A. Avoided output losses due to climate-resilient agricultural investment or climate-neutral investment by 2050, relative to magnitude of additional investment (0.1 percentage points of GDP per year).
B. GDP-weighted public capital stock (at 2010–19 average prices and market exchange rate).

would be six times the additional investment, a benefit that is near the estimates of Hallegatte, Rentschler and Rozenberg (2019). This benefit would be one-and-a-half times larger than the benefit from the alternative, weather-neutral investment.

- If climate damage turns out to be minimal, the productivity gains from greater weather resilience in agriculture would not materialize and governments' investment in climate resilience would have diverted funding from weather-neutral investment, which would have yielded benefits. The additional investment in weather resilience would have generated some growth-boosting fiscal stimulus in the short term but this growth impulse would eventually be offset by rising debt stocks and interest cost.

The choice between the two options will depend on the probability distribution of climate damages, as assessed by policy makers, and the degree of risk aversion of policy makers. A risk-neutral policy maker, for example, would compare the probability-weighted average of the gains under different scenarios for climate damages against the assumed cost of 0.1 percentage point of GDP.

Policy implications

These results suggest that rising global temperatures could weaken South Asia's prospects considerably more than they would weaken those of other EMDE regions. South Asian governments have very limited fiscal room for increases in spending to avert this threat (chapter 2).

South Asian governments, households, and firms will need to bear the main burden of adapting to changing weather patterns. In the modeling exercise conducted here, South Asia's private sectors can reduce about one-third of the climate damage by 2050 with their autonomous responses to climate-induced changes in relative prices and incomes—provided there are no obstacles to these responses.

The model includes some frictions that impede resource reallocations—such as capital adjustment costs, wage rigidity, and liquidity constraints—and thus can amplify climate damage. In practice, however, frictions are likely to be much more widespread and persistent than those captured in the model, especially in EMDEs with weak institutions and governance. Thus, agricultural workers may struggle to find employment outside agriculture; farms may struggle to access the finance needed to invest in more capital-intensive or climate-resilient farming practices or to access information about such practices; firms and households may struggle to operate productively in overcrowded cities; and governments benefits intended to help climate-vulnerable areas may raise reservation wages and discourage relocations.

In particular, the model does not capture the interaction between South Asia's lagging structural transformation and climate adaptation. Agriculture employs about 42 percent of South Asia's work force compared with 31 percent in other EMDEs and South Asia has lower agricultural labor productivity than any other EMDE region (chapter 1). The share of non-agricultural employment has risen more slowly in the region than in the average EMDE (Ohnsorge, Rogerson, and Xie 2024; World Bank 2024). As a

result, South Asia has a large reservoir of agricultural labor that could be redeployed into less climate-affected, as well as more productive, non-agricultural jobs.

It is essential for successful climate adaptation that governments support autonomous adaptation. This means that policies are needed to make markets work better to help firms, farms, and households adapt. One way of allowing clearer market signals would be to remove distortive subsidies and price controls. Access to finance can be expanded so that firms and households can invest into cooling technologies and farms can invest in irrigation and climate-resilient crops. Financial instruments can be developed that offer insurance against climate disasters. Social benefit systems can be better designed to rapidly ramp up support in the event of climate shocks. Transport and digital connectivity can be improved to allow labor to move out of the most climate-affected areas. Education and training can be strengthened to help workers move out of agriculture into non-agricultural jobs.

In addition, government investment in climate resilience, including in agriculture, could reduce the climate damage that remains after autonomous adaptation. However, because South Asia's fiscal positions are fragile, the ability of governments to undertake such investment is severely constrained.

The constraints on public investment in many EMDEs also indicate the importance of the role that advanced economies and other EMDEs can play in accelerating adaptation by sharing and transferring climate-related technologies. For instance, CGIAR can play a significant role in funding agricultural innovation in EMDEs.

Annex SL1 Methodology

This analysis uses a variant of the G-Cubed model (Liu et al. 2020; McKibbin and Wilcoxen 1999; 2013), which contains 21 countries and regions suited for analyzing the effects of rising global temperatures and adaptation in Asia, especially South Asia, but in the global context.

Model setup

The G-Cubed model incorporates standard features of large macro models that describe short-run dynamics and long-run equilibrium.

Households. Households are assumed to be of two types, with one group making decisions using forward-looking expectations and the other following simple rules of thumb. They are subject to an intertemporal budget constraint.

Firms. Firms are also assumed to be of two types, with one group making decisions using forward-looking expectations and the other following simple rules of thumb. Firms are modeled separately within each sector. They are subject to an intertemporal budget constraint.

Labor markets. The labor market features sticky nominal wages that adjust over time. The mechanisms for adjustment are specific to each country, given different labor contracting laws and regulations. The labor market clears with firms hiring until the marginal product of labor equals the real wage in each sector, and those who are not hired becoming unemployed. Nominal wages adjust to clear the labor market in the long run. Short-term unemployment rises or falls in response to aggregate demand and supply shocks.

Governments. Stocks and flows of physical and financial assets are accounted for in the model, so budget deficits accumulate into government debt. An intertemporal budget constraint applies to governments, which means that long-term equilibrium in stock variables is reached slowly over time through changes in asset prices. That is, interest rates adjust to equilibrate government fiscal positions. Government spending is exogenous, and the government deficit is endogenous. The fiscal rule imposing fiscal sustainability is a lump sum tax on households that equals the change in the interest servicing costs. This implies that fiscal deficits can permanently change but the stock of debt to GDP will eventually stabilize at a new level.

Central banks. Money is issued by central banks for all transactions, with central banks setting short-term nominal interest rates to target their

macroeconomic mandates, such as inflation, unemployment and the exchange rate. Inflation rates are anchored in the long run but short-term fluctuations are allowed by the monetary policy rules. The Henderson-McKibbin-Taylor monetary rule governs monetary policy in each country and region in the model.

Balance of payments. Countries are linked through international trade and capital flows. An intertemporal budget constraint also applies to countries, so current account deficits accumulate into foreign debt. Real exchange rates adjust to equilibrate the balance of payments.

Population dynamics

To introduce the life cycle of consumers, the model assumes that individuals live over an infinite horizon but are subject to a constant probability of death at any point of time across all consumers (Liu and McKibbin 2022).

The model is solved from 2018, adjusting forward-looking variables so that the model solution for 2018 replicates the database for 2018. To generate a baseline into the future, the key input is exogenous projections of age-specific population growth and sectoral labor-augmenting productivity growth by country. The dynamics of endogenous variables, including national and sectoral output from 2018 onward, are driven by labor force and productivity growth.

Individuals in each region are assumed to have an identical, hump-shaped age-productivity profile. Population change is assumed to affect all economic sectors equally. Labor-augmenting productivity is different across sectors but independent of age. If labor-augmenting productivity increases in a particular sector, all workers in the sector experience the same productivity growth regardless of their ages. The labor-augmenting productivity in all sectors in the most advanced (or frontier) region, the United States, is normalized to one. This assumes that the U.S. economic structure is stable on a balanced growth path and that the productivity differences across sectors will remain unchanged into the future.

Population data are sourced from the United Nations World Population Prospects 2024 (the medium variant). The database contains annual data on population projection by age up to 2100 for 237 countries. The age-specific population data is aggregated from 237 countries to G-Cubed regions.

Labor productivity

For age-related productivity, age-earning profiles are sourced from the National Transfer Account (NTA) database. The transfer database provides age-specific labor incomes in particular years for 66 countries, including 15 Asian countries. These age-earning profiles are mapped to the G-Cubed regions.

Sectoral productivity

For labor-augmenting productivity, a catch-up model is used where the productivity in each sector in every region catches up with that in the same sector in the frontier region. There are three components: productivity growth in the frontier region, initial productivity levels, and catch-up rates. The United States is assumed to be the frontier region and the model assumes that all sectors in the United States grow at a constant rate of 1.4 percent every year in the future (U.S. Congressional Budget Office 2024). The initial productivity levels by sector are calculated based on the 2023 Groningen productivity database. The database provides sectoral labor productivity for 12 sectors in 84 countries in 2017, measured in the local currency. The sectoral productivity is measured by value added per worker in each sector. Their countries and sectors are mapped to G-Cubed. Initial productivity levels are normalized in all sectors in the United States to be 100 and relative productivity levels are calculated for all other regions. Non-U.S. regions are assumed to catch up with the United States by sector unless special adjustments are made. This implies that regions behind the United States would grow faster than the United States.

Scenarios

Baseline scenario. The baseline projection is based on actual data from 2018, which already reflects climate impacts up to that year. To establish a no-climate-damage baseline for assessing the impacts of rising global temperatures, the baseline scenario neutralizes temperature

shocks exceeding the 1985–2005 average by introducing a counteracting shock to offset the climate shock in 2024. This adjustment ensures that, when simulating climate shocks starting in 2025, the new baseline is isolated from historical climate damage. For climate impacts after 2024, net climate shocks are calculated relative to the 2024 level. Consequently, the future climate effects relative to the no-climate-damage baseline include the cumulative effects of rising global temperatures from the historical average temperatures up to 2024 plus additional changes from 2025 onward.

Climate damage scenario. The climate damage scenario envisages the same temperature path as the IPCC (2022)'s RCP8.5 scenario and the associated SSP5 scenario. For the full horizon until 2011, some have argued that this scenario is extreme (for example, Sarofim et al. 2024). At least until 2050, the time frame considered here, the RCP8.5 scenario appears to be somewhat above, and the RCP4.5 scenario somewhat below, temperature increases under current and stated policies (Schwalm, Glendon, and Duffy 2020).

ANNEX TABLE SL1 Literature review of climate damages

Citation	Sample	Climate trend or shock	Methodology	Comment
Impact on GDP and per capita incomes				
Anttila-Hughes and Hsiang (2013)	Philippines; Household tri-annual data; 1985–2006	Cyclones	Difference-in-difference	Increase in wind exposure by 1 m/s increases death toll and economic losses by about 22 percent. Losses mitigated by access to electricity, sanitation, buildings, and information.
Burke, Hsiang, and Miguel (2015)	Cross-country annual data; 166 countries; 1960–2010	Temperature trends	Panel regression	Rising temperatures lower (raise) output if baseline temperature is > (<) 13C.
Cachon, Gallino, and Olivares (2012)	Firm level weekly data for 64 automobile plants; United States; Jan. 1994–Dec. 2005	Temperature and precipitation shocks	Panel regression	A week with >=6 days of temperatures > 90F lowers output by 8.75 percent. A week with 2–4 snow days lowers output by 2.78 percent. A week with >=6 days of rain lowers output by 5.9 percent. A week with wind speeds >=44 mph lowers output by 7.91 percent.
Carleton and Hsiang (2016)	16 papers for 2007–2016 are summarized, while metaregression analysis is based on 197 papers	Temperature trends	Literature review, metaregression analysis	Temperature and rainfall trends have lowered some crop yields by up to 4–48 percent, with the largest reductions in SSA as well as maize and wheat. Rising temperatures have lowered average growth by 0.25 percentage points from 1960 to 2010. Cyclones have lowered GDP growth by 1.27 per year.
Dell, Jones, and Olken (2012)	Cross-country annual data; 125 countries; 1950–2003	Temperature trend	Panel regression	A 1C increase in temperature raises annual growth by 0.561 percentage point on average but lowers it by 1.394 percentage points in developing economies.
Fernando, Liu, and McKibbin (2021)	Average daily and monthly data for 193 countries; 2006–2100	Temperature trends and shocks	Macroeconometric model	RCP2.6 scenario: Output losses of 0.6–3.2 percent by 2050. RCP8.5 scenario: additional output losses of 0.5–1.5 percent by 2050.
Hsiang (2010)	Sectoral annual data; 28 of 31 Caribbean-basin countries from 1970–2006	Cyclones	Panel regression	A cyclone lowers output by 2.5 percent. In a cyclone, output losses in non-agriculture (agriculture) are 2.4 (0.1) percent higher with a 1C increase in temperature.
Hsiang and Jina (2014)	Country level annual data; 1950–2008	Cyclones	Difference-in-difference	A 1 m/s increase in wind speed lowers output by 0.38 percentage points 15 years after a cyclone.
Nordhaus (2010)	Grid-level annual data; United States; 1900–2008	Temperature trends	Two stage-least-squares and quantile regressions	The annual cost of hurricane damage is 0.071 percent of U.S. GDP if there is no global warming, and will be 0.15 percent of U.S. GDP if there is global warming.
Yang (2008)	Country-level annual data; 1970–2002	Cyclones	Quasi-experiment	A 1-point increase in the mean storm index lowers GDP by 0.423 percent three years after storms.

ANNEX TABLE SL1 Literature review of climate damages (*continued*)

Citation	Sample	Climate trend or shock	Methodology	Comment
Impact on labor markets				
Barreca (2012)	County-level annual data; 373 counties in the United States; 1973–2002	Temperature shocks	Panel regression, Hadley CM3 (A1F1) model for mortality	A temperature >90F is associated with 5.4 more deaths per 100,000 inhabitants than a temperature of 60–70F.
Beine and Jeusette (2021)	51 papers published from 2003–2017	Temperature trend or climate shocks	Literature review, metaregression analysis	Rising global temperatures increase the probability of migration by 20–30 percent, and by 5–10 percentage points more in developing economies than elsewhere.
Currie and Rossin-Slater (2013)	Individual-level annual data; U.S. state of Texas; 1996–2008	Cyclones	IV panel regression	A hurricane within 30km during the last month of pregnancy increases the risk of abnormality in the newborn by 0.0379 percentage points.
Dasgupta et al. (2021)	Worker-level data; 106 countries; 1986–2005	Temperature trends	Panel regression	3C global warming lowers labor productivity by 18 percent in low-exposure sectors and 6–18 percent in Asia.
Deschenes and Greenstone (2011)	Individual-level annual data; United States; 1968–2002	Climate trend or shock	Panel regression. Hadley CM3 (A1F1) model for mortality	Rising global temperatures raise annual mortality by 1.8 percentage points.
Fishman et al. (2019)	Individual-level data; Ecuador; 1950–80	Temperature trends	Panel regression	A 1C higher temperature in utero leads to 0.7 percent lower earnings as adults.
Garg et al. (2020)	Individual-level and district-level annual data; India; 2006–2014	Temperature trends	Quasi-Experiment	The extra days with an average daily temperature above 29C, relative to 15–17C, reduce math and reading test performance by 0.03 and 0.02 standard deviations, respectively. Mitigated by NREGA.
Heal and Park (2016)	County-level annual data; United States; 1986–2012	Temperature trends	Panel regression	One additional day with daily mean temperatures between 80 and 90°F lowers per capita wages by 0.028 percent in that year; a year with an additional day above 90°F lowers it by 0.048 percent.
Kaczan and Orgill-Meyer (2020)	Literature review; 17 articles; 2004–2018	Climate trend or shock	Literature review	N/A
Kjellstrom et al. (2009)	Grid-level daily and annual data. 21 countries or regions; 1960–2005	Temperature shocks	Descriptive statistics	In Southeast Asia and Latin America and the Caribbean, rising global temperatures lower labor productivity by 11.4–26.9 percent.

ANNEX TABLE SL1 Literature review of climate damages (*continued*)

Citation	Sample	Climate trend or shock	Methodology	Comment
Impact on labor markets (*continued*)				
Kudamatsu, Persson, and Strömberg (2012)	Individual-level monthly data; 28 Sub-Saharan African countries; 1984–2011	Drought	Panel regression	Drought raised child mortality rates by 0.05 percent.
Maccini and Yang (2009)	Individual-level annual data; Indonesia; 1953–1974	Rainfall	IV regression with 2SLS	Women born in years with 20 percent higher rainfall at birth are 3.8 percentage points less likely to self-report poor health.
Niemelä et al. (2002)	Daily data from two call centers in Finland; July–October in unspecified year	Temperature shocks	Quasi-experiment, panel regression	A 1C increase in temperature above 25C lowers call center productivity as much as 5–7 percent.
Romanello et al. (2021)	Literature review	Climate trend or shock	Descriptive statistics	N/A
Schmitt, Graham, and White (2016)	Literature review of 20 studies	Heat waves, cyclones	Literature review	Heat waves were more costly than hurricanes.
Zander et al. (2015)	Worker-level data; Australia; 2013/14	Temperature trends	Descriptive statistics	Heat lowered incomes by 0.33–0.47 percent.
Zivin and Neidell (2014)	Individual-level U.S. survey data; 2003–2006	Temperature trends	OLS regression	At temperatures above 85F, workers in industries with high exposure to climate reduce daily labor supply by as much as 1 hour at the end of the day.
Das and Somanathan (2024)	Worker-level data for 400 workers in Delhi slums; Summer 2019	Heatwave	Regression	Every 1C increase in wet bulb temperature was associated with a fall in gross earnings of 13 percentage points, and an increase in the self-reported probability of sickness of the worker or a family member of 6 percentage points. Net earnings were 40 percent lower during the two heatwaves that occurred during the study period.
Impact on agriculture				
Auffhammer (2018)	At least 15 studies published during 2009–2018	Trends	Literature review	N/A
Carleton and Hsiang (2016)	Summary of 16 papers published during 2007–2016; Regression analysis based on 197 papers	Trends	Literature review, metaregression analysis	Temperature and rainfall trends have lowered some crop yields by up to 4–48 percent, with the largest reductions in SSA, as well as in maize and wheat. Rising temperatures have lowered average growth by 0.25 percentage point 1960–2010. Cyclones have lowered GDP growth by 1.27 per year.

ANNEX TABLE SL1 Literature review of climate damages (*continued*)

Citation	Sample	Climate trend or shock	Methodology	Comment
Impact on agriculture (*continued*)				
Dell, Jones, and Olken (2014)	At least 60 studies published during 2003–2013	Trends	Literature review, panel data estimation	N/A
Fisher, Hanemann, and Schlenker (2005)	County-level annual data; United States; 2,197 dryland non-urban counties; 514 irrigated non-urban counties and 227 urban counties; Data from 1982, 1987, 1992, 1997, and 2002	Climate trend	Panel regression	In dryland non-urban counties (not others), rising global temperatures unambiguously lead to annual loss of about US$5–US$5.3 billion.
Guiteras (2009)	District-level annual data; India; More than 200 districts	Climate trend	Panel regression	Rising global temperatures will lower agricultural yields by 4.5–9 percent during 2010–39.
International Monetary Fund (2020)	N/A	Climate trend	Discursive	N/A
Keane and Neal (2020)	County-level annual data for the United States; 1950–2015	Temperature trends	Mean observation OLS model	A day with temperatures of 1C over 29C lower crop yield by 0.82–0.89 percent.
Lobell and Schlenker (2010)	Country-level annual data; At least 39 Sub-Saharan African countries; 1961–2006	Temperature trends	Panel regression	A temperature increase into a higher temperature bracket lowered yields by 22 percent for maize, 17 percent for sorghum, 17 percent for millet, 18 percent for groundnuts, and 8 percent cassava.
Lobell, Schlenker, and Costa-Roberts (2011)	Global sample of geophysical data; 1980–2008	Climate trend	Panel regression	Rising global temperatures have lowered yields by 3.8–5.5 percent during 1980–2008.
Mendelsohn, Nordhaus, and Shaw (1994)	County-level annual data; United States; 3,000 counties; 1951–1980	Climate trend	Cross-section regressions	N/A
Roberts and Schlenker (2009)	County-level data; United States; 1950–1977 versus 1978–2005	Temperature trends or shocks	Non-linear panel regression using interaction terms	Temperatures above 29C lower corn yields, above 30C lower soybean yields, and above 32C lower cotton yields.
Impact on industrial output				
Cachon, Gallino, and Olivares (2012)	Weekly vehicle production at 64 automobile plants in the United States for Jan 1994–Dec 2005, along with daily weather conditions at these assembly plants	Temperature and precipitation shocks	Panel regression	A week with 6 days or more of temperatures above 90F lowers output by 8.75 percent. A week with 2–4 snow days lowers output by 2.78 percent. A week with 6 days or more of rain lowers output by 5.9 percent. A week with wind speeds of 44 mph or more lowers output by 7.91 percent.
Dell, Jones, and Olken (2012)	Cross-country annual data; 125 countries; 1950–2003	Temperature trend	Panel regression	A 1C increase in temperature raises annual growth by 0.561 percentage points on average but lowers it by 1.394 percentage points in developing economies.

ANNEX TABLE SL1 Literature review of climate damages (*continued*)

Citation	Sample	Climate trend or shock	Methodology	Comment
Impact on industrial output (*continued*)				
Hsiang (2010)	Sectoral annual data; 28 out of 31 Caribbean-basin countries from 1970–2006	Cyclones	Panel regression	A cyclone lowers output by 2.5 percent. In a cyclone, output losses in non-agriculture (agriculture) are 2.4 (0.1) percent higher with a 1C increase in temperature.
Somanathan et al. (2021)	Individual-level data from selected firms in three industries: cloth weaving, garment sewing, and large infrastructural steel production; India between Feb 2000–March 2003	Temperature shocks	Panel regression	Temperature of 35C or above lowers annual output by 0.22 percent.
Chen et al. (2018)	Individual-level monthly data in a silicon wafer maker; China; September 2013–August 2017	Temperature shocks	Panel regression	10C higher wet bulb temperature lowers output by 8.3 percent.
Impact on asset losses				
Abrell, Ciscar and Pycroft (2016)	Sectoral annual data for 129 countries/regions; 57 commodities	Floods	Computable general equilibrium model (Climate Assessment General Equilibrium model)	In the highest sea-level rise scenario (1.75 m by the 2080s), global GDP would fall 0.5 percent below baseline, with larger losses in Central Europe, North America, and parts of South-East Asia and South Asia.
Asuncion and Lee (2017)	Studies from 1990–2016	Sea level rise	Literature review, descriptive statistics	Sea level rise could cause economic losses of 0.15–9.3 percent.
Dasgupta (2021)	Review of 100 studies published during 1971–2020	Biodiversity	Literature review, descriptive statistics	Current extinction rates of species are estimated to be 100–1,000 times higher than the average extinction rate over the past tens of millions of years.
Hallegatte (2012)	Review of more than 70 studies from 1956–2009	Sea level rise	Literature review, descriptive statistics	The economic impact of sea level rise could lead to a significant reduction in GDP, although the exact figures are challenging to quantify with current knowledge.
Hinkel, Linke, and Vafeidis (2014)	Global geophysical data	Floods	Four different climate models from Coupled Model Intercomparison Project Phase 5	Without adaptation, 0.2–4.6 percent of the global population could be flooded annually by 2100, causing economic losses of 0.3–9.3 percent of global GDP. The costs of building and maintaining coastal defenses are US$12-71 billion per year by 2100.
Nolan et al. (2018)	Review of 594 published papers that refer to data from 21,000 to 14,000 years before present	Biodiversity	Discursive	The probability of large compositional change in biodiversity is less than 45 percent under low-emission scenarios and greater than 60 percent under high-emission scenarios.
Pelli et al. (2023)	Firm-level annual data for 6,037 manufacturing firms; India; 1995–2006	Cyclones	Panel regression	An average tropical cyclone in India results in the destruction of about 2.2 percent of a firm's fixed assets and a reduction in sales by about 3.1 percent. These effects are temporary.

ANNEX TABLE SL1 Literature review of climate damages (*continued*)

Citation	Sample	Climate trend or shock	Methodology	Comment
Impact on asset losses (*continued*)				
Pörtner et al. (2023)	Review of at least 167 studies from 2005–23	Biodiversity	Literature review, descriptive statistics	Rising global temperatures are projected to cause species shifts and loss of biodiversity globally.
Rosenberg and Fay (2019)	Large sample of EMDEs	Rising global temperatures	Range of modelling exercises	Infrastructure investment needs to meet SDGs, including climate adaptation, range from 2–8.2 percent of GDP per year.
Impact on energy demand				
Mansur, Mendelsohn, and Morrison (2008)	Individual-level annual data for residential and commercial energy consumers; United States; Data derived from earlier studies and surveys conducted in the 1990s	Temperature trends	Two-stage-least squares regression	Rising global temperatures will increase electricity consumption for cooling but reduce the use of other fuels for heating. 2.5C rise in temperature would cause damage of approximately US$26 billion per year.
van Ruijven, De Chian, and Wing (2019)	Country-level annual data for 204 countries;1978–2014	Climate trend or shock	Panel regression, descriptive statistics	In RCP4.5, world energy demand will increase 18–21 percent relative to the baseline by 2050.

ANNEX TABLE SL2 Country coverage

Region groups	Region codes	Regions
Advanced economies	USA	United States
	JPN	Japan
	EUW	Western Europe
	AUS	Australia
	KOR	Korea, Rep.
	ADV	Rest of Advanced Economies
Developing Asia	CHN	China
	IND	India
	IDN	Indonesia
	PHL	Philippines
	VNM	Viet Nam
	THA	Thailand
	MYS	Malaysia
	PAK	Pakistan
	BGD	Bangladesh
	LKA	Sri Lanka
	ROA	Rest of Asia
Other developing regions	LAC	Latin America
	SSA	Sub-Saharan Africa
	MNA	Middle East and North Africa
	ROW	Rest of World

Source: World Bank.
Note: ADV = Canada and New Zealand; ROW = mainly Eastern Europe (including Russian Federation and Türkiye) and Central Asia.

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CHAPTER 2

Bridging the Gap:

Revenue Mobilization in South Asia

Bridging the Gap: Revenue Mobilization in South Asia

South Asian governments need to raise revenues to shore up their fiscal positions. Although tax rates in South Asia are often above the emerging market and developing economy (EMDE) average, most tax revenues are lower. On average during 2019–23, South Asian government revenues totaled 18 percent of GDP—well below the 24 percent of GDP average in EMDEs. Controlling for tax rates and the size of potential tax bases, tax revenues in the region are 1–7 percentage points of GDP below potential, with shortfalls in five of the region's eight countries larger than in the average EMDE. Revenue shortfalls are particularly pronounced for consumption taxes but are also sizable for personal income taxes and, in the larger economies, corporate income taxes. Weak revenue collection has only partly reflected country characteristics, such as widespread informal activity outside the tax net and large agriculture sectors. Even after accounting for these characteristics of South Asian economies, sizable tax gaps remain—highlighting the need for improved tax policy and administration. There is scope to raise tax revenues by eliminating loopholes, streamlining tax codes, strengthening enforcement, and facilitating compliance. The introduction of pollution pricing could also both boost revenues and help address the region's high pollution.

Introduction

Fiscal pressures. All South Asian countries face significant fiscal challenges, in particular large debt and debt-service burdens. At end-2023, gross government debt averaged 77 percent of GDP in South Asia, compared with an emerging market and developing economy (EMDE) average of 64 percent of GDP. Partly as a result, South Asian governments spent 26 percent of their revenues on interest payments—well above the EMDE average of 9 percent. The challenges of high debt and debt -service costs are common across South Asia: Nepal is the only country with ratio of government debt to GDP and ratio of interest payments to government revenues below the EMDE average (figure 2.1).

Severely constrained spending capability. Heavy debt and debt-service burdens constrain funding capability for basic government services. All South Asian countries except Maldives spend less on healthcare than would be expected based on their per capita incomes, and three of the four South Asian countries with the highest interest burdens spend less than half on education (relative to GDP) of the EMDE average—and far less than would be expected based on their per capita incomes.

Low revenues. At the root of South Asia's fiscal challenges are low revenues. During 2019–23, South Asian governments' revenues excluding grants averaged 18 percent of GDP, the lowest among all EMDE regions and well below the EMDE average of 24 percent of GDP. Shortfalls relative to the EMDE average were common across South Asian countries, with the exception of Maldives. In part, South Asian countries' below -average government revenue-to-GDP ratios reflected below-average *non-tax* revenues, but the region's average *tax* revenue-to-GDP ratio was lower than in all other EMDE regions except for the Middle East and North Africa.

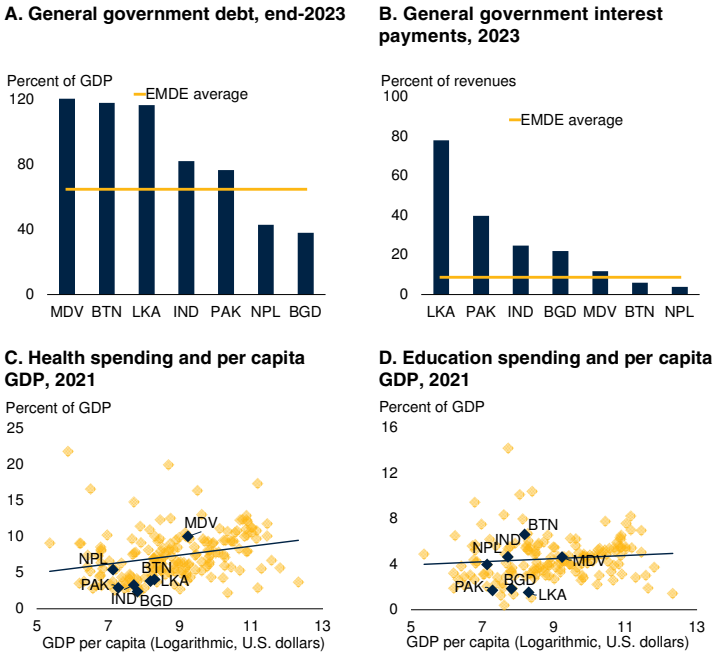
Questions. This chapter examines the following questions.

1. How large is the tax revenue shortfall in South Asian countries?
2. To what extent do country characteristics contribute to this shortfall?
3. Which policy options are available to raise tax revenues?

Note: This chapter was prepared by Hagen Kruse, Franziska Ohnsorge, Gabriel Tourek (University of Pittsburgh), and Zoe Xie, with contributions from Rabiul Hossain (Bangladesh Bank).

FIGURE 2.1 Fiscal positions

All South Asian countries face fiscal challenges. Some have exceptionally high debt—in some cases to the point of debt distress. Some face high debt service burdens. Some underfund their education or healthcare systems compared with peers with similar per capita incomes.



Sources: IMF World Economic Outlook; World Development Indicators (database); World Bank.
Note: BGD = Bangladesh; BTN = Bhutan; EMDE = emerging market and developing economy; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan.
A. EMDE is nominal US$ GDP-weighted average for 135 EMDEs. For Bhutan, around two-thirds of general government debt is in hydropower debt.
B. EMDE is nominal US$ GDP-weighted average for 133 EMDEs.
C.D. Latest available data are for 2021. Per capita income in nominal US dollars. Straight line represents linear relationship between GDP per capita and health or education spending.
C. Sample includes 146 EMDEs and 37 advanced economies.
D. Sample includes 123 EMDEs and 38 advanced economies.

Contributions to the literature. This chapter contributes to the literature *first*, by updating and extending earlier studies on the drivers of tax revenues, using the latest data to derive estimates of revenue shortfalls and their sources. *Second*, it conducts a comprehensive review of the literature on how tax revenues respond to changes in national income—often referred to as tax buoyancy—and to tax policies, and compares estimates for South Asia with those for other countries. *Third*, the chapter draws on a recent review of the literature based on policy reforms in countries in South Asia and elsewhere to identify measures that hold promise for South Asia. *Finally*, it explores options for deriving revenues from pollution pricing, which could yield a double dividend by increasing revenue and lowering South Asia's exceptionally high levels of pollution.

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

Main findings. The chapter presents the following findings.

First, although tax rates in South Asia are often above the EMDE average, most tax revenues are lower. Countries in the region other than Maldives have tax revenues that are 2–18 percentage points of GDP less than the EMDE average.

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

Third, in all South Asian countries except Nepal, up to one-third of the shortfall can be explained by features of their economies. For example, up to one-half of the shortfalls in personal income tax revenue, up to one-half of the shortfalls in corporate income tax revenue, and up to one-third of the shortfalls in consumption tax revenue can be accounted for by country characteristics such as pervasive informality and large agriculture sectors. For Nepal, the country characteristics account for four-fifths of the overall tax revenue shortfall as the country has one of the highest levels of informality and one of the largest agriculture sectors in the region. In four South Asian countries, the remaining tax gaps—the difference between the actual and the potential tax revenues implied by the tax rates, potential tax bases, and country characteristics—are larger than the EMDE average and suggest the need for broader reforms to tax policy and tax administration.

Fourth, South Asian governments' revenues could be raised by tax policy measures to eliminate exemptions, and unify, simplify, and harmonize tax rates. In EMDEs of other regions, efforts to facilitate tax collection and incentives for tax officials have been successful in raising revenues. In addition, pollution pricing could help address high levels of pollution, as well as low government revenues—two of South Asia's main challenges.

Features of South Asian revenue collection

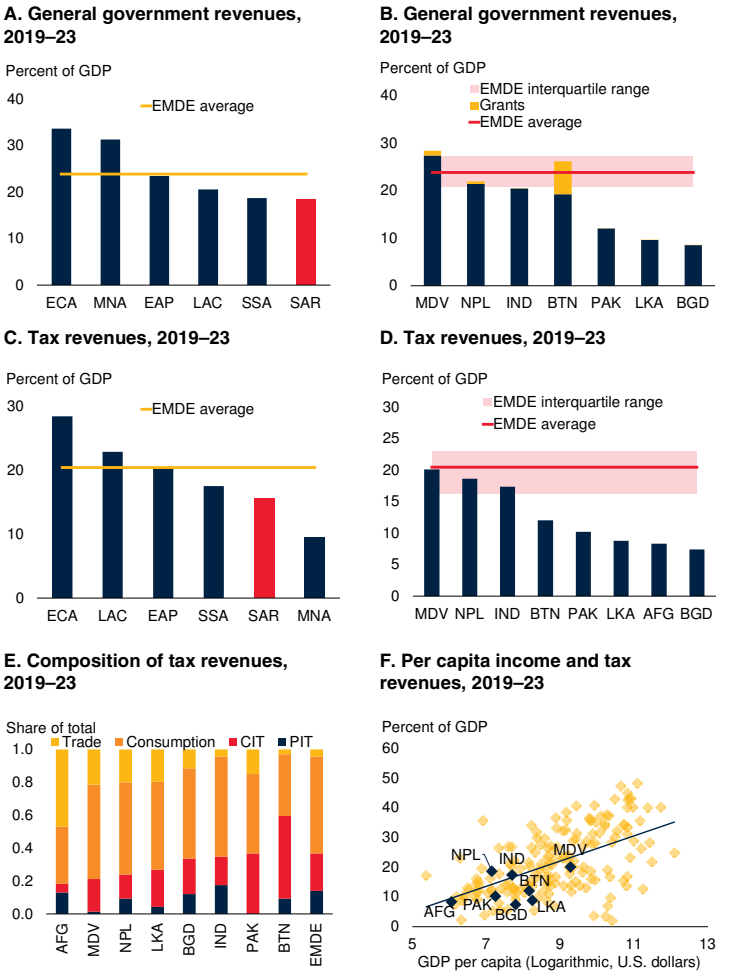
Almost all South Asian countries have above-average tax rates and below-average revenue collection. For trade tax revenues, this partly reflects relatively limited trade openness, but for consumption and direct taxes it appears to reflect something other than small potential tax bases.

Low tax revenues. During 2019–23, general governments (including central and subnational governments) in South Asian countries other than India, Maldives, and Nepal collected less tax revenue than three-quarters of EMDEs, and much less than countries with similar per capita incomes (figure 2.2). South Asia's revenue weakness has been long-standing. During 2013–23, in all South Asian countries other than India, Maldives, and Nepal, tax revenue-to-GDP ratios remained virtually stagnant or even fell (Bangladesh and Bhutan) (figure 2.3). In 2024, however, Sri Lanka's tax revenue-to-GDP ratio is estimated to have risen substantially, albeit from a very low base, on the back of reforms of the value -added tax (VAT) which increased rates, reduced registration thresholds, and removed exemptions (World Bank 2024a).

Broad-based tax weakness versus failure to tax high-growth activities. South Asian countries' weak revenue collection appears to be more broad-based than merely a failure to tax the fastest-growing economic activities. In Bangladesh and India, revenue buoyancies—the responsiveness of tax revenues to changes in the tax base—are broadly in line with the EMDE average and, in Nepal, they are even in the highest quartile for EMDEs (based on a literature review detailed in annex 2.1). Only Pakistan's tax buoyancy falls in the bottom quartile of EMDEs, suggesting a reliance on taxation of slow-growing economic activities.

FIGURE 2.2 Government revenues

In all South Asian countries other than Maldives, government revenue-to-GDP ratios are well below the EMDE average. Except in India, Maldives, and Nepal, tax revenue-to-GDP ratios are in the bottom quartile of EMDEs and lower than might be expected given per capita incomes. Most South Asian countries rely more than the average EMDE on trade and consumption taxes and less on income taxes.



Sources: Haver Analytics; IMF Government Finance Statistics (database); UNU-WIDER; World Bank Fiscal Survey (database); World Development Indicators (database); World Bank.

Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; CIT = corporate income tax; EAP = East Asia and the Pacific; ECA = Europe and Central Asia; EMDE = emerging market and developing economy; IND = India; LAC = Latin America and the Caribbean; LKA = Sri Lanka; MDV = Maldives; MNA = Middle East and North Africa; NPL = Nepal; PAK = Pakistan; PIT = personal income tax; SAR = South Asia; SSA = Sub-Saharan Africa. All revenues refer to general government revenues.

A.B. Total revenue excludes grants. EMDE average is nominal GDP-weighted average of 140 EMDEs.

C.D. Tax revenue includes social security contributions. EMDE average is nominal GDP-weighted average of 142 EMDEs.

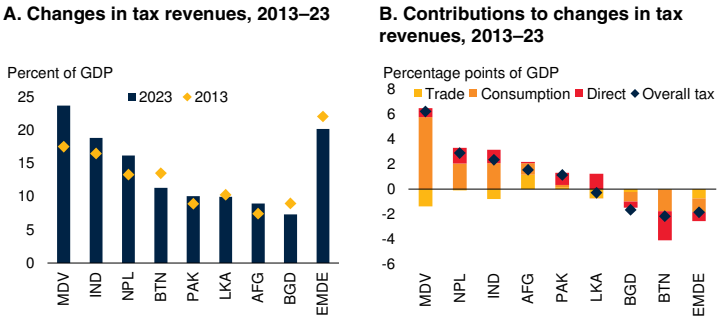
E. EMDE average is nominal GDP-weighted average of 111 EMDEs. Decomposition of direct tax revenues into personal income tax and corporate income tax is missing for Pakistan. For Pakistan, red bars show total direct taxes excluding social security.

F. Per capita income in nominal US dollars. Straight line represents linear relationship between GDP per capita and tax revenue as a percent of GDP.

Composition of tax revenues tilted toward trade and consumption. In all South Asian countries other than Bhutan and Pakistan, greater shares of tax revenues are generated by consumption taxes—such as sales tax, excise taxes, and VAT—and trade taxes than in the

FIGURE 2.3 Changes in tax revenues over the past decade

Over 2013–23, tax revenue-to-GDP ratios rose in most South Asian economies. The exceptions were Bangladesh and Bhutan, where tax revenue ratios fell, driven especially by falling consumption tax revenue-to-GDP ratios.



Sources: Haver Analytics; IMF Government Finance Statistics (database); UNU-WIDER; World Bank Fiscal Survey (database); World Bank.

Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; EMDE = emerging market and developing economy; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL= Nepal; PAK = Pakistan. EMDE is nominal GDP-weighted average of 110 EMDEs. Tax revenue includes social security contributions. Tax revenues refer to general government tax revenues.

average EMDE, with smaller shares derived from income taxes (figure 2.2E). This relatively high dependence on trade and consumption tax revenues limits the region's revenue potential, undermines the equity of the tax system because of the regressive nature of consumption taxes, and creates disincentives to trade.

Above-average tax rates. In part, above-average reliance on revenues from consumption and trade taxes reflects relatively high tax rates on consumption and imports (figures 2.4A, B). Tariffs, including para-tariffs (defined as additional taxes or fees imposed on goods over and above customs tariff), are above-average in all South Asian countries except Bhutan, which raises effective trade tax rates well above the EMDE average. In India and Sri Lanka, para-tariffs triple or quadruple effective tariff rates (World Bank 2024a, 2024b). In Pakistan and Sri Lanka, consumption tax rates were well above the EMDE average in 2024. In addition, in most South Asian countries with available data, corporate income tax rates are above the EMDE average and, in India, the average personal income tax rate is above-average.

Below-average tax revenues despite high tax rates. For all categories of taxes, most South Asian countries' tax revenues are lower than would be expected given these tax rates (figures 2.4C–E).

- ***Pakistan, Sri Lanka, and Bangladesh***—the three South Asian countries with the lowest overall revenue-to-GDP ratios—also have much lower tax revenue-to-GDP ratios compared with other EMDEs with similar tax rates in all categories of taxes.
- ***India*** collects less trade tax revenue than would be expected based on its tariff and para-tariff rates. In ***Bhutan***, given its below-average tax rates, both consumption and trade tax revenues fall short of the expected levels. For these two countries, direct tax revenues, including personal and corporate income tax revenues are in line with what would be expected based on their income tax rates.
- ***Maldives and Nepal*** raise more tax revenues than would be expected based on their tax rates (except for a small shortfall in Nepal's direct tax revenues). In Maldives, this reflects revenues from a double-digit sales tax rate on tourism-related activities. In Nepal, this reflects its broad-based tax code (World Bank 2021).

Potential tax bases skewed toward consumption. For *trade* taxes, the revenue shortfalls in part reflect low trade integration: all South Asian countries other than Maldives have trade-to-GDP ratios well below the EMDE average (figure 2.5A). For *consumption* taxes, however, shortfalls appear to reflect factors other than small potential tax bases, since all South Asian countries other than Maldives have consumption-to-GDP ratios above, or in line with, the EMDE average (figures 2.5B). Across South Asia, consumption is by far the largest potential tax base and trade the smallest (figure 2.5D).

A gap that needs bridging

Econometric estimates suggest that South Asian countries' tax revenues are 1–7 percentage points of GDP below their potential, estimated on the basis of their tax rates and the size of their potential tax bases. Only part of this shortfall is explained by country characteristics such as pervasive informality, large agriculture sectors, and lack of financial development. Even

controlling for these characteristics, the tax gaps in most South Asian countries remain larger than in the average EMDE.

Revenue shortfalls

Econometric estimates are used to quantify the tax revenue shortfalls relative to potential revenues estimated on the basis of tax rates and potential tax bases. In South Asia, revenue shortfalls are particularly large for consumption taxes but are also evident for personal income and corporate income taxes.

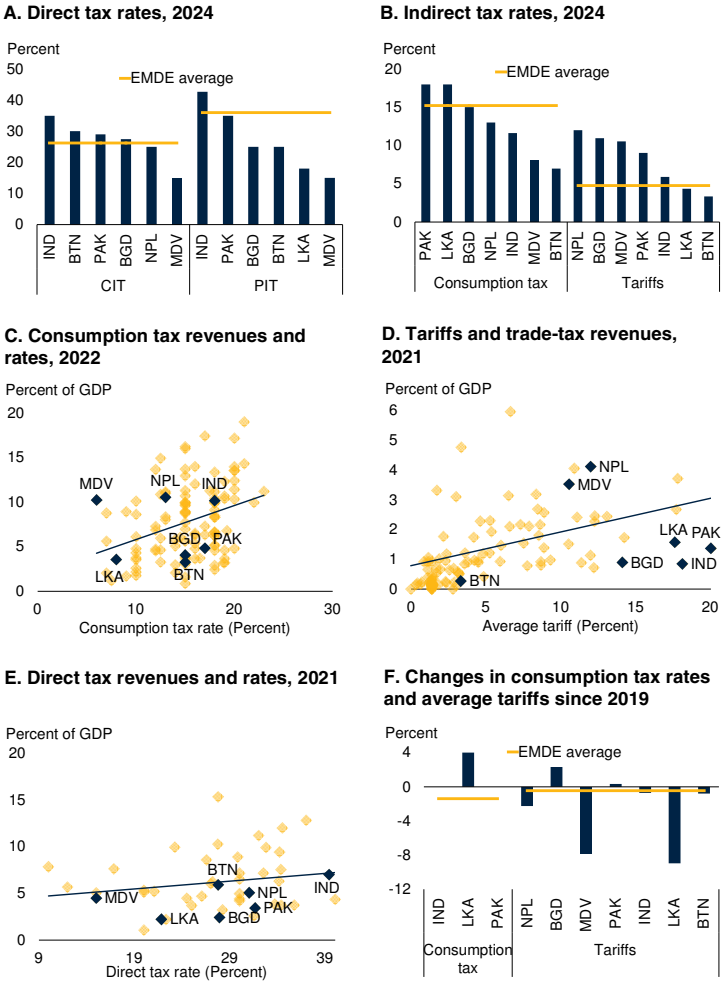
"Tax revenue shortfall": Methodology. As a first step, a stochastic frontier analysis is conducted, which estimates the efficiency frontier and a country's tax potential for each type of tax (annex 2.2; Kruse et al. 2025). Compared with the traditional regression approach, the stochastic frontier model has the advantage that it models inefficiency in revenue collection separately from random error in a combined error term (Jondrow et al. 1982). The dependent variable is tax revenue, as a percentage of GDP, and its correlates are the proxies for the potential tax base, as a percentage of GDP, and tax rates. All variables are used in their logarithmic form. The sample includes up to 139 EMDEs during 2000–23, with a smaller sample for corporate income tax revenue.

- ***Potential tax bases.*** Labor income, market capitalization of listed domestic companies, consumption, and goods imports proxy for the potential tax bases of personal income tax, corporate income tax, consumption tax, and trade tax, respectively. The choice of a broad definition for potential tax bases helps reduce the reverse causality from changes in tax rates to tax bases.

- ***Tax rates.*** For corporate income tax, the standard tax rate is used. The VAT or goods and services tax rate is used for consumption tax, and the average tariff rate is used for trade tax. For personal income tax rates, for which data are available for the highest and lowest rates, the average of the two rates is used, with the highest rate alone used as a robustness check.

FIGURE 2.4 Tax rates and revenues

Tax rates in South Asia are above or in line with EMDE averages—with the exception of personal income tax rates, which in most cases are lower. But tax revenues (relative to GDP) in South Asia are mostly below the levels that would be expected given these tax rates.



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

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

A. EMDE aggregate is revenue-weighted average of 54 EMDEs (personal income tax) or 57 EMDEs (corporate income tax) with available data.

B. EMDE aggregate is revenue-weighted average of 62 EMDEs (consumption tax) or 91 EMDEs (average tariffs) with available data.

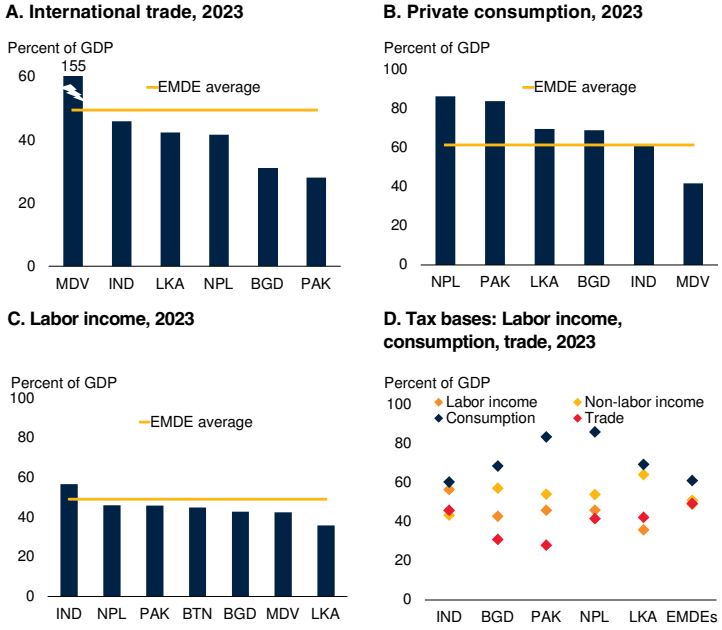
D. Average tariff rates. For Bangladesh, India, and Sri Lanka, tariff rates include para-tariffs (border fees that resemble tariffs).

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

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

FIGURE 2.5 Tax bases

Among the three main tax bases, private consumption is a larger share of GDP in South Asia than in other EMDEs, while the ratios to GDP of international trade and labor income are smaller.



Sources: International Labour Organization; World Development Indicators (database); World Bank.
Note: BGD = Bangladesh; BTN = Bhutan; EMDE = emerging market and developing economy; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan.

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

- ***Personal income taxes.*** Given their tax rates and potential tax bases, all South Asian countries except India and Nepal have had larger shortfalls in personal income tax revenues than three-quarters of EMDEs. The shortfalls in those countries range from 0.8 to 1.5 percentage points of GDP, compared with an average shortfall of 0.6 percentage point or less for three-quarters of all EMDEs (figure 2.6A). For Maldives, the personal income tax revenue shortfall is the only large revenue shortfall, consistent with the country's high income tax exemptions (World Bank 2022).
- ***Corporate income taxes.*** Given tax rates and potential tax bases, shortfalls in corporate income tax revenues have been larger in three of South Asia's four largest countries—Bangladesh, India, and Sri Lanka—than in three-quarters of EMDEs. The shortfalls have ranged from 1.1 to 1.6 percentage points of GDP, compared with a shortfall of 0.8 percentage point or less for three-quarters of the EMDE sample (figure 2.6B).

Shortfall in indirect tax revenue: Consumption taxes. Given their tax rates and potential tax bases, most South Asian countries have had shortfalls in consumption tax revenues in recent years (figure 2.6D). The shortfalls in Afghanistan, Bangladesh, Bhutan, and Pakistan have been larger than in most EMDEs, in excess of 4 percentage points of GDP. For these four countries, the estimated shortfalls are at least as large as actual consumption tax collection, which is broadly in line with earlier estimates: for example, World Bank (2024c) estimates that in FY2019 the VAT gap for Bangladesh was twice the size of its VAT revenue collection. For India, Maldives, and Nepal, in contrast, consumption tax revenue shortfalls have been below the EMDE average.

Shortfall in indirect tax revenues: Trade taxes. Given their tariff rates and potential tax base, Bhutan, Bangladesh, Sri Lanka, and India have had larger shortfalls in trade tax revenues than three-quarters of EMDEs (figure 2.6E). Even so, for all four countries, trade revenue shortfalls are less than 1 percentage point of GDP. However, the data for actual trade revenues include revenues from para-tariffs, which are significant in several South Asian countries (Kathuria and Arenas 2018). Accounting for the para-tariff rates of 10 to 15 percent, estimated trade revenue shortfalls in India and Pakistan would double, albeit still remaining below 1 percentage point of GDP.

Correlates of revenue shortfalls and tax gaps

Only part of these tax revenue shortfalls can be explained by country characteristics such as widespread informality, large agriculture sectors, and lack of financial development. Even accounting for these characteristics, potential tax

revenues in most South Asian countries remain 1–5 percentage points of GDP above actual tax revenues. In Bangladesh, Bhutan, Pakistan, and Sri Lanka, this gap is larger than the average of the broad EMDE sample.

"Tax gap": Methodology. To investigate correlates of the large shortfalls in personal income tax, corporate income tax, and consumption tax, the stochastic frontier estimation above is expanded to include country characteristics that are associated with the revenue shortfalls. Consistent with the literature, the "tax gap" is defined as the difference between actual tax revenue and the potential tax revenue, estimated on the basis of tax rates, potential tax bases, and country characteristics (Hutton 2017; World Bank 2025a). The dependent variable remains the specific type of tax revenue-to-GDP ratio, but the set of explanatory variables is expanded to include additional country characteristics as control variables.[1]

The following country characteristics are considered:

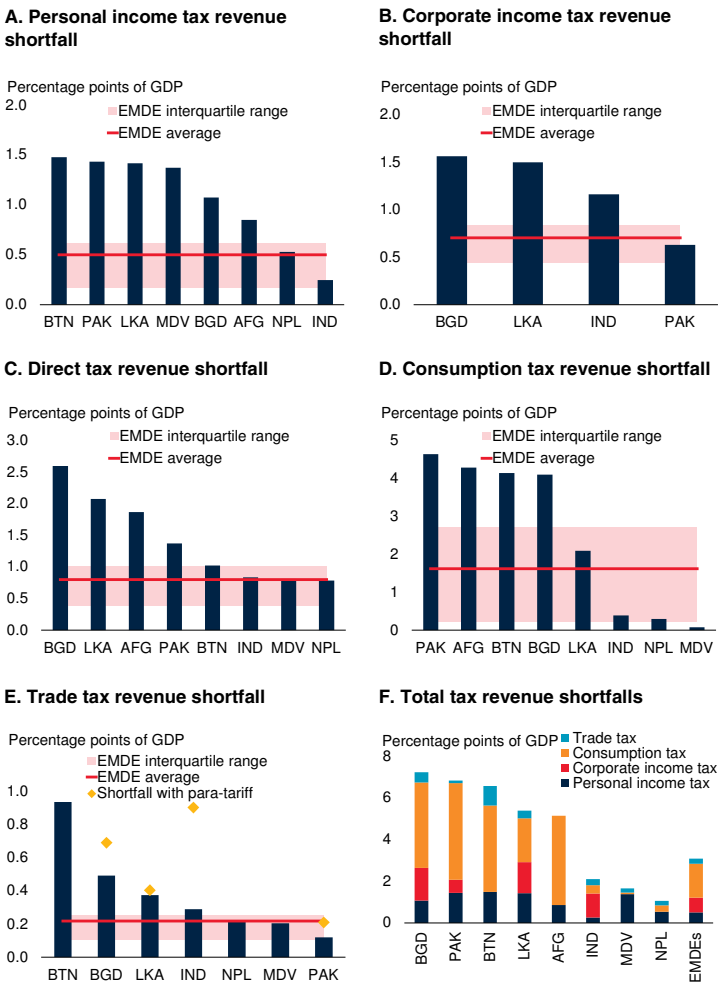
- the size of the informal sector or the size of the agriculture sector as a proxy for the share of economic activity that is difficult to tax;
- financial development as a proxy for enforcement capacity;
- the size of the agriculture sector also to proxy for exemptions from consumption taxes.

A smaller informal sector and a more developed financial system are associated with a higher personal income tax revenue-to-GDP ratio. A smaller agriculture sector and a more developed financial system are associated with higher ratios to GDP of corporate income and consumption tax revenue (annex tables A2.2–A2.4). Data availability restricts the sample to up to 104 EMDEs for 2000–23.

[1] For this part of the analysis, Afghanistan is excluded due to lack of available data on some country characteristics.

FIGURE 2.6 Tax revenue shortfalls

Given tax rates and potential tax bases, tax revenue shortfalls are larger in most South Asian countries than in the average EMDE.



Sources: Haver Analytics; IMF Government Finance Statistics (database); International Labour Organization; UNU-WIDER; USAID Collecting Taxes Database; Vegh and Vuletin (2015); World Bank Fiscal Survey; World Development Indicators (database); World Integrated Trade Solution Database; World Bank. Annex table A2.7 lists data sources for each variable used.

Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; EMDE = emerging market and developing economy; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan. Tax revenue shortfall is the difference between potential and actual tax revenues. Potential tax revenues are obtained as the ratio of actual tax revenue and the efficiency score derived from stochastic frontier analysis with tax rate and potential tax base, for each tax type. Sample comprises 158 EMDEs during 2000–23. Values shown are the average of 2020 to the most recent period. For Pakistan, shortfalls of personal and corporate income tax revenues (A–C) are the average since 2015. The shaded region is the inter-quartile range of shortfall among all EMDEs.

A. Personal income tax rate is the average of the highest and lowest tax rates. Potential tax base for personal income tax revenue is labor income (percent of GDP). Robustness check in figure A2.2.1 uses only the highest rate. Estimation results are in columns (1)–(1.1) of annex table A2.2.

B. Potential tax base for corporate income tax revenue is market capitalization for listed domestic companies (percent of GDP), which is available for four South Asian countries (Bangladesh, India, Pakistan, and Sri Lanka). Estimation results are in column (1) of annex table A2.3.

C. Direct tax revenue excludes social security contributions. Direct tax rate is constructed as an average of personal income tax and corporate income tax rates, weighted by share of labor income in GDP. Direct tax base is constructed as an average of labor income and investment, weighted by share of labor income in GDP.

D. Potential tax base for consumption tax revenue is private consumption (as a percent of GDP). Robustness check in figure A2.2.1 uses a longer sample. Estimation results are in columns (1)–(1.1) of annex table A2.4.

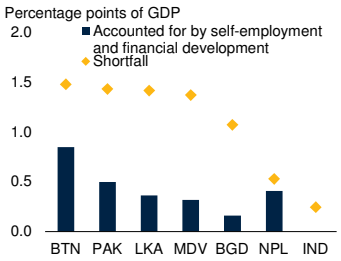
E. Potential tax base for trade tax revenue is goods imports (as a percent of GDP). Estimation results are in column (1) of annex table A2.5. Diamonds are tax revenue shortfalls implied by including in the estimates para-tariff rates cited in World Bank (2024a).

F. Estimated shortfall for trade tax revenue does not include the shortfall accounting for para-tariffs. Estimated shortfall for corporate income tax revenue is available for four South Asian countries—Bangladesh, India, Pakistan, and Sri Lanka.

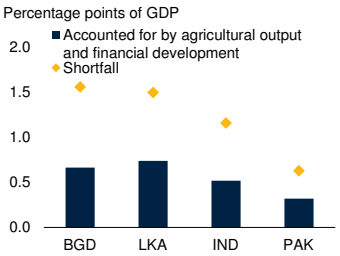
FIGURE 2.7 Tax gaps

Widespread informality, large agriculture sectors, and lack of financial development account for up to one-third of overall tax revenue shortfalls in most South Asian countries, and four-fifths of the shortfall in Nepal. This means that sizable tax gaps remain for most South Asian countries even after controlling for country characteristics, especially for direct income tax revenues.

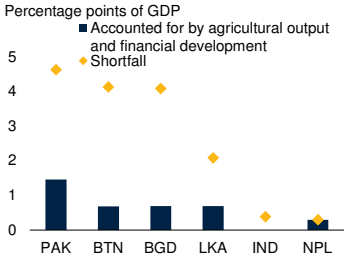
A. Personal income tax revenue shortfall accounted for by country characteristics



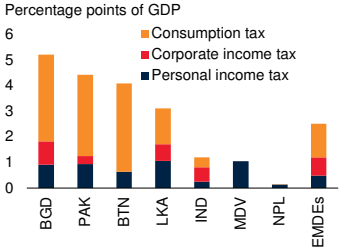
B. Corporate income tax revenue shortfall accounted for by country characteristics



C. Consumption tax revenue shortfall accounted for by country characteristics



D. Tax revenue shortfall unaccounted for by country characteristics



Sources: Haver Analytics; IMF Financial Development Index (database); IMF Government Finance Statistics; International Labour Organization; UNU-WIDER; USAID Collecting Taxes Database; Vegh and Vuletin (2015); World Bank Fiscal Survey; World Development Indicators (database); World Integrated Trade Solution Database; World Bank. Annex table A2.7 lists data sources for each variable used.

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

A.–C. Yellow diamond ("Shortfall") is the difference between potential (based on tax rate and potential tax base) and actual tax revenues, the same as shown in figure 2.6. The bars show the difference between the potential tax revenue (based on tax rate and potential tax base) and the potential tax revenue estimated using stochastic frontier analysis based on tax rate, potential tax base, and additional controls. Values shown are the average of 2020 to the most recent period. For Pakistan, shortfalls of personal and corporate income tax revenues (A–B) are the average since 2015. Estimation results are in annex tables A2.2–4.

D. Tax revenue gap is the unexplained part of the revenue shortfall, calculated as the difference between the revenue shortfall (diamonds in A–C) and the shortfall accounted for by the factors (bars in A–C). Total does not include trade tax revenue shortfall.

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

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

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

Contributions to South Asia's revenue shortfalls. When jointly included in the estimation, the country characteristics just considered account for up to one-third of the overall tax revenue shortfalls in all South Asian countries except Nepal, where they account for four-fifths (figures 2.7A–C).

- ***Bangladesh, Bhutan, Pakistan and Sri Lanka.*** Among these four countries with above-average tax revenue shortfalls, the country characteristics account for one-quarter of the overall shortfalls in Bangladesh and Bhutan and one-third in Pakistan and Sri Lanka. In particular, widespread informality and lack of financial development account for one-half, one-third, and one-quarter of the shortfall in personal income tax revenues in Bhutan, Pakistan, and Sri Lanka, respectively. A large agriculture sector and lack of financial development together account for one-half of the shortfall in corporate income tax revenues in Bangladesh, Pakistan and Sri Lanka, as well as one-third of the shortfall in consumption tax revenues in Pakistan and Sri Lanka. But even after controlling for these country

characteristics, the four countries still have tax gaps that are larger than the EMDE average (figure 2.7D).

- ***India.*** Offsetting the benefit of a more developed financial sector, a large agriculture sector may account for one-half of the shortfall in corporate income tax revenue in India. After accounting for country characteristics, India's overall tax gap remains below the average for the full EMDE sample.
- ***Maldives and Nepal.*** A lack of financial development accounts for one-quarter of Maldives' shortfall in personal income tax revenue. Nepal's high informality—highest in the region besides Afghanistan—and lack of financial development—one of the lowest in the region—together account for three-quarters of its shortfall in personal income tax revenue, while its larger agriculture sector—highest in the region besides Afghanistan—and lack of financial development together account for all of its shortfall in consumption tax revenue. Taking these characteristics into account reduces Nepal's already-low overall tax revenue shortfall to close to zero.

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

Policy options

South Asia's revenues could be raised by tax policy measures that eliminate exemptions, and unify, simplify, and harmonize tax rates. A broadening of direct tax bases could also increase the progressivity of tax systems. Experience from other countries suggests that steps to strengthen tax administration—particularly to facilitate enforcement and improve incentives for tax officials—can boost tax collection. In addition, pollution pricing could help address two of South Asia's critical challenges: not only some of the lowest revenue-to-GDP ratios in the world but also the world's worst air pollution.

Tax policy

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

Rationalizing exemptions. An unusually large share of South Asian income earners is exempt from personal income taxation. But exemptions are also pervasive for other taxes (figure 2.8). Exemptions make tax evasion easier and encourage informal activity. In all South Asian countries, the rationalization of tax exemptions—while preserving structural reliefs for lower-income households—is therefore a priority (FBR 2024; IMF 2023, 2024a, 2024b, 2024c; NBR 2024; World Bank 2021, 2023a, 2023b, 2025b).

Simplifying, harmonizing, and unifying tax regimes. The elimination of exemptions can be part of a broader strategy to simplify, harmonize, and unify the tax regime. Such streamlining could reduce incentives to operate in the informal sector and help both compliance and enforcement in South Asia (IMF 2023, 2024a; World Bank 2023a, 2023b, 2024c).

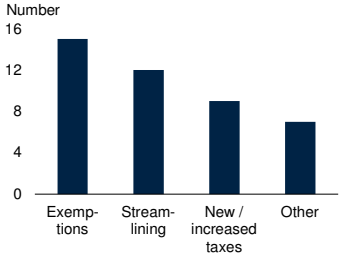
Presumptive taxation and withholding taxes. Presumptive taxation, which is based on expected income, could increase revenues in economies with widespread informality and large agriculture sectors dominated by small farm holdings, because it would lower compliance cost. Withholding taxes could simplify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

Tax progressivity. Progressive taxation, which entails levying higher tax rates on higher-income groups, can serve redistributive purposes. It also increases the acceptance of revenue mobilization

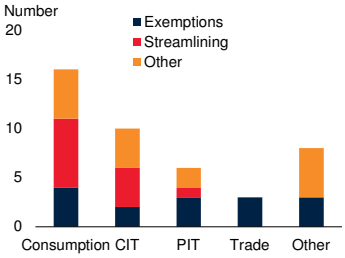
FIGURE 2.8 Tax reform priorities for South Asia

The most commonly recommended revenue reforms for South Asia are the removal of exemptions and the streamlining of taxes, especially in consumption taxes. In most South Asian countries, the threshold below which personal incomes are exempt from taxation is in the top quartile of EMDEs. For personal income taxpayers that are not exempt, Pakistan's wider-than-median range of personal income tax rates and wider-than-median range of personal income tax thresholds are consistent with a highly progressive tax system.

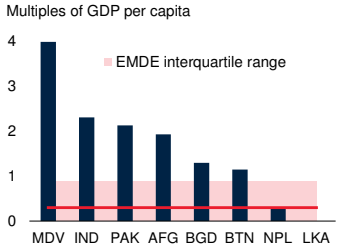
A. Recommendations for tax reform, by measure



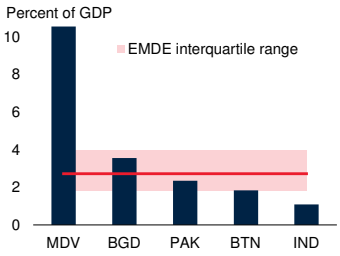
B. Recommendations for tax reform, by tax and measure



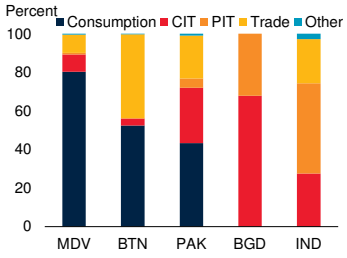
C. Income threshold for lowest personal income tax bracket, latest



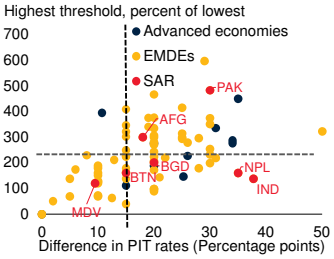
D. Revenues forgone due to exemptions and preferential tax treatments, 2021–23



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



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



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

Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; CIT = corporate income tax; EMDE = emerging market and developing economy; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan; PIT = personal income tax.

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

A. "Other" includes new or increased taxes, tax administration improvements, and measures not elsewhere classified.

B. "Consumption" includes VAT, goods and services taxes, sales taxes, and excise taxes. On the horizontal axis, "Other" includes measures that refer to several types of taxes. In the legend, "Other" comprises new or increased taxes, tax administration improvements, and measures not elsewhere classified.

C.F. Data are from 2022 or from 2021 if 2022 data are unavailable.

C. Red-shaded area shows interquartile range for 106 other EMDEs.

D. Red-shaded area shows interquartile range for 53 other EMDEs.

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

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

and tax morality among lower-income groups. Most EMDEs, including those in South Asia, rely more than advanced economies on indirect tax revenues, so that their tax systems are less progressive (Bachas, Jensen, and Gadenne 2024; Bergolo et al. 2023). Lower-income groups could be protected by shifting the base of revenue collection from indirect to direct taxes, or by increasing the progressivity of direct or indirect taxes (Lustig 2022).

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

Tax progressivity: Direct taxes. Policies that broaden the tax base can help shift tax revenue from indirect to direct taxes. Increasing tax rates on higher incomes and adjusting thresholds for income tax brackets can increase the progressivity of direct taxes. *Pakistan*, for example, ranks among the EMDEs with the widest range of tax rates and the widest range of income thresholds across personal income tax brackets, which makes its income tax regime relatively progressive (figure 2.8D). Income taxes can also be made more progressive by removing exemptions for high-income groups and raising the income bracket of the highest tax rate so that the highest-income groups are taxed at higher effective rates.

Taxing high-net-worth individuals: Potential. South Asia is home to 7 percent of the world's billionaires (Forbes 2024). In 2020, for example, almost 10 percent of Dubai's real estate was owned by investors from South Asia (Alstadsæter et al. 2022). On average, the effective rate on the wealth of global billionaires is below 0.5 percent (Alstadsæter et al. 2024). More taxation of wealth or real estate taxation could, in principle, be an attractive option for raising revenues and increasing progressivity (World Bank 2024e; 2025c). In *India*, for example, it has been estimated that a tax of 2 percent on the net wealth

of the 167 wealthiest families in 2022 would have increased total revenues by 0.5 percentage points of GDP (Bharti et al. 2024).

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

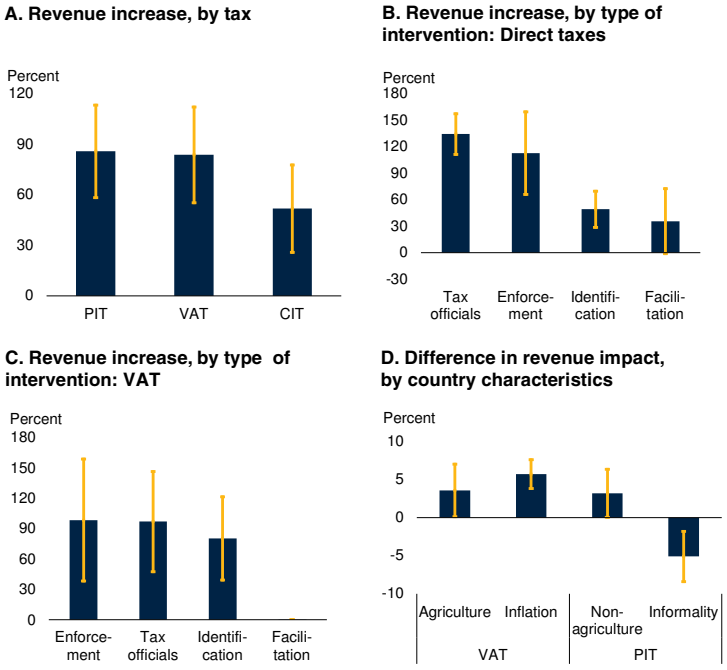
Taxing multinational corporations. Global tax reform as spearheaded by the OECD could have benefited South Asia. For South Asia, average net revenues from taxation of multinational corporations in line with the proposed "Multilateral Convention to Implement Amount A of Pillar One" have been estimated to amount to 1.8–2.6 percent of 2025 corporate income tax revenues (Barake and Le Pouhaër 2024). That said, the presence of multinational corporations in South Asia is limited: in 2023, net FDI inflows accounted for only 0.8 percent of GDP in South Asia, compared with about 1.5 percent of GDP in other EMDEs (UNCTAD 2024). Yet, *India* is estimated to have lost 5 percent of corporate income tax revenues in 2021 from the shifting of profits of multinational corporations into tax havens (Tørsløv, Wier, and Zucman 2023).

Tax administration

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

FIGURE 2.9 Revenue increases following policy reforms: Estimates from the literature

Interventions to improve tax administration have been particularly effective for VAT and personal income tax (especially where agriculture was relatively small, and informality limited). Tightened enforcement and stronger incentives or better deployment of tax officials have been more effective than facilitation of collection or better identification of taxpayers.



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

Note: CIT = corporate income tax; PIT = personal income tax; VAT = value-added tax. Direct taxes comprise CIT and PIT. The results of the meta-regression analysis shown here are based on estimated revenue impacts and the standard errors of these estimates from a range of studies. The studies varied widely in their design such that the scale of interventions cannot be compared.

A.–C. Blue bars indicate average revenue impact of 87 interventions in 17 countries, estimated in 26 studies. Yellow whiskers indicate 95 percent confidence intervals.

D. The correlation between estimated revenue impact and country characteristics at the start of implementation of the intervention that is under consideration. For VAT, "agriculture" indicates share of agriculture in value added and "inflation" indicates average annual inflation. For PIT, "non-agriculture" indicates the share of employment outside agriculture and "informality" indicates share of informal-sector output in GDP as estimated in the dynamic general equilibrium model of Elgin et al. (2021). Blue bars are the estimated coefficient of a cross-study regression of the estimated revenue impact on the country characteristic. Yellow whiskers are the 95 percent confidence intervals

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

Tax target. The highest average revenue gains were from interventions aimed at raising VAT or personal income tax revenues: on average in these cases, revenues rose by about 80 percent (figure 2.9A). The studies examined four types of interventions: strengthening the incentives or deployment of tax officials, improving taxpayer identification and fraud detection by using third-party data, and facilitating more rigorous collection. The effectiveness of interventions differed by type of intervention and by country characteristics.

Type of intervention. The largest revenue increases were achieved with two types of inventions: strengthening enforcement, and strengthening the incentives or deployment of tax officials (figures 2.9B, C).

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

- ***Incentives and deployment of tax officials.*** In Pakistan's Punjab, a scheme of merit-based re-assignment of tax officials significantly raised revenues (Khan, Khwaja, and Olken 2019). In Indonesia, a large reform of corporate tax administration, which increased the number of tax officials per taxpayer, almost tripled the related tax revenues (Basri et al. 2021). In Peru, revenues were increased by enforcement actions that targeted administrative effort toward the greatest expected revenue collection (Del Carpio, Kapon, and Chassang 2022). In the Democratic Republic of Congo, replacing tax collectors in the bottom quartile of enforcement performance raised revenues by almost half; involving village chiefs raised revenues further (Balán et al. 2022; Bergeron, Tourek, and Weigel 2023).

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

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

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

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

The potential of digital technologies

Digital technologies can help identify taxpayers, strengthen reporting, and facilitate collection (Okunogbe and Santoro 2023).

Identifying taxpayers. Biometric national identification cards such as India's "Aardhar Card", Kenya's "Huduma Namba" national ID, and Ghana's "Ghana Card" allow tax authorities to identify potential taxpayers and integrate different systems, for example customs and VAT data. However, identification alone may not raise revenues unless it is accompanied by strengthened enforcement and sanctions, as recent experience in Liberia has shown (Okunogbe 2021).

Strengthening reporting. Digital technologies can improve reporting. For example, in Ethiopia, the rollout of cash registers that automatically recorded and transmitted transactions increased VAT revenues by almost one-half. In China, a shift to electronic receipts raised VAT revenues (Fan et al. 2023).

Strengthening fraud detection. Digital reporting and risk assessment can help detect fraud by cross-checking with third-party data. In Pakistan, for example, the introduction of electronic VAT filing and computerized risk analysis reduced refund claims by one-half and led to the detection of a significantly larger number of fraudulent claims than had manual assessments (Shah 2023).

Facilitating collection from electronic transactions. Electronic transactions can readily be taxed through digital means. In Costa Rica, credit card companies withhold sales tax (Brockmeyer and Hernandez 2016). Ghana, Tanzania, and Uganda levy taxes on mobile money transactions.

The potential of pollution pricing

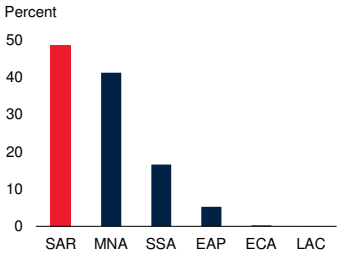
Because of its exceptionally high pollution levels, and the concentration of its population in the most polluted area—the Indo-Gangetic Plain and Himalayan Foothills—South Asia could benefit substantially from pollution pricing. This could take the form of pollution taxation or pollution trading, which are both increasingly being introduced around the globe, typically in the context of carbon emissions but also aimed at tackling air or water pollution. In 2022, 46 countries were pricing emissions, either in the form of pollution taxes or through emissions trading schemes (Black, Parry, and Zhunussova 2022; figure 2.10E). In 2023, carbon pricing instruments, for example, generated US$104 billion—0.7 percent of global tax revenue and more than five times what was generated from them in 2010 (World Bank 2024e).

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

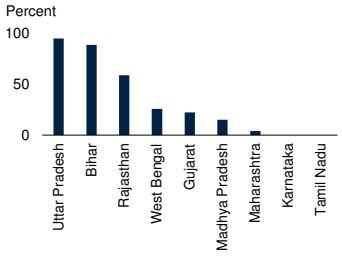
FIGURE 2.10 Pollution pricing

South Asia is the EMDE region with the highest air and water pollution, and it could benefit substantially from pollution pricing, which is increasingly common around the world. It can be implemented through either pollution taxation or pollution trading schemes, which have been raising a growing share of revenues.

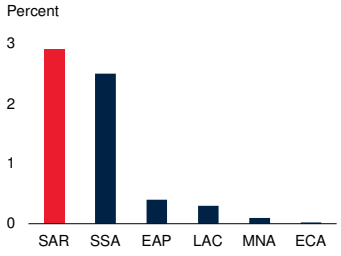
A. Population share exposed to over 50µg/m3 of PM2.5 in the air, 2022



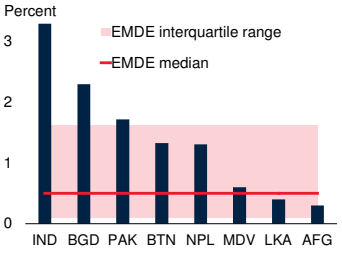
B. Population share exposed to over 50µg/m3 of PM2.5 in the air, 2022



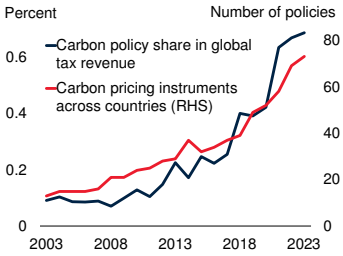
C. Deaths due to unsafe water sources, 2021



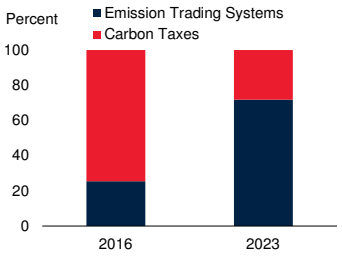
D. Deaths due to unsafe water sources, 2021



E. Global carbon pricing and government revenues



F. Shares of revenues from global carbon pricing by instrument



Sources: Institute for Health Metrics and Evaluation Global Burden of Disease (database); V6.GL.02.02 (database); World Bank State and Trends of Carbon Pricing Dashboard (database); World Bank.

Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; EAP = East Asia and the Pacific; ECA = Europea and Central Asia; EMDEs = emerging market and developing economies; IND = India; LAC = Latin America and the Caribbean; LKA = Sri Lanka; MDV = Maldives; MNA = Middle East and North Africa; NPL = Nepal; PAK = Pakistan; SAR = South Asia. SSA = Sub-Saharan Africa. Regional aggregates are population-weighted averages.

A.B. PM2.5 pollution refers to the amount of dust or soot particles in the air that measure 2.5 microns or less in width.

B. For brevity, the figure only shows air quality data for Indian states with population larger than 60 million in 2022.

C.D. Share of total age-standardized deaths that are attributed to unsafe water sources. Red-shaded area shows the interquartile range for 144 EMDEs.

E. Annual sum of nominal government revenue collected by each jurisdiction (central and sub-national) worldwide through emissions trading systems and carbon taxes. Number of carbon pricing instruments in place is the annual count of these measures. Tax revenue and GDP numbers underlying the global share are in nominal US dollars.

F. Classification of carbon pricing policies by instrument follows World Bank (2024f).

exposed to hazardous air pollution and the share is above 70 percent in six other predominantly northern Indian states (figure 2.10A, B). The poor are disproportionately affected, because they are less able to afford mitigation measures, such as migrating to less polluted areas, or healthcare treatments (Damania et al. 2023).

Water pollution. South Asia is also the EMDE region with the most polluted water. In 2021, 2.9 percent of deaths in the region were attributed to unsafe water sources. In six of South Asia's eight countries, water is less safe than the average level in other EMDEs. Water pollution is highest in India, Bangladesh, and Pakistan, all three of which rank in the quartile of EMDEs with the most polluted water (figures 2.10C, D).

Pollution taxes: Air pollution. In 1991, Sweden was among the first countries to introduce a carbon tax and it imposes one of the highest carbon tax rates worldwide. The tax generated about 1 percent of total tax revenues in 2022 and is estimated to have lowered emissions by 30 percent between 1991 and 2015 (Martinsson et al. 2024; World Bank 2023c). Among EMDEs, 11 countries have introduced carbon taxes to disincentivize polluting activities.[2] In 2014, for example, *Mexico* implemented a national carbon upstream excise tax, which is collected from producers and importers on a monthly basis and capped at 3 percent of a product's sales price. In 2023, this pollution tax generated 0.2 percent of total tax revenue (US$437 million). Carbon taxes have also been put in place in *South Africa* (0.1 percent of total tax revenue, or US$127 million, in 2023), Argentina (0.1 percent, or US$198 million), *Colombia* (0.2 percent, or US$124 million), and *Uruguay* (1.3 percent, or US$275 million) (World Bank 2024e). In South Asia, a gradually implemented, moderate carbon tax might raise government revenues by about 1.3 percentage points of GDP, on average, by 2030 (Mercer-Blackman, Milivojevic, and Mylonas 2024).

Pollution taxes: Water pollution. Taxes have also been put in place for water pollution. Among EMDEs, examples include rapidly rising levies in *China* for the three pollutants that most exceed standards; an environmental tax for chemical oxygen demand (dubbed "COD") emissions in

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

China's Jiangsu Province; and fees for residual pollution after wastewater treatment in *Colombia* and *Malaysia* (Olmstead and Zheng 2021). These schemes have been shown to significantly lower water pollution—by about 40 percent in Jiangsu, *China* between 2009 and 2011 (He and Zhang 2018); by 27–45 percent in *Colombia* between 1993 and 2005 (Blackman 2006); and by more than 70 percent in Malaysia between 1978 and 1991 (Kathuria 2006). However, their revenue impacts have not been rigorously assessed.

Pollution markets. Pollution markets price pollution through the trading of a limited number of pollution allowances issued by the government for each compliance period (Coase 1960). Markets for emission certificates have been introduced in the European Union and the United States, and are generally considered effective and efficient in reducing air pollution (Dechezleprêtre, Nachtigall, and Venmans 2023; Martin, Muûls, and Wagner 2016). In EMDEs, they are still rare and there are no water pollution trading schemes. Surat in *India's* state of Gujarat introduced the world's first emissions market for particulate matter in 2019. *China's* Guangdong province launched a carbon market for 200 industrial companies in 2013. The results have been as follows.

- ***Pollution reduction.*** The Gujarat scheme lowered pollution by 20–30 percent between 2019 and 2021, while the Guangdong scheme lowered pollution by 17 percent between 2011 (in anticipation of the scheme) and 2016 (Greenstone et al. 2025; World Bank 2024e; Zhu et al. 2022).

- ***Revenue generation.*** The license auctions for these pollution trading schemes have also raised revenues, amounting to 0.7 percent of state revenues in Guangdong in 2022 (World Bank 2024e). In Gujarat, revenues from auctioning 20 percent of pollution permits have so far been used to cover direct administrative costs and are therefore not separately reported as state revenues. Globally, there has been a shift since about 2016 toward allocating licenses using auctions. As a result, the vast majority of global government revenues from carbon pricing now comes from pollution markets (figure 2.10F).

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

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

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

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

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

Annex 2.1 Literature review: Tax buoyancies

The responsiveness of revenues to changes in tax bases in Bangladesh and India is comparable to that in other emerging market and developing economies (EMDEs); in Nepal responsiveness is in the top quartile of EMDEs, and in Pakistan it is in the bottom quartile. Policy priorities include taxation of under-taxed activities with above-average economic growth, and a broad-based expansion of tax bases.

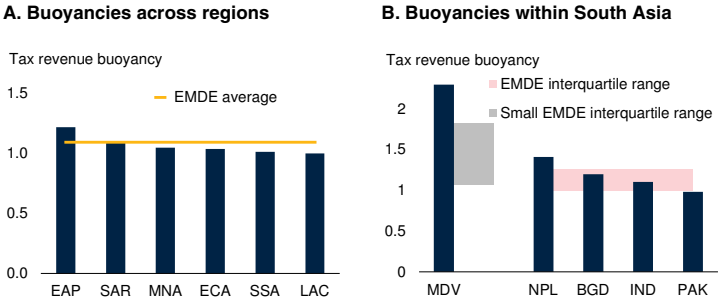
Tax buoyancy. South Asia's low revenue-to-GDP ratios could reflect small tax bases or a lack of responsiveness of revenues to the region's rapidly growing tax base. The responsiveness of revenues to the tax base is captured by a country's "tax revenue buoyancy," measured as the ratio of changes in tax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

Literature review: Estimates of tax buoyancies. A large body of literature has estimated tax revenue buoyancies for specific countries or country groups, including South Asian countries. A systematic review of the literature finds 55 studies that have estimated country-level revenue buoyancies from 1977 until 2019. These studies cover 148 economies, including 112 EMDEs and five countries from South Asia. By construction, robust tax revenue buoyancy estimates are time-invariant across the underlying time period. The meta-analysis therefore presents a purely cross-sectional comparison of recent tax revenue buoyancies and abstracts from possible changes within countries over time. For countries that are covered by multiple studies, estimates are selected from the study with the longest and most recent period; studies published in peer-reviewed journals are selected over other studies (annex table A2.1).

Revenue buoyancies in South Asia. In Bangladesh and India, tax buoyancies are broadly in line with those of other EMDEs, whereas Nepal's tax buoyancy ranks in the top quartile of EMDEs and Pakistan's in the bottom quartile (figure A2.1.1). On average, South Asia's tax revenue buoyancy is around one, indicating that tax revenues grow proportionally to changes in tax bases, as they do in the average EMDE.

FIGURE A2.1.1 Literature review: Tax revenue buoyancies

South Asia's tax revenue buoyancy is close to the EMDE average and around one, indicating that tax revenues respond broadly proportionately to changes in the tax base. Within South Asia, Nepal has a revenue buoyancy in the top EMDE quartile (well above one), and Pakistan in the bottom EMDE quartile (well below one).



Sources: Dudine and Jalles (2018); Gupta, Jalles, and Liu (2022); Khadan (2020); Lagravinese, Liberati, and Sacchi (2020); World Bank; supplemented with buoyancy estimates from various country-specific studies (see annex table A2.2.1 for full list).
Note: BGD = Bangladesh; BTN = Bhutan; EAP = East Asia and the Pacific; ECA = Europe and Central Asia; EMDE = emerging market and developing economy; IND = India; LAC = Latin America and the Caribbean; LKA = Sri Lanka; MDV = Maldives; MNA = Middle East and North Africa; NPL = Nepal. PAK = Pakistan; SAR = South Asia; SSA = Sub-Saharan Africa.
A. Sample comprises 148 countries, including 112 EMDEs. Aggregation uses nominal GDP as weights.
B. Red shades denote interquartile ranges across 107 other EMDEs. Gray shades denote interquartile ranges across 24 small state EMDEs.

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

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

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

Annex 2.2 Methodology: Stochastic Frontier Analysis

The empirical analysis proceeds in two steps, both involving a stochastic frontier analysis estimation of tax revenue, as in Garg, Goyal, and Pal (2017), Hutton (2017), and World Bank (2025a). In the first step, the "tax revenue shortfall" is estimated as the deviation of actual tax revenue from the potential—obtained from the estimation using only tax rates and potential tax bases as the independent variables. In the second step, the estimation is augmented by country characteristics, and the "tax gap" is calculated as the deviation of actual tax revenue from the potential obtained from the estimation based on tax rates, potential tax bases, and country characteristics.

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

Step 1: Tax revenue shortfalls

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

Estimation model. Following the SFA model, a production function of revenue is modeled that transforms inputs, tax rates and potential tax base, into tax revenues.

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

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

To estimate the production function above, take natural logarithm

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

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

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

Rewriting as an econometric model

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

where the lower-case letter denotes the logarithmic of the corresponding upper-case letter, and $u_{it} = -\ln(E_{it})$ denotes the individual-level inefficiency to be estimated and is assumed to follow a half (positive) normal distribution.

A country's tax potential is then obtained as the ratio between actual tax revenue and the estimated efficiency score E_{it} (between 0 and 1). Tax revenue shortfall is then defined as the difference between tax potential and actual tax revenue.

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

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

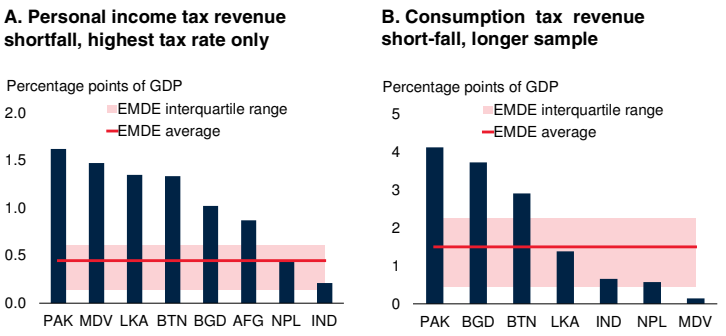
Tax rates. For personal income tax rates, for which data are available for the highest and lowest rates, the average of highest and lowest tax rates is used as baseline. Data on tax rates are from Vegh and Vuletin (2015), supplemented using the USAID *Collecting Taxes* Database, and World Bank data.

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

Robustness. Robustness checks are conducted using alternative tax rates or samples. For personal income tax rates, the robustness test includes only the highest tax rate (figure A2.2.1A). For consumption tax revenue, a longer time series is available than for the baseline sample, starting in 1989, and is used as robustness check (figure A2.2.1B).

FIGURE A2.2.1 Robustness checks on tax revenue shortfalls

One robustness check uses only the highest personal income tax rate. One robustness check uses a longer sample of consumption tax revenue. Both yield similar results to the baselines.



Sources: Haver Analytics; IMF Government Finance Statistics; International Labour Organization; UNU-WIDER; USAID Collecting Taxes Database; Vegh and Vuletin (2015); World Development Indicators (database); World Bank Fiscal Survey; World Bank World Integrated Trade Solution Database; World Bank. Annex table A2.7 lists data sources for each variable used.

Note: AFG = Afghanistan; BGD = Bangladesh; BTN = Bhutan; IND = India; LKA = Sri Lanka; MDV = Maldives; NPL = Nepal; PAK = Pakistan; EMDE = emerging market and developing economy. Tax revenue shortfall is the difference between potential and actual tax revenues. Potential tax revenues are obtained as the ratio of actual tax revenue and the efficiency score derived from stochastic frontier analysis with tax rate and potential tax base. Values shown are the average of 2020 to the most recent period. For Pakistan, shortfalls of personal income tax revenue (A) are the average since 2015. The shaded region is the inter-quartile range of shortfall among all EMDEs.

A. Personal income tax rate is the highest tax rate. Potential tax base for personal income tax revenue is labor income (as a percent of GDP). Estimation results are in column (1.1) of annex table A2.2.

B. Potential tax base for consumption tax revenue is consumption (as a percent of GDP). Sample includes observations during 1989–2023. Estimation results are in column (1.1) of annex table A2.4.

Step 2: Tax gaps

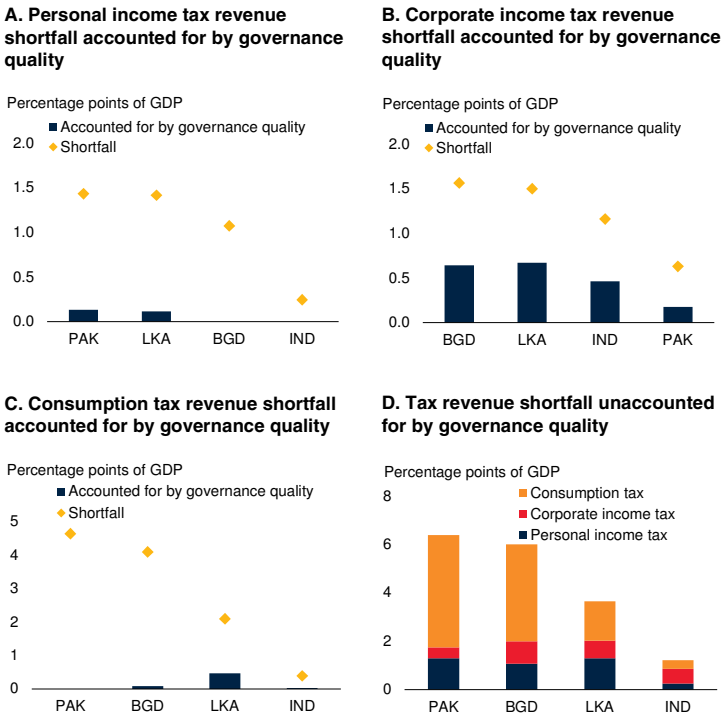
Estimation model. The same stochastic frontier specification is now augmented by country characteristics, to estimate the degree to which tax revenue shortfalls shrink once economic structure is controlled for.

The dependent variable is again tax revenues (as a percent of GDP), as in step 1. The independent variables include tax rates (in percent), potential tax bases (as a percent of GDP), and country characteristics. As before, all variables are defined in logarithmic terms.

Country characteristics. The following country characteristics are included: the size of the informal sector and the size of the agriculture

FIGURE A2.2.2 Robustness check for governance quality

Robustness check including governance quality in the second step estimation.



Sources: Haver Analytics; IMF Financial Development Index (database); IMF Government Finance Statistics; International Labour Organization; UNU-WIDER; USAID Collecting Taxes Database; Vegh and Vuletin (2015); World Development Indicators (database); World Bank Fiscal Survey; World Bank World Integrated Trade Solution Database; World Bank. Annex table A2.7 lists data sources for each variable used.

Note: BGD = Bangladesh; IND = India; LKA = Sri Lanka; PAK = Pakistan. Yellow diamond ("Shortfall") is the difference between potential (based on tax rate and potential tax base) and actual tax revenues, the same as shown in figure 2.6. The bars show the difference between the potential tax revenue (based on tax rate and potential tax base) and the potential tax revenue estimated using stochastic frontier analysis based on tax rate, potential tax base, and a governance quality score constructed as the scaled average of the ICRG bureaucracy quality and corruption scores. Values shown are the average of 2020 to the most recent period. For Pakistan, shortfalls of personal and corporate income tax revenues (A–B) are the average since 2015. Estimation results are in annex table A2.6.

D. Tax revenue gap is the unexplained part of the revenue shortfall, calculated as the difference between the revenue shortfall (diamonds in A–C) and the shortfall accounted for by the factors (bars in A–C). Total does not include trade tax revenue shortfall.

sector as a proxy for the size of the economy that is hard to tax; financial development as a proxy for enforcement capacity; and the size of the agriculture sector also to proxy for exemptions from consumption taxes.[6] Annex table A2.2.7 lists data sources and definitions for the variables used.

Sample. In this second step, Afghanistan is excluded because many of the correlate variables are not available for the country and insufficient data are available to account for the structural shift that occurred with the change in government in August 2021. Data availability further restricts the sample to 104 EMDEs for 2000–23. The specific estimation sample period varies slightly for each specification, as indicated in annex tables 2.2.2–5.

Robustness: Governance. Poor governance or weak institutions, such as reflected in the presence of tax evasion and corruption of tax officials, can undermine tax collection efforts (Ajaz and Ahmad 2010; Besley and Persson 2014; Nichelatti and Hiilamo 2024). Using the average (scaled to 0 to 1) of the bureaucracy quality and corruption scores from the International Country Risk Guide (ICRG) to proxy for the quality of governance, annex table A2.2.6 shows that better governance is correlated with higher personal income, corporate income, and consumption tax revenues. The ICRG score is available for four South Asian countries—Bangladesh, India, Pakistan, and Sri Lanka. For those four countries, governance quality accounts for up to 10 percent (Pakistan and Sri Lanka) of the personal income tax revenue shortfall, up to one-half (Bangladesh and Sri Lanka) of the corporate income tax revenue shortfall, and up to one-quarter (Sri Lanka) of the consumption tax revenue shortfall (figure A2.2.2). Because poor governance tends to correlate strongly with other control variables, we do not include it together with the rest of the country characteristics.

Robustness: Sample. Estimates obtained using the SFA approach are sensitive to sample size. For this reason, robustness exercises are conducted that use the same smaller sample from the second step in the first step. These estimation results are listed in annex table A2.2.2 column (1.2), annex table A2.2.3 column (1.1), and annex table A2.2.4 column (1.2), and are quantitatively similar to the baseline results.

Robustness: Laffer curve. A robustness specification is conducted for each tax revenue category that includes the squared (logged) tax rate to capture possible non-monotonic relationship between tax rate and tax revenue collection. By

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

including the squared (logged) tax rate, the model could capture the curvature of a Laffer curve (Alba and McKnight 2022). Implicitly, a translog tax revenue production function is assumed for this step, which allows for interaction term of variables included in the X_{it} term (Coelli et al. 2005). Annex table A2.2.3 column (4.1), annex table A2.2.4 column (4.1), and annex table A2.2.5 column (3) report the second step results including the squared tax rate term for corporate income tax revenue, consumption tax revenue, and trade tax revenue, respectively.

This specification is not reported for personal income tax revenue because the estimation does not converge. The squared term is negative and statistically significant for consumption and trade tax revenues, suggesting that tax revenues do eventually decline when tax rates become too high. None of the South Asian countries falls on the declining portion of the implied Laffer curve for consumption or trade tax revenue. This implies that tax or tariff cuts would indeed lower revenue collection in South Asian countries. Any such cuts would therefore need to be embedded in broader reform to safeguard revenues.

ANNEX TABLE A2.1 Tax revenue buoyancies from the literature

Country	Period	Reference	Buoyancy
Algeria	1980–2014	Dudine and Jalles (2018)	1.21
Angola	1980–2017	Gupta, Jalles, and Liu (2022)	1.10
Antigua and Barbuda	1993–2017	Khadan (2020)	1.37
Argentina	1980–2014	Dudine and Jalles (2018)	1.14
Aruba	1993–2017	Khadan (2020)	0.87
Australia	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.90
Austria	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.93
Azerbaijan	1980–2014	Dudine and Jalles (2018)	0.98
Bahamas, The	1993–2017	Khadan (2020)	2.40
Bangladesh	1980–2014	Dudine and Jalles (2018)	1.20
Barbados	1990–2019	Ochieng and Mamingi (2022)	1.07
Belarus	1980–2014	Dudine and Jalles (2018)	0.75
Belgium	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.92
Belize	1993–2017	Khadan (2020)	1.20
Benin	1980–2017	Gupta, Jalles, and Liu (2022)	1.18
Bolivia	1980–2014	Dudine and Jalles (2018)	1.28
Botswana	1982–2001	Botlhole and Agiobenebo (2006)	1.98
Brazil	1980–2014	Dudine and Jalles (2018)	0.98
Bulgaria	1999–2017	Tanchev and Todorov (2019)	0.89
Burkina Faso	1980–2017	Gupta, Jalles, and Liu (2022)	1.29
Burundi	1980–2017	Gupta, Jalles, and Liu (2022)	0.99
Cabo Verde	1980–2017	Gupta, Jalles, and Liu (2022)	1.20
Cameroon	1980–2017	Gupta, Jalles, and Liu (2022)	1.25
Canada	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.92
Central African Republic	1980–2017	Gupta, Jalles, and Liu (2022)	0.68
Chad	1980–2017	Gupta, Jalles, and Liu (2022)	1.40
Chile	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.66
China	1980–2014	Dudine and Jalles (2018)	1.24
Colombia	1980–2014	Dudine and Jalles (2018)	1.25
Comoros	1980–2017	Gupta, Jalles, and Liu (2022)	1.07
Congo, Dem. Rep	1980–2017	Gupta, Jalles, and Liu (2022)	0.99
Congo, Rep	1980–2014	Dudine and Jalles (2018)	1.09
Côte d'Ivoire	1980–2014	Dudine and Jalles (2018)	1.04
Croatia	1980–2014	Dudine and Jalles (2018)	1.03
Cyprus	1980–2014	Dudine and Jalles (2018)	1.45
Czechia	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.82
Denmark	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	1.01
Djibouti	1993–2017	Khadan (2020)	0.39
Dominica	1993–2017	Khadan (2020)	1.51
Dominican Republic	1980–2014	Dudine and Jalles (2018)	1.07
Ecuador	1980–2014	Dudine and Jalles (2018)	1.38
Egypt, Arab Rep.	1980–2014	Dudine and Jalles (2018)	0.97
Equatorial Guinea	1980–2017	Gupta, Jalles, and Liu (2022)	0.90

ANNEX TABLE A2.1 Tax revenue buoyancies from the literature (*continued*)

Country	Period	Reference	Buoyancy
Estonia	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.72
Eswatini	1993–2017	Khadan (2020)	1.58
Ethiopia	1980–2014	Dudine and Jalles (2018)	1.32
Fiji	1993–2017	Khadan (2020)	1.82
Finland	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.91
France	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.93
Gabon	1980–2017	Gupta, Jalles, and Liu (2022)	0.85
Germany	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.91
Ghana	1980–2017	Gupta, Jalles, and Liu (2022)	1.16
Greece	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.81
Grenada	1993–2017	Khadan (2020)	1.20
Guinea	1980–2014	Dudine and Jalles (2018)	1.23
Guinea–Bissau	1980–2017	Gupta, Jalles, and Liu (2022)	1.10
Guyana	1993–2017	Khadan (2020)	2.32
Haiti	1980–2014	Dudine and Jalles (2018)	1.30
Honduras	1980–2014	Dudine and Jalles (2018)	1.03
Hungary	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.85
Iceland	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.65
India	1980–2014	Dudine and Jalles (2018)	1.10
Indonesia	1980–2014	Dudine and Jalles (2018)	1.11
Iran, Islamic Rep.	1980–2014	Dudine and Jalles (2018)	1.03
Ireland	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	1.05
Israel	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.88
Italy	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.93
Jamaica	1998–2010	Milwood (2011)	1.09
Japan	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.93
Kazakhstan	1980–2014	Dudine and Jalles (2018)	1.11
Kenya	1980–2017	Gupta, Jalles, and Liu (2022)	1.05
Kiribati	1993–2017	Khadan (2020)	0.72
Korea, Rep.	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.79
Kuwait	1980–2014	Dudine and Jalles (2018)	0.96
Kyrgyz Republic	1980–2014	Dudine and Jalles (2018)	1.18
Lao PDR	1980–2014	Dudine and Jalles (2018)	1.35
Latvia	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.84
Lesotho	1992–2015	Koatsa and Nchake (2017)	1.25
Libya	1980–2014	Dudine and Jalles (2018)	0.07
Luxembourg	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.89
Macao SAR, China	1993–2017	Khadan (2020)	1.65
Madagascar	1980–2017	Gupta, Jalles, and Liu (2022)	1.02
Maldives	1993–2017	Khadan (2020)	2.30
Mali	1980–2017	Gupta, Jalles, and Liu (2022)	1.23
Malta	1993–2017	Khadan (2020)	1.57
Mauritius	1980–2017	Gupta, Jalles, and Liu (2022)	0.99

ANNEX TABLE A2.1 Tax revenue buoyancies from the literature (*continued*)

Country	Period	Reference	Buoyancy
Mexico	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.90
Moldova	1980–2014	Dudine and Jalles (2018)	1.02
Montenegro	1993–2017	Khadan (2020)	2.18
Morocco	1980–2014	Dudine and Jalles (2018)	1.20
Mozambique	1980–2017	Gupta, Jalles, and Liu (2022)	1.09
Myanmar	1980–2014	Dudine and Jalles (2018)	1.36
Nepal	1980–2014	Dudine and Jalles (2018)	1.41
Netherlands	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.89
New Zealand	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.90
Nicaragua	1980–2014	Dudine and Jalles (2018)	1.22
Niger	1980–2017	Gupta, Jalles, and Liu (2022)	1.31
Nigeria	1980–2014	Dudine and Jalles (2018)	0.86
Norway	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.94
Oman	1980–2014	Dudine and Jalles (2018)	1.27
Pakistan	1979–2015	Shahzada et al. (2016)	0.98
Palau	1993–2017	Khadan (2020)	3.16
Papua New Guinea	1980–2014	Dudine and Jalles (2018)	1.12
Peru	1980–2014	Dudine and Jalles (2018)	1.14
Philippines	1980–2014	Dudine and Jalles (2018)	1.06
Poland	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.81
Portugal	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.84
Qatar	1980–2014	Dudine and Jalles (2018)	1.67
Romania	1980–2014	Dudine and Jalles (2018)	1.07
Russian Federation	1980–2014	Dudine and Jalles (2018)	1.11
Rwanda	1980–2017	Gupta, Jalles, and Liu (2022)	1.13
Samoa	1993–2017	Khadan (2020)	0.88
São Tomé and Principe	1993–2017	Khadan (2020)	0.73
Saudi Arabia	1980–2017	Gupta, Jalles, and Liu (2022)	0.80
Senegal	1980–2017	Gupta, Jalles, and Liu (2022)	1.16
Seychelles	1993–2017	Khadan (2020)	1.82
Sierra Leone	1977–2009	Kargbo and Egwaikhide (2012)	0.95
Singapore	1980–2014	Dudine and Jalles (2018)	0.84
Slovak Republic	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.81
Slovenia	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.86
Solomon Islands	1993–2017	Khadan (2020)	1.96
South Africa	1980–2014	Dudine and Jalles (2018)	1.07
Spain	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.85
St. Kitts and Nevis	1993–2017	Khadan (2020)	1.05
St. Lucia	1993–2017	Khadan (2020)	1.51
St. Vincent and the Grenadines	1993–2017	Khadan (2020)	1.15
Sudan	1980–2014	Dudine and Jalles (2018)	0.60
Suriname	1993–2017	Khadan (2020)	1.74
Sweden	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.95

ANNEX TABLE A2.1 Tax revenue buoyancies from the literature (*continued*)

Country	Period	Reference	Buoyancy
Switzerland	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.96
Tajikistan	1980–2014	Dudine and Jalles (2018)	1.13
Tanzania	1980–2014	Dudine and Jalles (2018)	1.19
Thailand	1980–2014	Dudine and Jalles (2018)	1.21
Tonga	1993–2017	Khadan (2020)	1.05
Türkiye	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	1.05
Uganda	1980–2017	Gupta, Jalles, and Liu (2022)	1.13
Ukraine	1980–2014	Dudine and Jalles (2018)	1.12
United Arab Emirates	1980–2014	Dudine and Jalles (2018)	1.35
United Kingdom	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.92
United States	1995–2016	Lagravinese, Liberati, and Sacchi (2020)	0.80
Uruguay	1980–2014	Dudine and Jalles (2018)	1.01
Uzbekistan	1980–2014	Dudine and Jalles (2018)	0.90
Vanuatu	1993–2017	Khadan (2020)	1.16
Venezuela, RB	1980–2014	Dudine and Jalles (2018)	1.04
Viet Nam	1980–2014	Dudine and Jalles (2018)	0.91
Yemen, Rep.	1980–2014	Dudine and Jalles (2018)	0.96
Zambia	1980–2017	Gupta, Jalles, and Liu (2022)	0.96
Zimbabwe	1980–2017	Gupta, Jalles, and Liu (2022)	1.07

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

ANNEX TABLE A2.2 Personal income tax revenue

	Dependent variable: Personal income tax revenue (% GDP), log					
Variables	(1)	(1.1)	(1.2)	(2)	(3)	(4)
Personal income tax rate, average of highest and lowest rates (%), log	**0.1885*** **		**0.2596*** **	**0.2331*** **	**0.2619*** **	**0.3384*** **
	[0.0654]		[0.0662]	[0.0671]	[0.0609]	[0.0631]
Personal income tax rate, highest rate (%), log		**0.1241** **				
		[0.0487]				
Potential tax base (labor income % GDP), log	**0.6706*** **	**0.6602*** **	**0.6208*** **	**0.6319*** **	**0.4411*** **	**0.3579** **
	[0.1470]	[0.1502]	[0.1350]	[0.1461]	[0.1383]	[0.1438]
Self-employment (% total employment), log				**-0.5959*** **		**-0.1137** **
				[0.0845]		[0.0480]
Financial development index, log					**0.7434*** **	**0.7242*** **
					[0.0393]	[0.0455]
Constant	-2.2883***	-2.1671***	-2.4070***	-0.1230	-0.4427	-0.2753
	[0.6100]	[0.6371]	[0.6100]	[0.5811]	[0.5542]	[0.6180]
Observations	1370	1437	1235	1365	1235	1235
Numbers of countries	111	113	104	111	104	104
Estimation sample period	2004–23	2004–23	2004–21	2004–23	2004–21	2004–21

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

ANNEX TABLE A2.3 Corporate income tax revenue

	Dependent variable: Corporate income tax revenue (% GDP), log					
Variables	(1)	(1.1)	(2)	(3)	(4)	(4.1)
Corporate income tax rate (%), log	**0.1626****	**0.1293****	**0.3151*****	**0.1801*****	**0.2535*****	**1.5251***
	[0.0709]	[0.0633]	[0.0701]	[0.0680]	[0.0676]	[0.8558]
Corporate income tax rate (%), log squared						-0.2131
						[0.1459]
Potential tax base (market capitalization % GDP), log	**0.0560*****	**0.0602*****	**0.0311***	**0.0384****	**0.0359****	**0.0322***
	[0.0174]	[0.0164]	[0.0166]	[0.0180]	[0.0147]	[0.0176]
Agriculture (% GDP), log			**-0.2587*****		**-0.0991****	**-0.1199****
			[0.0431]		[0.0401]	[0.0547]
Financial development index, log				**0.3435*****	**0.2779*****	**0.2527*****
				[0.0615]	[0.0651]	[0.0876]
Constant	0.5806**	0.7570**	0.4984**	0.8559***	0.8096***	-1.0510
	[0.2348]	[0.2087]	[0.2061]	[0.2141]	[0.2166]	[1.2527]
Observations	699	616	698	617	616	616
Numbers of countries	50	46	50	46	46	46
Estimation sample period	2000–22	2002–21	2000–22	2002–21	2002–21	2002–21

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets. Results estimated using Stochastic Frontier Analysis with true random effects model (Greene 2005). Sample includes EMDEs since 2000. Column (1.1) uses the same sample as column (4).

ANNEX TABLE A2.4 Consumption tax revenue

	Dependent variable: Consumption tax revenue (% GDP), log						
Variables	(1)	(1.1)	(1.2)	(2)	(3)	(4)	(4.1)
Consumption tax rate (%), log	**0.6418*****	**0.7317*****	**0.6475*****	**0.7620*****	**0.5663*****	**0.5476*****	**1.9017*****
	[0.1011]	[0.0363]	[0.0481]	[0.0411]	[0.0464]	[0.0350]	[0.2515]
Consumption tax rate (%), log squared							**-0.2734*****
							[0.0514]
Potential tax base (consumption % GDP), log	**0.3025*****	**0.0857****	**0.5763*****	**0.4984*****	**0.4538*****	**0.4936*****	**0.4537*****
	[0.0452]	[0.0427]	[0.0563]	[0.0469]	[0.0386]	[0.0506]	[0.0638]
Agriculture (% GDP), log				**-0.1400*****		**-0.0576****	**-0.0878*****
				[0.0199]		[0.0224]	[0.0205]
Financial development index, log					**0.3970*****	**0.3199*****	**0.3729*****
					[0.0272]	[0.0231]	[0.0263]
Constant	-0.8738**	-0.2619	-2.0789**	-1.9014***	-0.7456***	-0.2118	-1.6721***
	[0.4138]	[0.1854]	[0.2407]	[0.1783]	[0.1980]	[0.2760]	[0.3937]
Observations	1913	2118	1483	1891	1673	1483	1483
Numbers of countries	114	114	101	114	109	101	101
Estimation sample period	2000–23	1989–23	2002–21	2000–23	2002–21	2002–21	2002–21

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets. Results estimated using Stochastic Frontier Analysis with true random effects model (Greene 2005). Total goods and services tax revenue includes revenues from goods and services taxes, sales taxes, value added tax, excise, and other taxes on consumption. Sample includes EMDEs since 2000, except column (1.1), which includes the full sample of EMDEs starting in 1989. Column (1.1) uses the same sample as column (4).

ANNEX TABLE A2.5 Trade tax revenue

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

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in brackets. Results estimated using Stochastic Frontier Analysis with true random effects model (Greene 2005).

ANNEX TABLE A2.6 Governance quality

Variables	(1) Personal income tax revenue (% GDP), log	(2) Corporate income tax revenue (% GDP), log	(3) Consumption tax revenue (% GDP), log
Personal income tax rate, average of highest and lowest rates (%), log	**0.1395***		
	[0.0721]		
Potential tax base (labor income % GDP), log	**0.1729***		
	[0.089]		
Corporate income tax rate (%), log		**0.1525** **	
		[0.0636]	
Potential tax base (market capitalization % GDP), log		**0.0431** **	
		[0.0167]	
Consumption tax rate (%), log			**0.7114*** **
			[0.0420]
Potential tax base (consumption % GDP), log			**0.3140*** **
			[0.0600]
Average bureaucracy quality and corruption scores (ICRG), log	**0.7643*** **	**0.2489** **	**0.0906** **
	[0.0888]	[0.1003]	[0.0384]
Constant	0.3571	0.8007***	-1.0774***
	[0.6826]	[0.2168]	[0.2508]
Observations	1010	608	1295
Numbers of countries	75	42	81
Estimation sample period	2004–23	2002–23	2002–23

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

ANNEX TABLE A2.7 Data sources of variables used in frontier analysis estimation analysis

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

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Policy views among economists in the region	Spring 2019, Box 9

Note: The *South Asia Development Update* was called *South Asia Economic Focus* through Spring 2023.

Growth prospects for South Asia are dimming. The global economic environment has become more challenging and is a source of heightened downside risks. After a decade of repeated disruptions, South Asia's buffers to cushion new shocks are slim. Tackling some of its greatest inefficiencies and vulnerabilities could help South Asia navigate this unusually uncertain outlook: unproductive agricultural sectors, pressures from rising global temperatures, and fragile fiscal positions. For most South Asian countries, increased revenue mobilization is a prerequisite for strengthening fiscal positions. Even taking into account the particular challenges of collecting taxes in South Asian economies—such as widespread informal economic activity and large agriculture sectors—South Asian economies face larger tax gaps than the average emerging market and developing economy. This suggests the need for improved tax policy and administration. Until fiscal positions have strengthened, the burden of climate adaptation will disproportionately fall on the private sector. If allowed sufficient flexibility, private sector adaptation could offset about one-third of the likely climate damage by 2050. This may, however, require governments to remove obstacles that prevent workers and firms from moving across locations and activities. As growth prospects dim, the challenge grows to create jobs for South Asia's rapidly expanding working-age population. South Asia's large diasporas could become a source of strength if their knowledge, networks, and other resources can be better tapped for investment and trade.

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