

Advance Edition

Fiscal Policy in Commodity Exporters

A Balancing Act



Fiscal Policy in Commodity Exporters: A Balancing Act provides a timely and compelling analysis of one of the most persistent challenges in economic policy:

how to transform volatile commodity revenues into stable and sustainable development. Combining rigorous cross-country evidence with practical policy guidance, the volume explains why fiscal procyclicality and volatility remain so difficult to overcome—and which institutions can make a difference. Its careful treatment of the energy transition makes the book especially valuable for countries confronting both new opportunities and profound fiscal risks. This will be an essential reference for researchers, policymakers, and anyone seeking to understand the economic consequences of commodity dependence.

Ugo Panizza

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Vice President, Centre for Economic Policy Research

Fiscal policy in many emerging market and developing economies tends to be procyclical and generates unnecessary business cycle volatility. But not all these economies face the same challenges, and finding the right policy recommendations requires a good understanding of the context in which fiscal policy is conducted. Commodity exporters are a large group of countries for which these perverse fiscal dynamics tend to be larger and are driven by distinct forces. This book provides a novel and thorough analysis of fiscal policy in commodity exporters. It produces a very large number of stylized facts about how fiscal policy is conducted in these economies and, more importantly, it translates that context into a series of policy recommendations. A must-read for anyone interested in fiscal policy in commodity-dependent economies.

Antonio Fatás

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Commodity-exporting developing economies live on a fiscal roller coaster: revenues surge in booms, collapse in slumps, and public spending too often amplifies the ride. Drawing on evidence from nearly a hundred commodity exporters, this volume documents why fiscal policy in these economies remains procyclical and volatile, quantifies the costs for growth, and shows how the energy transition is reshaping fiscal risks for oil and metal exporters alike. Its message is ultimately constructive: the boom-bust pattern can be broken; fiscal frameworks anchored in credible rules, savings funds, and bold institutions allow governments to smooth the cycle rather than amplify it. This book is an indispensable guide for policymakers and essential reading for anyone concerned with macroeconomic stability in the developing world.

Francesco Zanetti

Professor of Economics and David Richards Fellow of Wadham College,
University of Oxford

This excellent new book by the World Bank is a timely and fresh addition to the literature on how commodity exporting countries should manage the inherent volatility in their primary source of income. Successfully managing the ups and downs of the commodity price cycle is essential for long-term economic growth and poverty reduction. The book's focus on the costs of procyclical fiscal policy, the need to consider the energy transition and the growing demand for critical minerals in fiscal policy decisions, and the importance of strong institutions and frameworks in delivering sound fiscal policy outcomes are particularly important contributions.

Tim Callen

Visiting Fellow, Arab Gulf States Institute

This volume tracing the path of fiscal dynamics in commodity-dependent countries offers strong evidence that agriculturally dependent EMDEs suffering from boom-and-bust price cycles are hard-pressed to deal with the resulting economic consequences. Unfortunately, it is precisely these countries that are among the poorest, also facing governance challenges and low productivity. For this reason, the usual admonition of creating more fiscal space is often difficult to achieve. Given heightened global uncertainty, rising debt levels, and trade disruptions, the fiscal challenges have never been more acute. The World Bank has produced a commendable body of work, supported by rigorous analysis, and offering some valuable and practical suggestions for this group of vulnerable economies. This is a volume well worth reading.

Danny Leipziger

Professor of International Business and International Affairs,
George Washington University, and
Managing Director of the Growth Dialogue

Fiscal policy for commodity exports is key for good management of the resource revenues. And will be crucial for the critical minerals boom that are expected.

This book gives a very useful analysis of good fiscal policy management for developing countries. Much to be recommended for both policy makers and academics.

Rick van der Ploeg

Professor of Economics, University of Oxford,
and Research Director, Oxford Centre for Analysis of Resource Rich Economies

The problem with commodities is not that their prices fluctuate, but how governments respond to those fluctuations. This book shows that in commodity-exporting developing countries, fiscal policy remains stubbornly procyclical. Governments also rely more heavily on resource revenues than on taxation, while spending less on growth-enhancing investments. The result is a toxic combination of volatile public spending, slower growth, rising debt,

and too little economic diversification. This book shows that the resource curse is not inevitable. Fiscal institutions can “tie the government’s hands,” saving windfall revenues in good times and resisting the temptation to seize and spend the rents. These reforms are essential if the citizens of commodity-exporting countries are to benefit from their natural wealth. With the green-energy transition increasing the strategic importance of many commodities, the stakes have rarely been higher.

Shantayanan Devarajan

Professor of the Practice of International Development,
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This important study is essential reading for researchers and policymakers on how commodity price volatility affects the fiscal positions of emerging market and developing economy (EMDE) commodity exporters. A key contribution is to show how the fiscal and growth implications differ across EMDE commodity exporters by export type—energy, agriculture, or metals—both in the short term and over longer periods of structural transformation. Some policy recommendations are general to any commodity exporter, such as mitigating fiscal volatility, strengthening fiscal frameworks, and building sovereign wealth funds—but the menu of specific policy options varies substantially across countries.

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Fiscal Policy in Commodity Exporters



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Fiscal Policy in Commodity Exporters

A Balancing Act

Edited by Garima Vasishtha

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Foreword

To understand the economic fortunes of emerging market and developing economies (EMDEs) over the past quarter century, one must start with commodity markets. The 2000s brought a commodity supercycle and the fastest EMDE growth since the 1970s. The 2010s told a different story: commodity prices weakened after the 2009 global recession, and the oil price collapse of 2014–16 marked another turning point as EMDE growth lost momentum.

Then came the 2020s: turbulence on an entirely different scale. The COVID-19 pandemic, supply disruptions, Russia's invasion of Ukraine, a historic surge in inflation followed by sharply higher borrowing costs, elevated trade tensions, and conflict in the Middle East produced exceptionally large swings in commodity markets. As one shock after another buffeted the global economy, commodity-exporting EMDEs faced a difficult balancing act: meeting pressing resilience needs while preserving fiscal space for investment, jobs, and long-term development.

That last objective has become especially urgent. Around 1.2 billion young people in EMDEs are set to reach working age between 2025 and 2035. Creating productive jobs for this generation is a defining development challenge. For many commodity-exporting EMDEs, home to nearly half of this youth wave, sound fiscal management is therefore not simply about stabilizing budgets: it is also about creating the conditions for investment, growth, and jobs.

Fiscal positions in commodity-exporting EMDEs have moved closely with commodity market swings. During the boom of the 2000s, stronger revenues and rapid growth helped many exporters improve fiscal balances, reduce debt, and rebuild fiscal space. But those gains proved difficult to sustain. The 2010s brought persistent deficits as commodity revenues weakened, contributing to rapid debt buildup.

The 2020s introduced further strain through pandemic-related spending, weaker growth, and higher borrowing costs amid repeated shocks. By 2025, median government debt in commodity exporting EMDEs had nearly doubled from its 2010 level. Fiscal cushions are thinner today as demands on public resources have become greater.

And cyclical volatility is only part of the story. The energy transition and new technologies, including artificial intelligence, are transforming production, investment, and demand for raw materials. Lower fossil fuel use could gradually erode an important revenue source for many oil exporters, while electrification, renewable energy, digital infrastructure, and technological change are boosting demand for metals and critical minerals.

These shifts are already creating opportunities for some exporters and difficult adjustments for others. But they carry a common implication: yesterday's fiscal frameworks cannot simply be carried into tomorrow. Governments must prepare for a

world in which commodity demand, prices, and revenues may be not only more volatile, but also fundamentally different.

This is where *Fiscal Policy in Commodity Exporters: A Balancing Act* comes in. It provides the World Bank Group's first comprehensive assessment of these fiscal challenges across commodity exporting EMDEs. The book traces fiscal outcomes since 2000, examines fiscal procyclicality and volatility and their consequences for growth, analyzes the implications of the energy transition for metal and oil exporters, and brings these strands together into a practical menu of policy options.

Several findings stand out. Commodity dependence remains pervasive: about two thirds of EMDEs, and roughly 90 percent of low-income countries, rely heavily on commodities. Fiscal policy in commodity exporting EMDEs remains both more procyclical and more volatile than in other EMDEs. That comes with a real economic cost.

In the average commodity-exporting EMDE, procyclical fiscal policy has increased the output impact of commodity price shocks by more than one-fifth. Advanced economy commodity exporters have tended to do the opposite: fiscal policy has dampened these shocks. Vulnerabilities also differ markedly across exporters: energy exporters are most dependent on resource revenues, while agricultural exporters appear especially susceptible to procyclicality and debt accumulation. Fiscal volatility also undermines investment and growth, ultimately limiting the resources needed to create productive jobs.

So, what should policymakers do? The first priority is to put some distance between government spending and the ups and downs of commodity prices. Fiscal rules can help, but rules on paper are not enough: they must be credible, enforceable, flexible, embedded in medium-term frameworks, and supported by transparent budgets and independent oversight.

Sovereign wealth funds can also stabilize public finances by saving windfall revenues during booms and creating room to support activity during slumps. But they, too, work best when integrated with the budget and protected from political pressure. The broader lesson is that institutions matter at least as much as instruments.

The second priority is to turn temporary resource income into lasting productive capacity. Stronger non-resource revenues can make budgets less vulnerable to commodity prices, while commodity windfalls can finance well-chosen investments in infrastructure, human capital, technology, and stronger institutions. This matters for jobs: across EMDEs, stronger investment growth tends to go hand in hand with stronger employment growth, while macroeconomic stability helps preserve the fiscal space needed for productive employment.

Different exporters face different challenges. Metal exporters may enjoy substantial new revenues as the energy transition advances, but those gains must not become a new source of procyclicality. Fossil fuel exporters face the opposite challenge: diversifying their revenue base along with broader economic diversification is becoming increasingly urgent. In either case, the objective is the same: convert volatile and exhaustible resource income into productive capacity, diversified economies, and more and better jobs.

The World Bank Group plays an important role. Through its policy advice, diagnostics, technical assistance, capacity building, and financing, including concessional support through IDA, it helps countries strengthen fiscal institutions while creating the foundations for private investment and job creation. Its broader jobs agenda points to the same ingredients: foundational infrastructure, a business environment that supports firms and investment, and the mobilization of private capital.

The country experiences documented in this book give reason for optimism. They show that procyclicality is not destiny and commodity dependence need not become a curse. With credible institutions, prudent saving, stronger domestic revenues, and sustained investment in people and productive capacity, commodity exporters can turn volatility into resilience, resource wealth into durable development, and demographic pressures into opportunities for productive jobs. That is the *balancing act* at the heart of this book: difficult, certainly, but achievable.

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Abbreviations

AE	advanced economy
AI	artificial intelligence
CBAM	carbon border adjustment mechanism
CEP	commodity export price
CPI	consumer price index
EAP	East Asia and Pacific
ECA	Europe and Central Asia
EMDEs	emerging market and developing economies
EU	European Union
FCS	fragile and conflict-affected situations
GDP	gross domestic product
GEC	Global Energy and Climate Model
HIC	high-income country
HIPC	Heavily Indebted Poor Countries
ICRG	International Country Risk Guide
IDA	International Development Association
IEA	International Energy Agency
IMF	International Monetary Fund
LAC	Latin America and the Caribbean
LIC	low-income country
LMC	lower-middle-income country
MDRI	Multilateral Debt Relief Initiative
MNA	Middle East and North Africa
MTBF	medium-term budgetary framework
MTEF	medium-term expenditure framework
MTFF	medium-term fiscal framework
MTPF	medium-term performance framework
OECD	Organisation for Economic Co-operation and Development
OLS	ordinary least squares
PFM	public financial management
PPP	purchasing power parity
R&D	research and development
SAR	South Asia
SOE	state-owned enterprise
SSA	Sub-Saharan Africa
STEPS	Stated Policies Scenario



SVAR	structural vector autoregression
SWFs	sovereign wealth funds
UMC	upper-middle-income country

Booms in government revenue can lead to hastily-executed investment programs [...] or to good but over-ambitious projects that are abandoned when revenue falls.

Sir Angus Deaton (1992)

2015 Sveriges Riksbank Prize in Economic Sciences
in Memory of Alfred Nobel, and
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OVERVIEW

The economic welfare of two-thirds of emerging market and developing economies (EMDEs) and 90 percent of low-income economies hinges on exports of commodities such as oil, minerals, and agricultural products. Because commodity prices tend to soar and plunge suddenly, that reliance exposes these economies to persistent fiscal challenges. When prices fall, government revenues plummet, making it harder to pay for public services and investment. These economies also tend to collect less tax from other sources, making them even more vulnerable to global price swings. This book offers the first comprehensive assessment of the scale of the fiscal challenge across commodity-exporting EMDEs in the 21st century, outlining a menu of policy options to address the challenge. It documents the extent to which government spending rises during commodity-price booms and is cut during downturns, which amplifies economic boom-and-bust cycles. It finds that countries can reduce fiscal risks by adopting stronger fiscal rules, saving more of their commodity revenues in sovereign wealth funds, and planning government finances over the medium term. Countries also need to prepare for changes in global commodity markets related to the energy transition. Fossil-fuel exporters, for example, face a future of lower revenues, while fresh opportunities could emerge for exporters of metals and critical minerals. The reforms outlined in this book can help make public finances more resilient, reduce economic instability, and support stronger long-term growth.

Introduction

The conflict in the Middle East, the Russian Federation's invasion of Ukraine, the COVID-19 pandemic, and escalating trade tensions have subjected commodity markets to a succession of major shocks in recent years. Their effects have been amplified by deeper structural shifts: the energy transition, rising risks from weather-related natural events, growing demand for rare earth metals and other critical inputs for technological change, and increasing geoeconomic fragmentation. Commodity prices plunged in early 2020 as global demand collapsed, surged to historical highs in 2022 amid war-related supply disruptions and strong post-pandemic demand, and eased in 2023–24 while remaining above pre-pandemic levels. More recently, the conflict in the Middle East delivered another major blow to global energy markets, triggering a sharp spike in oil prices. Together, these shocks and structural shifts have pushed commodity price volatility to historically elevated levels, with significant implications for commodity-exporting economies (figure O.1.A; World Bank 2025a).

These recent gyrations are a stark reminder that export and fiscal revenues in commodity-exporting emerging market and developing economies (EMDEs) are subject

Note: This chapter was prepared by Garima Vasishtha.

to the vagaries of commodity prices.¹ Fiscal policy is central to managing the effects of commodity-price volatility on the domestic economy, yet this has proved to be a persistent challenge for many commodity exporters. When fluctuations in commodity prices—and consequently related fiscal revenues—are reflected in fiscal expenditures and output, it may impede growth. Fiscal policy volatility can, therefore, act as a transmission mechanism for the “resource curse”—in which commodity abundance, when not managed properly, damages overall macroeconomic stability and growth (Bleaney and Halland 2009).

Against this backdrop, this book presents a comprehensive analysis of fiscal challenges in commodity-exporting EMDEs along several dimensions. It substantially enriches the literature by systematically documenting the evolution of fiscal indicators in these countries since the turn of the century; examining fiscal policy cyclicity and volatility, along with their underlying drivers; analyzing the implications of procyclicality and volatility for output growth; exploring the potential fiscal implications of the energy transition for metal and oil exporters; and offering a rich menu of policy options for managing the fiscal impacts of commodity price volatility. In doing so, it not only compares the experiences of commodity exporters and importers but also highlights how energy, metal, and agricultural exporters differ.

Dependence on commodities and price volatility

Commodity prices are critical for EMDEs, with about two-thirds of them—including about 90 percent of low-income countries (LICs)—relying on commodities for a significant share of their exports, fiscal revenues, and overall economic activity. In contrast, only about 13 percent of advanced economies rely heavily on commodity exports (figure O.1.B). Among EMDEs, about 25 percent are classified as agricultural commodity exporters, 23 percent as energy exporters, and 16 percent as metal exporters. Commodity-exporting EMDEs represent a highly diverse group, with the degree of reliance on commodities varying substantially across them. Dependence on commodity revenues is particularly high for energy exporters, where such revenues have averaged about 53 percent of total fiscal revenues since 2000 (figure O.1.C). By comparison, commodity revenues made up about 14 percent and 11 percent of total fiscal revenues for metal and agricultural exporters over this period, respectively.

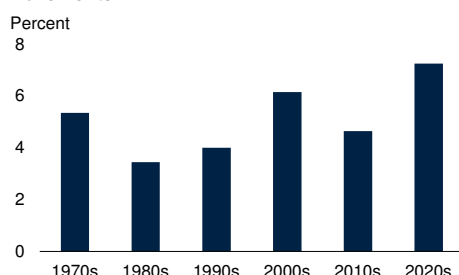
Dependence on commodities for export revenues exhibits a similar pattern. For oil exporters, exports of oil constitute on average about half of total goods exports. Although non-oil exporters tend to be more diversified, many still rely on a relatively narrow set of commodities. For example, copper exports account for about 28 percent of goods exports in the median copper exporter. Coffee and natural gas exports amount to

¹ Throughout this book, an economy is classified as a commodity exporter if, on average in 2017–19, either its combined exports of all commodities accounted for 30 percent or more of its total exports or its exports of any single commodity accounted for 20 percent or more of its total exports (World Bank 2025b). Economies are excluded if they reached either threshold only because of re-exports. Non-commodity exporters are all economies not classified as commodity exporters. For brevity, these economies are referred to as “commodity importers.”

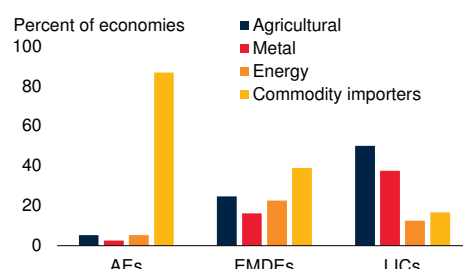
FIGURE 0.1 Commodity dependence and price volatility

The challenges associated with commodity dependence are likely to become more acute as commodity prices experience heightened volatility, as evidenced by the record high volatility in the post-pandemic period. Commodities are critical sources of export and fiscal revenues for about two-thirds of EMDEs and 90 percent of LICs. Dependence on commodity exports is particularly high for energy exporters. Median fiscal revenue in commodity exporters moves in tandem with commodity prices.

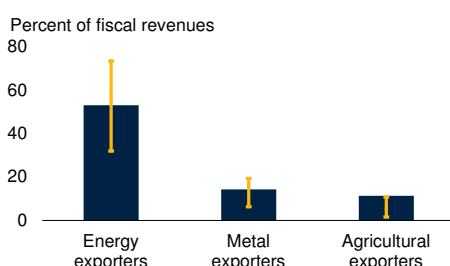
A. Decadal volatility of commodity price movements



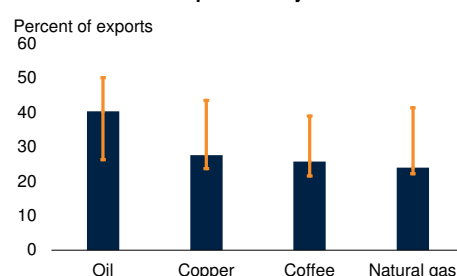
B. Share of commodity exporters, 2026



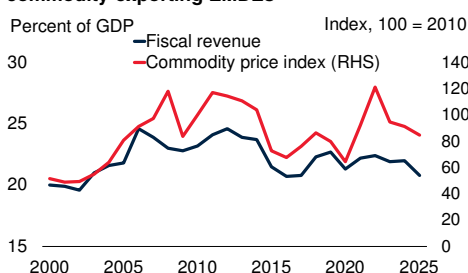
C. Share of resource revenue in total revenue



D. Share of EMDE exports of key commodities



E. Fiscal revenues and commodity prices in commodity-exporting EMDEs



F. Commodity prices and GDP growth in commodity-exporting EMDEs



Sources: UN Comtrade (database); United Nations University World Institute for Development Economics Research (UNU-WIDER); World Integrated Trade Solution (WITS) (database); World Bank; World Economic Outlook (database).

Note: AEs = advanced economies; bbl = billion barrels; EMDEs = emerging market and developing economies; LICs = low-income countries.

A. Panel shows the volatility of composite commodity index by decades, measured as standard deviation of monthly price changes.

B. Share of agricultural, metal, and energy exporters, and commodity importers in advanced economies, EMDEs, and LICs in 2026. Sample includes 38 advanced economies and 154 EMDEs (including 24 LICs).

C. Unweighted average of resource revenue as a share of fiscal revenue for commodity exporters, based on the latest available data. Sample includes 12 agricultural exporters, 15 metal exporters, and 32 energy exporters. Whiskers show the interquartile range.

D. Panel shows the median share of exports accounted for by oil, copper, coffee, and natural gas for EMDE exporters of that commodity. The number of countries in the sample is 12 for oil, 5 for copper, 4 for coffee, and 6 for natural gas. Whiskers indicate interquartile ranges. Based on latest available data.

E. Panel shows the World Bank's aggregate commodity price index and median fiscal revenue for 94 commodity-exporting EMDEs.

F. Real GDP growth and the World Bank's commodity price index in real 2010 U.S. dollars. Aggregate growth for commodity exporters is calculated using GDP weights at average 2010–19 prices and market exchange rates. Sample includes 90 commodity exporters.

about 26 percent and 24 percent of total goods exports for the median exporter of these commodities, respectively (figure O.1.D).

Such dependence on commodity revenues implies that swings in commodity prices often result in markedly volatile commodity-related fiscal revenues in commodity-exporting EMDEs (figure O.1.E). These revenue swings can be passed on to public spending, making fiscal policy more procyclical—expansionary in good times and contractionary in bad times—than in other EMDEs.² Swings in commodity prices are also an important driver of the business cycle in commodity-exporting EMDEs, in contrast to advanced-economy commodity exporters, and are associated with high investment and consumption volatility (figure O.1.F).³ Moreover, fiscal procyclicality and volatility can dampen growth and reduce policy space for sustained investment, which ultimately limits robust job creation and inclusive growth.

Main contributions

This book brings together new empirical evidence and policy analysis to deepen the understanding of how fiscal policy operates in commodity-exporting EMDEs. It builds on a well-established literature on fiscal management in commodity exporters which focuses on the vulnerabilities arising from volatile and exhaustible resource revenues, and the role of fiscal institutions (for example, Ossowski and Halland 2006; Richaud et al. 2019). Existing work typically focuses on a subset of commodity exporters—often oil exporters—or on specific commodity-exporting regions. By covering a large sample of up to 95 commodity exporters, this book provides a broader and more nuanced empirical basis for identifying policy priorities for commodity-exporting EMDEs.

Across five chapters, the book advances the literature by offering new cross-country evidence on fiscal outcomes, the tendency of government spending and cutbacks to coincide with commodity price cycles, the role of fiscal procyclicality and volatility, and the potential fiscal implications of the energy transition for metal and oil exporters. It provides novel insights by comparing fiscal outcomes in commodity exporters with importers and also highlighting how fiscal risks vary across different types of commodity exporters. Building on these insights, it distills concrete policy lessons, underscoring how fiscal institutions and frameworks can mitigate the impact of commodity price volatility. Taken together, the contributions offer pragmatic policy options for strengthening fiscal resilience, and improving macroeconomic stability and growth prospects in commodity-exporting EMDEs.

² Kaminsky, Reinhart, and Végh (2004) and Talvi and Végh (2005) made early contributions to the empirical research on the procyclicality of fiscal policy. More recent contributions include Arroyo Marioli and Végh (2026); Carneiro and Garrido (2016); Frankel, Végh, and Vuletin (2013); Michaud and Rotherth (2018); and Richaud et al. (2019). For studies documenting evidence for select groups of commodity-exporting countries, refer to Bova, Medas, and Poghosyan (2016) and Céspedes and Velasco (2014), among others.

³ For example, IMF (2015); Jacks, O'Rourke, and Williamson (2011); Richaud et al. (2019); and World Bank (2009).

The book makes five main contributions to the related literature and policy debates:

- *Comprehensive analysis of fiscal policy in commodity-exporting EMDEs.* The book presents a thorough assessment of fiscal outcomes, fiscal policy cyclicalities, and volatility in commodity-exporting EMDEs, drawing on a large cross-country dataset of energy, metal, and agricultural exporters. From a policy perspective, it sheds light on why standard countercyclical prescriptions can be difficult to implement in commodity exporters and highlights the need for fiscal frameworks explicitly anchored to commodity price dynamics.
- *Novel evidence on fiscal procyclicality and its growth consequences.* The book provides robust evidence that fiscal policy in commodity-exporting EMDEs remains procyclical, and that this procyclicality amplifies macroeconomic volatility. Methodologically, it expands country coverage beyond often-studied oil exporters and quantifies the macroeconomic costs of procyclical fiscal responses during commodity booms. The policy contribution lies in demonstrating that procyclicality is not inevitable: institutional quality, fiscal rules, and building buffers during booms can materially shape outcomes, offering options for policy makers seeking to “manage abundance” more effectively.⁴
- *Analysis of fiscal policy volatility as a distinct challenge.* By quantifying the impact of changes in fiscal expenditures unrelated to economic conditions, the book makes the case that mitigating fiscal policy volatility is beneficial for growth. It identifies key macroeconomic, structural, and institutional drivers of fiscal policy volatility, and highlights that reducing volatility calls for credible fiscal institutions, stabilization mechanisms, and medium-term anchors that can insulate government budgets from commodity price swings. Country case studies show that well-designed fiscal rules and sovereign wealth funds (SWFs) can play a stabilizing role when they are part of broader institutional reforms.
- *Focus on the fiscal implications of the energy transition for metal and oil exporters.* The book provides estimates of how metal price shocks affect fiscal revenues and expenditures in metal-exporting EMDEs over the short run. This matters for policy makers because the energy transition and technological advancements are boosting demand for critical metals and minerals, raising concerns over supply reliability and price volatility. The book also discusses potential long-run fiscal implications for oil exporters facing a structural decline in fossil fuel demand.
- *Menu of policy options to strengthen fiscal frameworks in commodity-exporting EMDEs.* Synthesizing empirical evidence and country case studies, the book offers a rich menu of policy options to improve fiscal outcomes in commodity exporters. It emphasizes that fiscal frameworks work best when tailored to each country’s circumstances, backed by credible institutions and a clear commitment to fiscal discipline, and embedded in medium-term fiscal frameworks. The book therefore

⁴ The notion of “managing abundance” was stressed by Cuddington (1989).

moves beyond “one-size-fits-all” advice and identifies key priorities for policy makers seeking to strengthen resilience, credibility, and growth amid swings in commodity prices.

Evolution of fiscal policy in commodity-exporting EMDEs since 2000

Since the turn of the 21st century, fiscal positions in commodity-exporting EMDEs have generally been weaker than in other EMDEs. Their revenues have been lower and more volatile, their primary balances have moved more sharply with commodity prices, and the gains from commodity booms have often proven temporary. These patterns have exacerbated debt vulnerabilities in commodity exporters since the 2007–09 global financial crisis, highlighting how quickly fiscal positions can deteriorate when commodity prices turn. By 2025, debt in the median commodity-exporting economy had nearly doubled from its 2010 level, even though it remained below that of the median commodity importer. This points to a deeper challenge: resource wealth has often amplified fiscal risks rather than providing lasting resilience.

Trends in fiscal revenues, expenditures, primary balances, and debt

Fiscal revenues and expenditures

Over 2000–25, median fiscal revenue in commodity-exporting EMDEs was about 3 percentage points of GDP lower on average than in other EMDEs (figure O.2.A). Much of this revenue gap reflects lower tax collection, as many commodity exporters rely more on revenue from natural resources than on taxes. Within these broad patterns, however, lie substantial cross-country variations: government revenues in some countries are much more affected by changes in commodity prices than in others, depending on how heavily they rely on commodity exports.

Primary expenditures generally mirrored this revenue pattern over 2000–25. Although they have trended up since 2000, median primary expenditure (excluding interest payments) was about 3 percentage points of GDP lower on average in commodity exporters than in importers (figure O.2.B). Within commodity exporters, median primary expenditure tends to be higher in energy exporters than in agricultural and metal exporters (figure O.2.C). The composition of expenditure also varies considerably across EMDEs, with health, infrastructure (that is, transport and communication) and research and development (R&D) expenditures generally accounting for a smaller share of GDP in commodity exporters relative to importers (figure O.2.D).

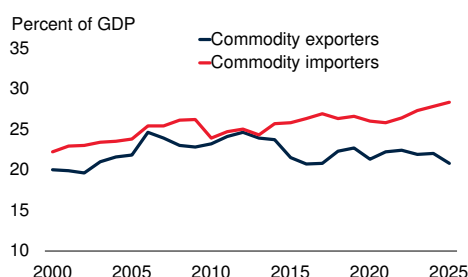
Primary balances

Primary balances in EMDEs improved markedly in the first half of the 2000s. This improvement was especially pronounced for commodity exporters, where changes in primary balances are usually driven more by shifts in revenues than they are in commodity importers (figure O.2.E). In contrast, changes in spending tend to play a relatively

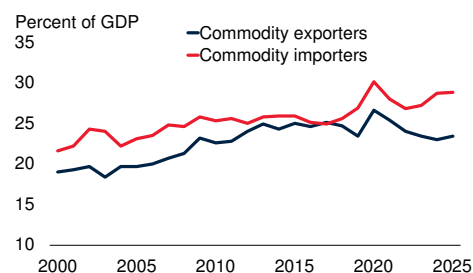
FIGURE 0.2 Fiscal revenues, expenditures, and primary balances

Over 2000–25, both median fiscal revenues and primary expenditures in commodity-exporting EMDEs averaged about 3 percentage points of GDP lower than in other EMDEs. Among commodity exporters, energy exporters, on average, have higher expenditure-to-GDP ratios than agricultural and metal exporters. Infrastructure and R&D spending account for a smaller share of GDP in commodity exporters compared with commodity importers. Overall, changes in primary balances in commodity exporters tend to be more revenue driven than those in commodity importers.

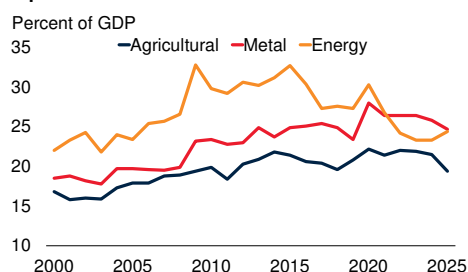
A. Fiscal revenue, by commodity exporter status



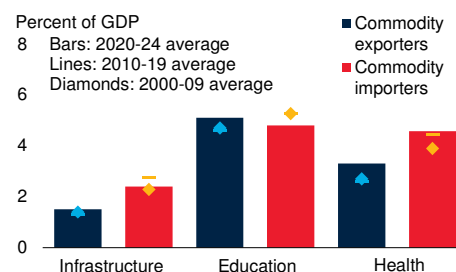
B. Primary expenditure, by commodity exporter status



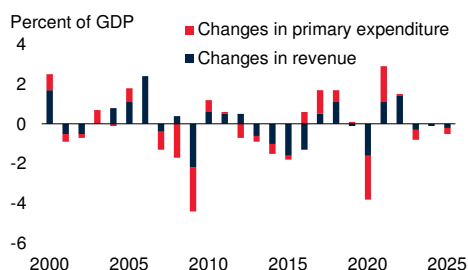
C. Primary expenditure, by type of commodity export



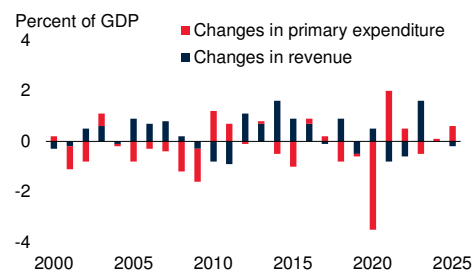
D. Essential public expenditures



E. Primary balance decomposition: Commodity-exporting EMDEs



F. Primary balance decomposition: Commodity-importing EMDEs



Sources: IMF GFS Government Expenditures by Function (accessed in May 2026); Kose et al. (2017; updated in Spring 2026); World Bank; World Economic Outlook (database).

Note: EMDEs = emerging market and developing economies.

A. Median fiscal revenue (percent of GDP) for up to 94 EMDE commodity exporters and 59 EMDE commodity importers.

B. Median primary government expenditure (percent of GDP) for up to 92 EMDE commodity exporters and 56 EMDE commodity importers.

C. Median government expenditure (percent of GDP) for EMDE agricultural, metal, and energy exporters. Sample includes up to 37 EMDE agricultural exporters, 25 metal exporters, and 34 energy exporters.

D. Infrastructure expenditure refers to spending on transport and communication. Blue (red) bars indicate simple averages for EMDE commodity exporters (importers) over 2020–24; blue (yellow) lines are the averages over 2010–19; and blue (yellow) diamonds are the averages over 2000–09. Sample includes up to 23 EMDE commodity exporters and 21 commodity importers.

E.F. Bars show average contributions of primary expenditure and revenue to changes in primary balance for EMDE commodity exporters (panel E) and importers (panel F). Sample includes up to 94 commodity exporters (panel E) and up to 59 commodity importers (panel F).

larger role in commodity importers (figure O.2.F).⁵ In the early years of the 2000s commodity boom, primary balances improved strongly, especially for energy exporters. This progress, however, did not last. In the 2010s, commodity exporters saw persistent and often widening primary deficits, mainly because of lower revenues following the 2007–09 global financial crisis and subsequent price collapses.

In the early 2020s, the sharp increase in spending needs triggered by the pandemic, combined with a contraction in output, led to a substantial worsening of primary deficits in both commodity exporters and importers. Following a post-pandemic rebound in output growth, and as countries worked to make public finances more sustainable, primary deficits narrowed significantly over 2021–25 and moved closer to balance in both commodity exporters and importers. Overall, while average primary deficits were broadly similar across commodity exporters and importers over 2000–25, commodity exporters experienced much higher volatility.

Government debt

Government debt in EMDEs—among commodity exporters and importers alike—has followed a distinct U-shaped pattern since 2000. Debt fell prior to the global financial crisis, then rose quickly after 2010 as primary deficits worsened. The decline in government debt over 2000–08 was particularly pronounced among commodity exporters, fueled by strong revenue growth as commodity prices increased. Debt-relief efforts, including the Heavily Indebted Poor Countries (HIPC) Initiative and the Multilateral Debt Relief Initiative (MDRI), also helped many LICs reduce debt sharply. This progress, however, was reversed following the global financial crisis, exposing yet again fiscal vulnerabilities caused by swings in commodity prices.

Government debt rose sharply in commodity-exporting EMDEs after the commodity price plunge of 2011–16, especially after the oil price collapse of 2014–16. Fiscal deficits surged as revenues fell and governments implemented fiscal stimulus measures. This decade, government debt in EMDEs rose further owing to the pandemic and the overlapping adverse shocks in subsequent years. By 2025, median debt in commodity exporters had nearly doubled from its 2010 level, reaching about 51 percent of GDP, while debt in commodity importers increased by about one-half, to 59 percent of GDP (figure O.3.A). Although the U-shaped pattern in government debt is evident for all types of commodity exporters, debt trends have differed depending on country- and commodity-specific factors.

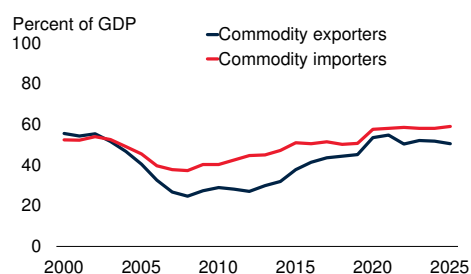
Alongside the buildup of debt, its composition has shifted toward riskier sources of financing in both commodity exporters and importers, especially since the global financial crisis. These growing vulnerabilities are reflected in pronounced downgrades in long-term sovereign debt ratings for commodity exporters; a similar, although smaller, decline is also evident for commodity importers. Many EMDEs are now increasingly

⁵ However, marking a break from this pattern, the deterioration of primary balances during the global recession episodes of 2009 and 2020 in commodity exporters and importers alike was driven by sharp increases in expenditures.

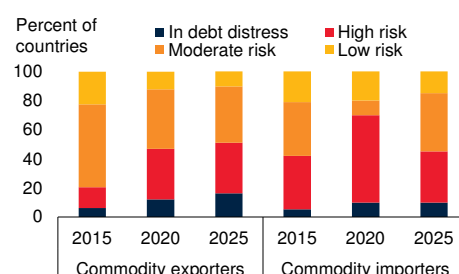
FIGURE O.3 Government debt

The evolution of EMDE government debt since 2000 has followed a U-shaped pattern. In the run-up to the 2007–09 global financial crisis, declining debt bolstered EMDE fiscal space. The reduction in median government debt was particularly large for commodity exporters. This pattern was reversed over the subsequent decade, as median government debt rose markedly alongside the plunge in commodity prices over 2011–16. Debt related risks in commodity exporters have deteriorated significantly since the mid-2010s, with the share of countries at low risk shrinking from about 22 percent to 10 percent.

A. Government debt, by commodity exporter status



B. IMF-WBG debt sustainability analysis



Sources: Kose et al. (2017; updated in Spring 2026); World Bank.

A. Median government debt (percent of GDP) for up to 92 EMDE commodity exporters and 57 EMDE commodity importers.

B. Share of EMDE commodity exporters and importers in debt distress or at risk of debt distress, based on the joint World Bank-IMF Debt Sustainability Framework for Low-Income Countries (LIC-DSF). Sample includes up to 48 EMDE commodity exporters and 20 commodity importers.

vulnerable to debt distress, especially after the sharp increases in debt levels and borrowing costs in recent years. The overall debt risk profile in commodity exporters has deteriorated significantly since 2015, with the share of countries at low risk shrinking from about 22 percent to 10 percent (figure O.3.B). While commodity importers also face substantial debt vulnerabilities, a much higher share of these countries is considered to be at low risk.

Fiscal policy during commodity booms and slumps

Building on the broad patterns highlighted above, chapter 1 presents a more detailed look at fiscal dynamics during commodity booms (a trough-to-peak rise in commodity prices) and slumps (a peak-to-trough decline in commodity prices).⁶ It shows that fiscal outcomes in commodity-exporting EMDEs often move with commodity price cycles. On average, primary balances tend to improve during booms and deteriorate during slumps. These changes mainly reflect shifts in revenues that are closely tied to commodity prices, while spending patterns are less pronounced across booms and slumps. Furthermore, the analysis suggests that changes in fiscal spending are largely driven by

⁶To identify commodity price cycles, standard techniques used to study business cycles are applied to global price indexes for energy, metals, and agriculture for the 2000–25 period. A boom in commodity markets is defined as a trough-to-peak rise in commodity prices; a *slump* is a peak-to-trough decline. A full cycle consists of both a boom and the subsequent slump. Chapter 1 provides further details.

interest payments, with lower borrowing costs and stronger GDP growth during commodity price upswings and the opposite during downturns.

Overall trends, however, hide substantial differences in fiscal policy and outcomes across energy, metal, and agricultural exporters. Revenue growth rises sharply during booms and slows during slumps—especially in energy exporters and, to a somewhat lesser extent, in metal exporters (figure O.4.A). Interest payments rise substantially across all exporters during slumps, but primary spending patterns differ. In energy exporters, real primary spending growth does not differ significantly between booms and slumps. The opposite pattern holds in agricultural exporters, while spending growth changes little over the commodity price cycle in metal exporters. As a result, primary balances in energy and metal exporters tend to improve during booms and weaken during slumps, while changes in agricultural exporters are more muted (figure O.4.B).

The analysis of commodity price cycles also explores how policy frameworks and the quality of institutions shape these fiscal outcomes. Among these factors, the presence of SWFs is most consistently associated with prudent fiscal policy management over the commodity price cycle, while fiscal rules and public institutions have had more limited influence. Countries with SWFs tend to limit primary spending growth during booms and increase it during slumps, using the funds to build savings in upswings to support the economy in downturns. In contrast, countries without SWFs can be prone to the “voracity effect,” whereby political pressure leads to higher spending when resources are abundant.⁷

Challenges posed by commodity dependence

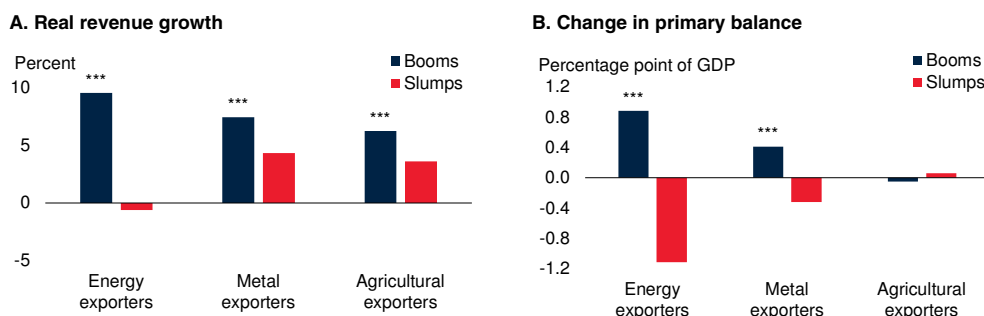
Governments in commodity-exporting economies tend to spend more when commodity prices are high and cut spending when prices fall. As a result, government spending is more closely tied to the economic cycle and fluctuates more sharply than in other EMDEs. On average, over the past four decades, the correlation between the cyclical components of real government spending and real output in commodity exporters was about 22 percent higher than in commodity importers. Real primary government spending was also about 40 percent more volatile, making it harder to maintain stable public services and investment. Many commodity exporters also grapple with weaknesses in institutional quality and governance, which are key enabling factors for effective fiscal policy. On average, commodity exporters rank lower than other EMDEs on main governance indicators, including control of corruption, regulatory quality, political stability, and rule of law.

Several long-term factors make it difficult for commodity-exporting countries to manage public finances. First, beyond the volatile nature of commodity prices, revenues derived from natural resources are subject to additional uncertainties related to the size of commodity reserves, future production costs and volumes, and potential changes in

⁷ For a detailed discussion of the “voracity effect,” refer to Tornell and Lane (1998, 1999) and Velasco (1999, 2000).

FIGURE 0.4 Fiscal dynamics over commodity cycles

Fiscal performance in commodity-exporting EMDEs typically comoves with commodity price cycles, although to varying degrees across countries. The median primary balance in energy and metal exporters tends to strengthen during booms and weaken during slumps, reflecting sizable swings in revenue growth. Agricultural exporters, in contrast, display more muted primary balance dynamics.



Sources: Kose et al. (2017; updated in Spring 2026); World Bank; World Economic Outlook (database).

Note: ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

A.B. Panel shows median change in real government revenue (panel A) and primary balance as a share of GDP (panel B) during commodity price booms and slumps. Sample includes up to 38 agricultural exporters, 25 metal exporters, and up to 34 energy exporters.

future fiscal regimes (Ossowski and Halland 2016). The uncertainty around resource revenues—and consequently fiscal revenues—complicates fiscal management and the efficient use of public resources. This is particularly challenging when resource revenues constitute a large share of total fiscal revenues.

Second, many natural resources, such as oil and minerals, are finite and can lose value as new technologies reduce demand for these resources. This raises difficult questions about how governments should use current resource income while preserving wealth for future generations. Third, because commodity prices are set in global markets, government revenues can rise and fall for reasons beyond a country's control (Ossowski and Halland 2016). During commodity booms, the real exchange rate tends to appreciate, making other export industries less competitive and hindering investment in these sectors. Finally, large rents from the exploitation of nonrenewable resources can encourage corruption and wasteful public spending.

Fiscal policy procyclicality and volatility

Commodity price shocks are not the only source of instability in commodity-exporting EMDEs. Fiscal policy can also add to macroeconomic instability because governments often use resource revenues to finance domestic spending. The procyclicality and volatility of fiscal policy can often make macroeconomic management harder and amplify uncertainty.

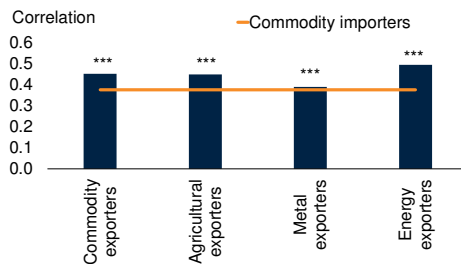
Fiscal policy procyclicality

As shown in chapter 2, fiscal procyclicality has been particularly prevalent in commodity-exporting EMDEs compared to commodity importers. Over 1990–2024,

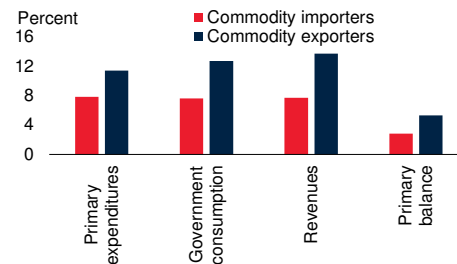
FIGURE 0.5 Fiscal policy procyclicality and volatility

Commodity-exporting EMDEs tend to display significantly higher procyclicality than commodity importers, regardless of their major commodity export—agriculture, metals, or energy. Fiscal policy in commodity exporters is also more volatile than that in commodity importers, on average.

A. Fiscal procyclicality in EMDEs: Commodity exporters versus importers



B. Fiscal policy volatility in EMDEs: Commodity exporters versus importers



Sources: World Bank; World Economic Outlook (database).

Note: EMDEs = emerging market and developing economies.

A. Bars show average correlation between the (Hodrick-Prescott-filtered) cyclical components of real GDP and real government spending within groups. The sample period is 1980–2024. Sample of EMDEs includes 91 commodity exporters (37 agricultural, 24 metal, and 34 energy exporters), and 60 commodity importers. *** indicates that the difference between the average correlation for the particular country group and that for commodity importers is statistically significant at the 10 percent level or better.

B. Bars show averages by country group, of the standard deviations of the residuals obtained from regressing four dependent variables—log differences of real primary expenditures, real government consumption, real revenues, and the change in primary balance (percent of GDP)—on real GDP growth. Weights used are the PPP GDP shares in the respective group's total GDP. Annual data for 146 EMDEs over 1990–2024.

real government spending in commodity exporters moved more closely with the business cycle than in commodity importers, with fiscal procyclicality measures of 0.45 and 0.37, respectively (figure 0.5.A). When commodity prices rise, governments may increase public spending or cut taxes. Conversely, when commodity prices fall, lower revenues may force governments to raise taxes or cut public spending. Furthermore, it is often politically easier to cut taxes or increase public spending than to reverse those decisions later. As a result, government deficits and debt can gradually rise over time. This leaves governments with less room to support the economy during downturns. Although fiscal policy has become less procyclical in many EMDEs in recent decades, progress has been slower among commodity exporters. This pattern has continued even as some institutional improvements have taken root over time, suggesting that governments in commodity exporters still face strong pressures to spend during booms and cut back during downturns.

Fiscal procyclicality can amplify the business cycle in commodity-exporting EMDEs. Using the 2003–08 commodity price boom as an example, the analysis in chapter 2 suggests that procyclical fiscal policy in the average EMDE commodity exporter made the effect of commodity price shocks on output more than one-fifth larger than it would have been if fiscal policy had not reacted to the shock. In contrast, advanced-economy commodity exporters have, on average, used fiscal policy to cushion the effect of commodity price shocks. For a commodity price shock of the same size, output in the average commodity-exporting EMDE has changed by more than three times as much as

in the average advanced-economy commodity exporter, partly because fiscal policy tends to amplify shocks in the former and cushion them in the latter.

Fiscal policy volatility

As shown in chapter 3, fiscal policy has been more volatile in EMDEs than in advanced economies since 1990, and more so in EMDE commodity exporters than in importers. Real primary government spending was about 40 percent more volatile in EMDE commodity exporters than in importers (figure O.5.B). The same pattern appears when looking at other fiscal indicators, such as revenues, government consumption, and primary balances.

Fiscal policy volatility appears to reflect long-standing features of commodity-exporting economies. Countries that depend more heavily on commodities tend to have higher fiscal policy volatility, with energy exporters typically experiencing higher volatility than agricultural or metal exporters. This pattern persists even after taking country income levels into account. Institutional features and policy choice also matter. Countries with less robust political constraints and weaker control of corruption tend to exhibit higher fiscal volatility.

Fiscal policy volatility can hurt growth, mainly because it makes economic output more volatile (chapter 3). Additionally, when government spending volatility is high, tax rates may also become more volatile or less predictable. This uncertainty can discourage investment and dampen growth. An illustrative scenario suggests that fiscal volatility could fall meaningfully if the average commodity-exporting EMDE adopted the policies closer to those used in the average advanced economy in three areas: capital account openness, exchange rate flexibility, and use of fiscal rules. Fiscal volatility would fall from 11.4 percent to 8.8 percent. This could raise average annual per capita GDP growth in commodity-exporting EMDEs from about 1.6 to 1.8 percent.

Institutional and governance quality

Fiscal policy works best when institutions are strong. But many commodity-exporting EMDEs struggle with weak governance, limited technical capacity, and political pressures that make sound fiscal management harder. On average, commodity exporters score lower than other EMDEs on several governance indicators, including control of corruption, regulatory quality, political stability, and rule of law. Energy exporters often exhibit the weakest scores across most governance indicators. Resource wealth can undermine institutions if it reduces pressure on governments to be accountable or to modernize, creating a strong incentive for political leaders to stay in power—the so-called “resource curse.”

Resource revenues can also encourage rent-seeking. Access to natural resource rents often distorts fiscal decisions, leading governments to spend too much on current government consumption or to spend inefficiently (Bleaney and Halland 2009). Moreover, point-source natural resources (mainly minerals and energy) are especially vulnerable to rent-seeking as revenues are concentrated and easier to control than in the case of diffuse resources (mainly agricultural commodities). This can make it more difficult to monitor

how much money the government receives and how it is spent, especially in oil-rich countries (Devarajan 2019).

Structural shifts

The energy transition represents a structural shift in commodity markets, posing divergent fiscal risks and opportunities for exporters (chapter 4). The transition could substantially change both the scale and composition of demand for minerals and metals. This could lead to lasting changes in commodity prices, as well as greater price volatility. Metal exporters are likely to benefit from higher exports and government revenues, especially in the short to medium term. Prices of critical metals may rise as supply can be slow to respond to stronger demand. The transition presents an opportunity, but metal exporters will need to manage higher revenues prudently to avoid over-reliance on a few industries. They should use the gains to support growth in other parts of the economy.

In contrast, demand for oil and other fossil fuels is expected to decline over the long run. This could reduce government revenues and create major fiscal risks for fossil fuel exporters. Fossil fuel exporters will need to pursue long-term diversification reforms, strengthen non-oil revenue mobilization, and curtail government spending where necessary. While the trajectory of the energy transition depends on technological developments and policy choices, governments in commodity-exporting countries need to act now to create a policy environment that allows them to benefit from their endowments while managing the fiscal risks.

Challenges to economic diversification

When commodity prices move sharply, export earnings become less stable for countries that depend heavily on those commodities. This uncertainty can discourage risk-averse firms from investing, dampening long-term growth. Export diversification can help make export earnings more stable and promote long-run growth (Bleaney and Greenaway 2001; Ghosh and Ostry 1994; Hesse 2008). Diversification is difficult in practice, however. Commodity dependence can become self-reinforcing, making it harder for countries to develop other sources of growth. First, when commodity prices are high, firms and governments may have an incentive to focus on producing more of the existing commodities instead of innovating and investing in other productive sectors. Conversely, when commodity prices are low, governments have less revenue to invest in the foundations of diversification, such as human capital development, infrastructure, and technology. Once a country becomes commodity dependent, it can be very difficult to change course. Without active policy intervention, commodity dependence can last for decades or even centuries (UNCTAD 2021).

Second, commodity dependence is often linked with weaker technological development. This can create a vicious cycle in which limited technological capacity keeps countries reliant on primary commodity exports, while that reliance slows the development of new technological capabilities (UNCTAD 2021). Third, deeper structural barriers can also impede diversification. Commodity sectors often develop separately from the rest of the domestic economy, creating a “dual economy.” Commodity sectors often use advanced

technology, require large investments, and are closely linked to global markets, while the rest of the economy may remain underdeveloped (UNCTAD 2024).

Moreover, commodity dependence is often associated with weaker governance and poorer social outcomes. For example, reliance on point-source natural resources, such as fuels and minerals, tends to have a negative effect on the quality of institutions and governance (Bulte, Damania, and Deacon 2005; Isham et al. 2005). Political pressures can also slow reform. Groups that benefit from the commodity sector may resist change, making reliance on primary exports more entrenched (UNCTAD 2024). Commodity dependence is also associated with weaker social outcomes and lower productivity (Csordás 2018; Nkurunziza, Tsowou, and Cazzaniga 2017).

Policy options

Commodity dependence poses lasting challenges for public finances. Revenues are often volatile, governments may spend more in booms and cut back in slumps, fiscal buffers are often limited, and countries are highly exposed to global shocks. These vulnerabilities are compounded by weak domestic tax revenue mobilization: between 2000 and 2024, tax revenues in the median commodity-exporting EMDE averaged about 12 percent of GDP, compared with 16 percent in other EMDEs. Addressing these challenges requires a comprehensive policy strategy that strengthens fiscal frameworks, improves revenue mobilization, enhances fiscal governance, and supports longer-term economic diversification.

Many commodity-exporting EMDEs have already adopted fiscal rules, independent fiscal councils, and SWFs to manage swings in commodity revenues and reduce fiscal procyclicality. The evidence presented in this book suggests that these instruments work best when they are supported by strong institutions, transparency, technical capacity, and sustained commitment to fiscal discipline. Without these foundations, even well-designed fiscal frameworks can be weakened by poor implementation, political pressures, or limited accountability. Institutional gaps remain large: as of 2024, only 12 commodity exporters had fiscal councils, underscoring that effective fiscal management depends not only on formal rules, but also on credible oversight and accountability.

The policy agenda therefore cannot rely on any single instrument. It requires robust fiscal frameworks, stronger non-resource revenue mobilization, better fiscal governance, more transparent budgets, and policies that help economies diversify. Policy priorities will differ across commodity exporters, depending on the strength of their institutions, fiscal space, and the extent to which they depend on commodities. Commodity exporters also differ in the institutional arrangements they already have in place. For example, SWFs are present in about 83 percent of energy exporters, compared with 40 percent of metal exporters and about 30 percent of agricultural exporters. This reinforces the case for tailoring policies to country circumstances.

Countries with stronger institutions and larger fiscal buffers can focus on refining existing fiscal rules, savings mechanisms, and medium-term frameworks. Countries with weaker capacity may need to prioritize more basic public financial management (PFM)

reforms, stronger tax revenue mobilization, and greater fiscal transparency. Metal exporters benefiting from windfall revenues related to the energy transition need mechanisms to save and invest these gains prudently. Fossil-fuel exporters facing a long-term decline in revenues need to accelerate non-resource revenue mobilization, spending reform, and economic diversification.

The international community also has an important role to play through technical support, policy advice, concessional financing, and, where needed, coordinated debt treatment. Together, these reforms are critical to enhancing fiscal resilience, increasing macroeconomic stability, and promoting stronger economic growth in commodity-exporting EMDEs.

Robust fiscal frameworks

Fiscal rules

A growing number of EMDEs have adopted fiscal rules since 2000. Commodity exporters have increasingly adopted them to manage revenue volatility and avoid spending too much during booms (figure O.6.A). Agricultural and metal exporters adopted fiscal rules earlier, but by 2024, energy exporters had largely caught up. Fiscal rules impose lasting limits on key budgetary aggregates to promote sound fiscal policy. They are typically categorized into four main types: (i) budget balance rules limit fiscal deficits; (ii) debt rules limit the accumulation of public debt; (iii) expenditure rules constrain the growth of government spending or the overall size of government; (iv) revenue rules set minimum or maximum targets for government (tax) revenues.

Commodity-exporting EMDEs often adopt a combination of fiscal rules, generally blending a rule that restricts public debt accumulation with operational limits on spending or fiscal deficits. Fewer countries rely on only one fiscal target. Budget balance and debt rules are the most prevalent, followed by expenditure rules. Revenue rules are less common, partly because governments have limited control over revenues from year to year. Furthermore, the design of fiscal rules differs widely across countries, reflecting country-specific challenges and needs.

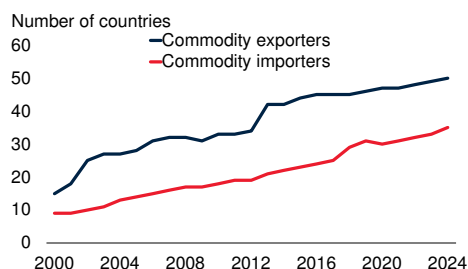
The empirical evidence and country cases presented throughout this book indicate that fiscal rules have had mixed results in commodity-exporting EMDEs, consistent with previous research. This partly reflects the inherent difficulty of designing rules that can withstand the fundamental uncertainty and volatility of commodity revenues, as well as sudden changes in economic conditions. When designing fiscal rules, commodity exporters need to assess whether commodity price changes are temporary or lasting, and how much revenue can be expected over the medium term (IMF 2018).

The country case studies in chapters 3 and 5 highlight that the effectiveness of fiscal rules varies with country characteristics, including institutional quality and accountability. Rules are most effective when they are well-designed, flexible, and embedded in broader fiscal frameworks, including medium-term expenditure frameworks (MTEFs). Fiscal rules are less effective when institutions are weak, political commitment is limited,

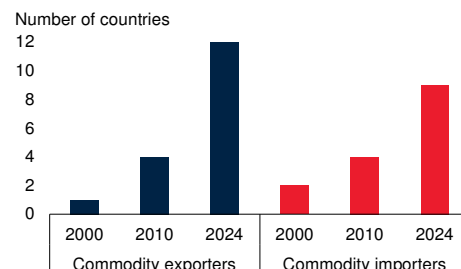
FIGURE 0.6 Fiscal frameworks and institutions

A growing number of EMDEs have implemented fiscal rules, with particularly strong uptake in commodity exporters in the 2000s. Few countries have also established fiscal councils as independent institutions for fiscal oversight. Complementing these trends, the adoption of sovereign wealth funds (SWFs) has grown rapidly in commodity exporters. SWFs are more prevalent in energy exporters, followed by metal and agricultural exporters.

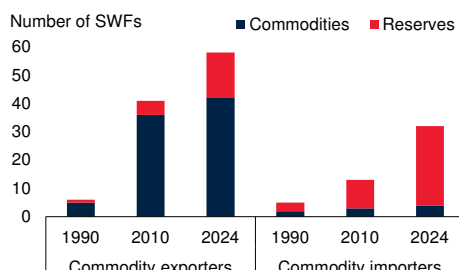
A. Fiscal rules in EMDEs



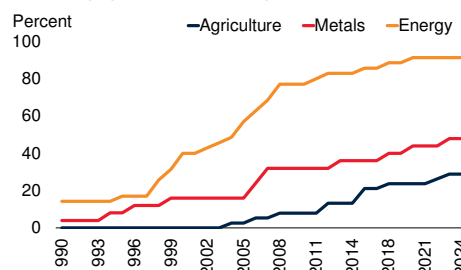
B. Fiscal councils in EMDEs



C. Number of SWFs in EMDEs, by source of funds



D. Share of EMDE commodity exporters with SWFs, by type of commodity export



Sources: Alonso et al. (2025); Global SWF (database); World Bank.

Note: EMDEs = emerging market and developing economies; LICs = low-income countries.

A. Number of countries with at least one fiscal rule in place. Four types of fiscal rules are covered: expenditure rule, revenue rule, budget balance rule, and debt rule. Sample includes up to 50 EMDE commodity exporters and 35 commodity importers. Last observation is 2024.

B. Number of EMDEs with fiscal councils. Based on a sample of 21 EMDEs of which 12 are commodity exporters.

C. Number of SWFs in EMDEs, by source of funds (export of commodities or accumulation of reserves). Based on up to 84 EMDEs, including 54 commodity exporters.

D. Share of EMDE commodity exporters with SWFs. Based on 38 agricultural exporters, 35 energy exporters, and 25 metal exporters.

or the rules are poorly designed. Rules also work better when they cover the public sector broadly and are supported by fiscal councils and transparent budgets. Strong public institutions help create an enabling environment in which fiscal rules can deliver lasting improvements in primary balances in commodity exporters (Fatás, Gootjes, and Mawejje 2026). Fiscal rules are also more likely to work when there is political consensus and less polarization (Piguillem and Riboni 2021).

For commodity exporters that already have fiscal rules, the priority is not to make them more complex, but to make them fit the country's needs. Fiscal frameworks need to be strong enough to restrain spending during booms, flexible enough to respond to severe downturns, broad enough to limit circumvention, and simple enough to monitor and enforce (World Bank 2026b). More sophisticated rules can help stabilize the economy

when countries have good data, strong forecasting capacity, and robust institutions. But where these foundations are weak, overly complex rules can reduce transparency and credibility. International templates are therefore unlikely to work well unless they are adapted to country-specific fiscal challenges, technical and administrative capacity, and commodity dependence (World Bank 2026a).

Where fiscal rules are absent, commodity exporters may benefit from adopting them, but establishing credibility is essential. Credibility depends not only on sound design, but also on the conditions under which the rule is adopted. The first few years after adoption are especially important because political commitment is still being tested and support for the rule may be fragile. The economic and political context when a rule is adopted can therefore help or hinder early implementation, with potentially lasting effects for the credibility and effectiveness of the rule (Fatás, Gootjes, and Mawejje 2026).

Fiscal councils

Independent fiscal councils are an important institutional innovation for strengthening the management of public finances. Their objectives include: (i) bolstering commitment to sustainable policies, including through public assessments of fiscal plans and performance; (ii) providing or assessing macroeconomic and budgetary forecasts; and (iii) bringing independent expertise into the policy development and review process (Mooney, Wright, and Grenade 2018). In some countries, fiscal councils were created as part of broader reforms to improve public finances. While early adopters were advanced economies with strong administrative and technical capacity, several EMDEs followed suit, especially after the 2007–09 global financial crisis (figure O.6.B). Even so, fiscal councils remain less common in EMDEs than in advanced economies.

Fiscal councils remain rare in energy exporters, even though some of these countries have relatively sophisticated fiscal frameworks. One reason may be that greater transparency can be politically difficult. Independent fiscal councils can reduce information asymmetries between voters and policymakers, helping voters assess fiscal competence and discourage politically motivated fiscal behavior (Beetsma, Debrun, and Sloof 2022). But greater transparency may not appeal to incumbents who benefit from limited public scrutiny or from having discretionary control over windfall revenues. As a result, fiscal councils may be uncommon in commodity exporters not only because capacity is limited, but also because independent oversight of resource-revenue management can be politically sensitive.

Independent fiscal councils have played a particularly important role in commodity-exporting countries that have been able to transition from procyclical to countercyclical fiscal policies. Fiscal councils can reduce bias in fiscal forecasts and support compliance with fiscal rules (Beetsma et al. 2019; Debrun and Kinda 2017). While fiscal councils can help limit ad hoc fiscal decisions, they work only if they are independent, have enough resources, and have clear mandates (Hagemann 2011). For example, evidence from resource-dependent Caribbean countries shows fiscal councils are effective when

their operations are clearly defined in law, supported by robust legal safeguards, linked to clear fiscal targets anchored in fiscal rules, and protected from political influences (Schwartz and Beuermann 2021). Otherwise, poorly designed or inadequately resourced fiscal councils may have little effect on fiscal policy or budget outcomes (Davoodi et al. 2022). Lessons from the country case studies of Chile and Uganda in chapter 5 support this notion.

Sovereign wealth funds

SWFs are special-purpose public savings or investment funds that are owned by the government and are designed to stabilize business cycles and build national wealth over time. They usually serve one of three main purposes: stabilizing the budget, saving for the future, or financing development priorities.⁸ The adoption of SWFs has grown steadily over the past few decades. The number of SWFs operational in EMDEs has increased eight-fold since 1990, reaching about 90 in 2024. These funds are more common in commodity exporters than in other EMDEs (figure O.6.C). Among commodity exporters, SWFs are most prevalent in energy exporters: about 83 percent have them, compared with 40 percent of metal exporters and about 30 percent of agricultural exporters (figure O.6.D). With regard to their mandates, commodity exporters have mostly created funds to stabilize revenues and save for future generations. In contrast, commodity importers have increasingly established “strategic” funds to support development objectives, such as financing infrastructure or promoting long-term economic transformation.

As shown in chapter 2, SWFs can help reduce the procyclicality of government spending in commodity-exporting EMDEs.⁹ While a well-designed SWF can support fiscal policy implementation, it cannot substitute for a sound overall fiscal framework. As with fiscal rules, SWFs work best at dampening the negative impact of commodity price volatility when strong institutions protect them from political influences. SWFs can help reduce government spending volatility in countries with strong institutional frameworks and fiscal rules. But, as suggested by the country cases in chapter 3, they are less effective when they are poorly linked to the budget or lack adequate controls. Strong institutions and a firm commitment to fiscal discipline are also essential. Chile is often cited as an example of a country that has used SWFs successfully as part of a rigorous fiscal framework. For energy exporters, where SWFs are most common, the priority is to strengthen the fiscal institutions that govern these funds and link them more closely to the broader fiscal framework.

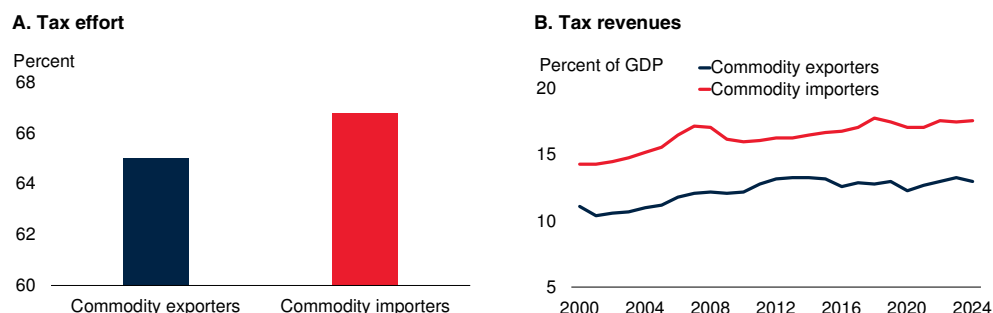
While stabilization funds play an important role in managing short-term revenue swings, savings funds can help turn temporary commodity booms into lasting national wealth (James et al. 2022). With regard to investment strategies, SWFs have traditional-

⁸ Other types of SWFs are reserve investment corporations, which seek to earn a higher return on foreign exchange reserves (for example, China and Singapore), development wealth funds (for example, Mongolia), and pension reserve funds, which aim to meet future public pension liabilities (for example, Australia). In practice, SWFs typically have multiple objectives that may evolve over time.

⁹ Coutinho et al. (2022) and Elbadawi, Soto, and Youssef (2017) find similar evidence.

FIGURE O.7 Tax revenues in EMDEs

Tax revenue mobilization is lower in commodity exporters than in other EMDEs, on average. Between 2000 and 2024, median tax revenues in commodity exporters averaged 12 percent of GDP, compared with 16 percent in commodity importers.



Sources: IMF World Revenue Longitudinal Data; McNabb, Danquah, and Tagem (2021); World Bank.

Note: EMDEs = emerging market and developing economies.

A. Tax effort is the ratio of actual tax collected to tax potential (maximum tax revenues given the structure of the economy and economic environment, and assuming efficient tax policy design and perfect collection). Based on 126 EMDEs, of which 84 are commodity exporters. Estimates are simple averages of the latest available data points for each country, based on the pooled estimates reported in McNabb, Danquah, and Tagem (2021).

B. Panel shows median tax revenue (percent of GDP) for EMDE commodity exporters and commodity importers. Sample includes up to 84 commodity exporters and 55 commodity importers.

ly invested abroad but some countries are increasingly using them to finance domestic investment, including in human and physical capital (Gelb et al. 2014). In this way, SWFs can support long-term development, especially in lower-income countries where investment needs are large and capital is scarce (Addison and Lebdioui 2022; van der Ploeg and Venables 2011).

Tax reform and non-resource revenue mobilization

Commodity-exporting EMDEs lag other EMDEs in domestic resource mobilization, partly reflecting weak tax administration and reliance on commodity revenues (figure O.7.A). Between 2000 and 2024, tax revenues in the median commodity exporter averaged about 12 percent of GDP, compared with about 16 percent in commodity importers (figure O.7.B). Weak tax revenue mobilization leaves governments with less room in the budget, hinders the adoption of countercyclical policies, and increases vulnerability to commodity price shocks. Commodity exporters therefore need to raise more revenue from non-commodity sources to keep public finances sustainable. Higher and more reliable domestic revenues give governments more room to invest in infrastructure, healthcare, and education, which can support medium-term growth. More stable revenues can also help make public spending less volatile and reduce the procyclical tendency of fiscal policy. Building tax collection capacity is also an important part of strengthening the state and its institutions, and making governments more accountable to its citizens (Devarajan and Do 2023; Gaspar, Jaramillo, and Wingender 2016). Policy priorities to boost revenue mobilization include broadening the tax base, reducing

exemptions, strengthening tax administration and compliance, and leveraging digital tools to make tax collection more efficient and transparent.

Chapter 4 shows that the energy transition creates potential long-term fiscal risks for oil-exporting countries, especially if oil prices decline over time. These economies need to strengthen their fiscal frameworks and reform their tax systems to reduce dependence on oil revenues and raise more revenue from non-oil sources. This would support growth and job creation, help keep debt sustainable, and make economies more resilient. Low-income oil exporters, especially, need more room in the budget to invest in human capital and infrastructure. At the same time, strong fiscal institutions and public financial management are also needed to ensure that revenues are spent efficiently and effectively to support inclusive growth.

Fiscal governance and institutions

Institutional quality

Strong institutions are critical prerequisites for prudent fiscal management and effective policy implementation. Better governance—such as stronger control of corruption, rule of law, public administration, and government stability—is associated with less procyclical and less volatile fiscal policies. Chapter 2 highlights that robust public institutions help limit procyclicality of fiscal spending. Improvements in institutional quality, such as government stability and law and order, have helped EMDEs reduce fiscal procyclicality since the global financial crisis (Arroyo Marioli and Végh 2026). In LICs, stronger budget institutions tend to make it easier for governments to support the economy during downturns and avoid overspending during booms (Dabla-Norris et al. 2010).

The case studies in chapter 3 also demonstrate that fiscal rules and SWFs work best when they are well designed, closely linked to broader policy goals, and supported by strong institutions and a clear commitment to sound public finances. When these enabling factors are lacking, governments are less likely to follow fiscal rules, reducing their effectiveness.

Budget transparency

Fiscal transparency boosts fiscal policy effectiveness in several ways (IMF 2018). First, transparency provides legislatures, markets, and citizens with the information they need to hold governments accountable for how public resources are used. Second, transparent fiscal institutions help governments better understand their financial position and policy trade-offs, and to identify potential fiscal risks. Finally, greater transparency makes fiscal plans more credible and can strengthen market confidence that the government can meet its financial obligations. Overall, greater budget transparency is linked with improved fiscal outcomes and more effective fiscal rules, especially in resource-rich countries. While commodity-dependent countries often have less transparent budgets, the strength of this relationship depends on the degree of their natural resource dependence, as well as their political systems and budget institutions (De Renzio, Gomez, and Sheppard 2005).

Economic diversification

To reduce the macroeconomic volatility induced by swings in commodity prices, EMDEs can gradually diversify their economies away from heavy reliance on commodities. Policies to encourage export diversification can support this goal, particularly in the longer term. Multiple policy levers can facilitate economic diversification (World Bank 2022a). To reduce reliance on commodities, governments can gradually scale up investment in infrastructure, while diversifying export-oriented sectors (Chang and Lebdioui 2020). Prudent management of resource rents is vital to ensure that commodity income is invested in productive capacity-building and sustained economic development. Regulatory reforms aimed at improving the business climate are critical for attracting investment. For export-oriented sectors, policies can help firms move into higher value activities and take on more stages of production (vertical diversification). Governments can also encourage firms to produce a wider range of goods and services (horizontal diversification), especially by supporting innovation and technological upgrading (Cherif and Hasanov 2014).

Another path to diversification is for governments to focus more on building a broader set of national assets. This means investing not only in natural resources but also in infrastructure, human capital, and stronger economic institutions (Gill et al. 2014; World Bank 2021). Infrastructure development—such as transport corridors, ports, telecommunications, and energy systems—can reduce trade costs and enable firms to connect to regional and global markets. Education and skills development also matter, especially improving learning outcomes, not just enrollment rates. Cross-country studies indicate that diversifying exports and government revenue streams away from commodities enhances long-term growth prospects and bolsters resilience to external shocks (for example, Hesse 2008; Papageorgiou and Spatafora 2012; World Bank 2018).

Although diversification has clear economic benefits, few EMDEs have successfully reduced their commodity dependence (World Bank 2026b). Examples of relatively successful diversification experiences reveal diverse and context-specific pathways rather than a one-size-fits-all approach. For example, Chile pursued a two-track diversification path: (i) diversification *within* industry, by increasing value added in the copper sector through improved extraction processes and ancillary services development; and (ii) diversification *across* industries, including by developing fisheries and increasing exports of higher-value agricultural goods (World Bank 2017). Chile also established mechanisms to save resource rents and invest strategically during commodity downturns, supported by fiscal rules and SWFs.

Other examples suggest that diversification depends on both domestic conditions and external factors, including a country's natural endowments. Indonesia's experience suggests that active diversification policies can yield results under favorable conditions that include access to markets and foreign technologies. The country's size, large domestic market, natural endowments in agribusiness and labor-intensive manufacturing, and favorable demographics supported diversification (Lashitew, Ross, and Werker 2021). More broadly, country examples underscore that diversification requires strong

political commitment, long-term development vision, and comprehensive policies across trade, industrialization, export promotion, infrastructure development, education, health, finance, and the energy sector (UNCTAD 2025).

Implementation capacity

Successful implementation of the fiscal frameworks outlined across the book depends critically on countries' technical and institutional capacity. Even well-designed fiscal frameworks may fail in achieving their objectives if they are implemented poorly or inconsistently. For commodity-exporting EMDEs, where institutional weaknesses often constrain policy design and implementation, capacity development is especially important. Lessons distilled from a comprehensive literature review in chapter 5 and the various country examples in this book underscore that countries need to invest in capacity building and technical expertise, if fiscal frameworks are to work as intended.

For instance, fiscal councils require technical expertise in fiscal policy analysis and forecasting. MTEFs may be difficult to implement if governments lack the necessary technical and administrative skills. Good management is essential for SWFs to work well. Similarly, using hedging instruments to manage commodity price risks requires specialized technical expertise. In some EMDEs, especially LICs, limited technical and administrative capacity can hinder the establishment and implementation of desired fiscal policy frameworks. However, strengthening implementation capacity takes time and may require technical assistance.

Global support

The global community can help countries strengthen fiscal frameworks by supporting efforts to build technical and administrative capacity, and credibility. Such efforts can help rebuild fiscal space, including through well-coordinated and efficient debt treatment frameworks, where needed. Policy advice and technical assistance from international financial institutions can help address gaps in implementation capacity. The World Bank, mainly via the International Development Association (IDA), has helped countries strengthen fiscal frameworks. This support has covered medium-term fiscal and budget frameworks, fiscal rules, budget systems, and core public financial management systems.

International support can also ease financing constraints that limit the effective implementation of fiscal frameworks in EMDEs. This includes providing concessional financing aimed at stabilizing fiscal positions and supporting reforms. The World Bank and the International Monetary Fund have adopted a three-pillar approach to mobilize existing and new tools into a comprehensive package to support low-income and vulnerable EMDEs in addressing short-term financing pressures (IMF and World Bank 2024). The approach involves: strengthening structural reforms and domestic resource mobilization; mobilizing international support to help countries meet financing needs, especially LICs; and where needed, reducing debt-servicing burdens. Additionally, greater international coordination can enhance the effectiveness of fiscal policy frame-

works and help sustain reform momentum. Such coordination can also ease structural constraints to economic diversification and strengthen longer-term economic resilience.

Synopsis

The remainder of this overview chapter summarizes the main messages of the five interconnected chapters featured in the book. For each chapter, the motivation, the main questions explored, contributions to the literature, and analytical findings are presented.

Chapter 1. Fiscal Policy Amidst Commodity Price Volatility: Trends and Challenges

Commodity-exporting EMDEs face significant fiscal challenges due to their dependence on fluctuating commodity revenues, often adopting fiscal policies that intensify the impact of boom-and-bust cycles, making it difficult to maintain long-term macroeconomic and fiscal sustainability. Amid heightened volatility in global commodity markets, understanding and improving fiscal management in commodity-exporting EMDEs is crucial to enduring future commodity market swings and ensuring resilience against external shocks. Preparing for the future begins with lessons from the past. In this chapter, Gootjes and Vasishtha frame the context for the rest of the book by examining the evolution of fiscal outcomes in commodity-exporting EMDEs since the turn of the century.

The chapter addresses the following questions.

- How has fiscal policy in commodity-exporting EMDEs evolved since the turn of the century relative to commodity-importing EMDEs?
- How does fiscal policy in commodity-exporting EMDEs comove with commodity price booms and slumps?
- How have fiscal policy frameworks and institutional arrangements in commodity-exporting EMDEs changed over time?
- How have these frameworks and institutions shaped fiscal dynamics over commodity price cycles?

Contributions

The chapter contributes to the literature in two ways. *First*, it systematically documents how fiscal indicators, as well as the policy and institutional frameworks that shape them, have evolved in commodity-exporting EMDEs since 2000. It draws attention to heterogeneity across countries exporting different types of commodities—energy, metals, and agriculture—highlighting how sensitivity to commodity price movements differs across exporters of different commodities. Moreover, it contrasts the evolution of fiscal outcomes in commodity exporters with that in other EMDEs. The analysis is based on an extensive sample of up to 94 commodity exporters and 59 commodity importers,

covering a comprehensive set of fiscal indicators, including primary balances, public spending, government revenues, and debt.

Second, the chapter examines the comovement between fiscal variables in commodity-exporting EMDEs and commodity price cycles. For these economies, the volatility of fiscal revenues is primarily influenced by commodity price movements rather than the output cycle, making price swings a central challenge. Despite the extant literature on the cyclical policy with respect to output cycles in EMDEs, very few studies have systematically examined the behavior of fiscal indicators during commodity price booms (a trough-to-peak rise in commodity prices) and slumps (a peak-to-trough decline in commodity prices) for such a large and diverse sample of countries.

Main findings

The chapter presents the following main findings.

Reliance on commodity exports is generally associated with lower fiscal revenues. Over 2000–25, median fiscal revenues were about 3 percentage points of GDP lower in commodity-exporting EMDEs than in other countries (figure O.8.A). This revenue gap is primarily driven by weaker tax collection in commodity exporters, highlighting a negative link between resource revenues and tax effort. These broad patterns, however, mask substantial heterogeneity across countries: fiscal revenues fluctuate with commodity price movements to varying degrees across commodity-exporting EMDEs, in part depending on the degree of resource dependence. A notable exception is the experience of metal exporters in the early 2010s, which sustained revenue growth through tax mobilization even as metal prices declined.

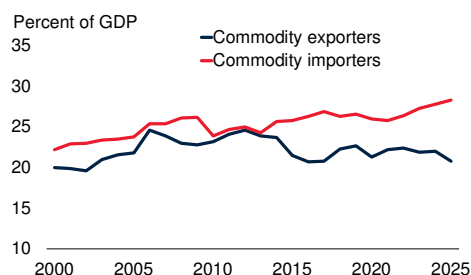
Although median primary expenditure in EMDEs has trended up since 2000, it constitutes a lower share of GDP in commodity exporters than in commodity importers, mirroring patterns in fiscal revenues. Since 2000, median primary expenditure in commodity-exporting EMDEs has averaged about 3 percentage points of GDP lower than in other EMDEs (figure O.8.B). Within commodity exporters, expenditures tend to be higher in energy exporters than in agricultural and metal exporters. The composition of expenditure also varies considerably between commodity exporters and importers. Notably, infrastructure (that is, transport and communication) and R&D expenditures have accounted for a smaller share of GDP in commodity exporters, particularly since the 2010s. Similarly, public spending on health has made up a smaller share of GDP in commodity exporters.

Primary balance dynamics in commodity exporters tend to be more revenue-driven than in commodity importers. Primary balances improved markedly in commodity exporters, particularly energy exporters, in the first half of the 2000s alongside booming commodity prices. This progress was quickly reversed after the global financial crisis, and the 2010s were characterized by persistent and often widening primary deficits, driven largely by lower revenues (figure O.8.C). By contrast, commodity importers experienced continued improvements in their primary balances through the mid-2010s. Over 2000–25, average primary deficits were broadly similar across the two groups, but commodity exporters experienced much higher volatility.

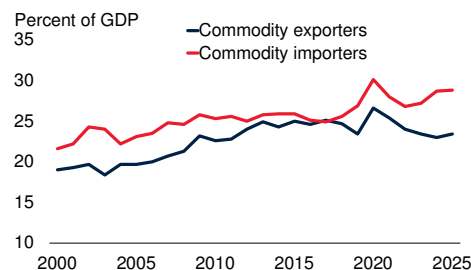
FIGURE 0.8 Evolution of fiscal indicators

Reliance on commodity exports is generally associated with lower fiscal revenue and primary expenditure. Primary balances in EMDEs improved markedly in the first half of the 2000s, particularly for commodity exporters, driven mainly by energy exporters. This progress was reversed as commodity prices plummeted during the global financial crisis. The 2010s were characterized by persistent, and often widening, primary deficits in commodity exporters. Alongside, the evolution of EMDE government debt since 2000 has followed a U-shaped pattern.

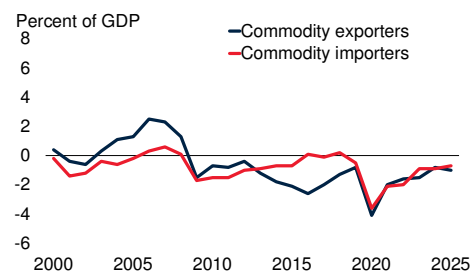
A. Fiscal revenue, by commodity exporter status



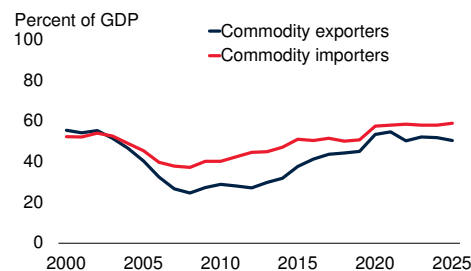
B. Primary expenditure, by commodity exporter status



C. Primary balance, by commodity exporter status



D. Government debt, by commodity exporter status



Sources: Kose et al. (2017; updated in Spring 2026); World Bank; World Economic Outlook (database).

A. Panel shows median fiscal revenue (percent of GDP) for EMDE commodity exporters and commodity importers. Sample includes up to 94 commodity exporters and 59 commodity importers.

B. Panel shows median primary government expenditure (percent of GDP) for EMDE commodity exporters and commodity importers. Sample includes up to 92 commodity exporters and 56 commodity importers.

C. Median primary balances (percent of GDP) for EMDE commodity exporters and commodity importers. Sample includes up to 92 commodity exporters and 56 commodity importers.

D. Median government debt (percent of GDP) for up to 92 EMDE commodity exporters and 57 EMDE commodity importers.

The evolution of government debt in both commodity exporters and importers has followed a U-shaped pattern since 2000. Debt reductions prior to the global financial crisis were followed by rapid debt accumulation after 2010, amid worsening primary deficits (figure 0.8.D). Meanwhile, the composition of public debt in EMDEs has shifted toward riskier sources of financing since the global financial crisis. Overall, sovereign debt risks in EMDEs have intensified relative to the pre-crisis period, with a more pronounced deterioration in commodity exporters compared to other EMDEs.

Fiscal outcomes in commodity-exporting EMDEs generally track commodity price cycles, albeit to varying degrees across energy, metal, and agricultural exporters. Revenue growth

accelerates sharply during booms and slows during slumps, most prominently in energy exporters and, to a lesser extent, in metal and agricultural exporters. Spending patterns are more varied. In energy exporters, (primary) expenditure growth remains broadly stable over the cycle; in metal exporters, it slows during booms relative to slumps—consistent with countercyclical fiscal management. By contrast, spending in agricultural exporters accelerates during booms and slows during slumps, pointing to procyclical policies. As a result of these dynamics, primary balances in energy and metal exporters tend to strengthen during booms and weaken during slumps, while changes in agricultural exporters are muted.

Fiscal governance frameworks have generally strengthened in both commodity exporters and importers since 2000. The adoption of fiscal rules and SWFs has been more prevalent in commodity exporters than in other EMDEs. To achieve their stated objectives, such frameworks need to be supported by strong institutions. However, commodity exporters are marred by persistent shortcomings in institutional environments—on average, commodity exporters have ranked lower than other EMDEs on indicators of institutional quality. Among these factors, the presence of SWFs is most consistently associated with prudent fiscal policy management over the commodity price cycle across commodity-exporting EMDEs, while fiscal rules and public institutions have had more limited influence.

Chapter 2. Fiscal Procyclicality in Commodity Exporters: An Enduring Challenge

In commodity-exporting economies, commodity price shocks have an important bearing on fiscal policy. Rising commodity prices can lead to procyclical increases in public spending and tax cuts. Conversely, declines in commodity prices can trigger procyclical tax increases and cuts in public expenditures as a result of reduced revenues from commodity production and exports. The procyclical tendency of fiscal policy in commodity exporters can magnify the impact of commodity price movements on economic activity, lead to inefficient stops-and-starts in government investment and services delivery, and introduce a bias toward a deterioration in fiscal positions. This chapter by Arroyo Marioli and Vasishtha provides a nuanced understanding of the complexities surrounding the cyclical nature of fiscal policy in commodity-exporting EMDEs.

The chapter addresses the following questions.

- How does the cyclicity of fiscal policy differ in commodity-exporting EMDEs relative to other EMDEs?
- How does the cyclicity of fiscal policy vary with macroeconomic and institutional characteristics?
- How does fiscal procyclicality affect economic growth in commodity-exporting EMDEs?
- Which policy interventions can help improve the quality of fiscal policy by reducing procyclicality?

Contributions

Chapter 2 makes four main contributions. *First*, it provides comprehensive evidence on fiscal procyclicality for a large sample of commodity exporters (agricultural, metals, and energy exporters) and commodity importers. Existing studies have covered either a geographically limited set of countries or mainly oil exporters. *Second*, it examines how fiscal cyclicity varies with macroeconomic and institutional characteristics of countries to shed light on why some commodity exporters are better able to “manage abundance” than others. *Third*, it deepens the understanding of the implications of fiscal procyclicality for economic growth. The chapter quantifies how procyclical fiscal policy responses have amplified business cycles in commodity-exporting EMDEs during periods of rising commodity prices, focusing on the 2003–08 commodity price boom as an illustrative example. *Finally*, it presents a comprehensive analysis of policies to reduce fiscal policy procyclicality.

Main findings

The chapter offers the following main findings.

Over the past four decades, fiscal policy has been more procyclical in EMDEs than in advanced economies, and more so in EMDE commodity exporters than in importers. The average correlation between the cyclical components of real GDP and real government spending—the measure of fiscal cyclicity—is 0.42 for EMDEs, while it is slightly negative for advanced economies. Among EMDEs, the correlation is 0.45 for commodity exporters and 0.37 for commodity importers (figure O.9.A). Although fiscal procyclicality has generally trended downward in recent decades, it has fallen less among commodity-exporting EMDEs than in other EMDEs (figure O.9.B).

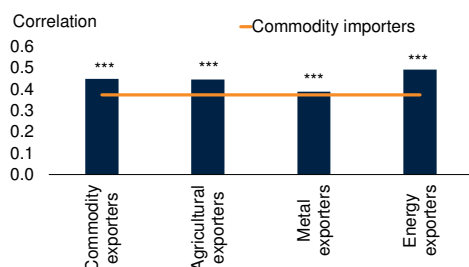
Fiscal procyclicality has amplified the business cycle in commodity-exporting EMDEs. Because of its procyclical nature, fiscal policy in the average EMDE commodity exporter has increased the impact of commodity price shocks on output by more than one-fifth, relative to the counterfactual in which fiscal policy does not respond to the price shock (figure O.9.C). In contrast, fiscal policy in advanced-economy commodity exporters has, on average, offset the output effect of a commodity price shock by reacting countercyclically. When hit by a commodity price shock of the same magnitude, the change in output in the average commodity-exporting EMDE has tended to be more than three times larger than that in its average advanced-economy counterpart, because of the opposite responses of fiscal policy in the two country groups. Using the 2003–08 commodity price boom as an illustrative example, estimates suggest that most of the difference between growth in EMDE and advanced-economy commodity exporters over this period is accounted for by the difference in the responses of fiscal policy—procyclical in EMDEs and countercyclical in advanced economies (figure O.9.D).

Structural policies can help reduce fiscal procyclicality. In particular, robust public institutions, stronger rule of law, greater capital account openness, fiscal rules to constrain government spending, and SWFs have all been associated with lower fiscal procyclicality (figures O.10.A and O.10.B). Fiscal rules and SWFs have been most

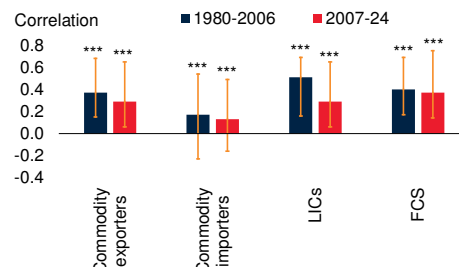
FIGURE 0.9 Fiscal procyclicality and implications for growth

Commodity-exporting EMDEs tend to display significantly higher procyclicality than other EMDEs, regardless of their major commodity export. On average, fiscal procyclicality has declined in commodity exporters over the past few decades. Nevertheless, fiscal policy in commodity exporters over 2007–24 was about twice as procyclical as in commodity importers, on average. Fiscal policy in commodity-exporting EMDEs has tended to amplify the effects of commodity price shocks on output, while in advanced economies it has tended to dampen the effects. More than three-fourths of the difference in growth between major commodity-exporting EMDEs and advanced economies during the 2003–08 commodity price boom can be explained by the difference in the cyclical policy of fiscal policy between the two groups of countries.

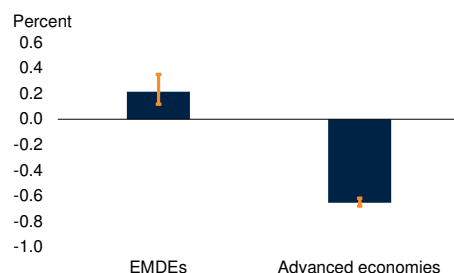
A. Fiscal procyclicality in EMDEs



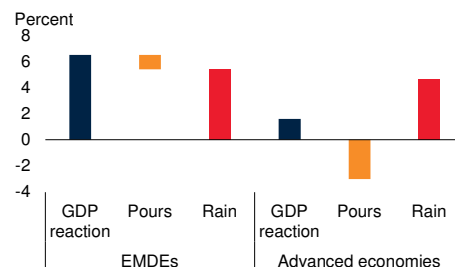
B. Shifts in fiscal procyclicality, 1980–2024



C. “Pours” as a fraction of “rains” in commodity exporters



D. “Pours” versus “rains”: 2003–08 commodity cycle



Sources: Arroyo Marioli and Végh (2023); International Monetary Fund; World Bank.

Note: EMDEs = emerging market and developing economies; FCS = fragile and conflict-affected situations; LICs = low-income countries. *** indicates that the difference between the average correlation for the particular country group and that for commodity importers is statistically significant at the 10 percent level or better. Whiskers show the 25th and 75th percentiles.

A.B. Bars show average correlation between the (Hodrick-Prescott-filtered) cyclical components of real GDP and real government spending within groups.

A. The sample period is 1980–2024. Sample of EMDEs includes 91 commodity exporters (37 agricultural, 24 metal, and 34 energy exporters), and 60 commodity importers.

B. For 1980–2006, the sample includes 90 commodity exporters, 91 commodity importers, 22 LICs, and 31 FCS. For 2007–20, it includes 95 commodity exporters, 95 commodity importers, 21 LICs, and 31 FCS.

C.D. The sample includes 4 advanced economies (Australia, Canada, New Zealand, and Norway) and 11 EMDEs (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Honduras, Indonesia, Russian Federation, South Africa, and Ukraine).

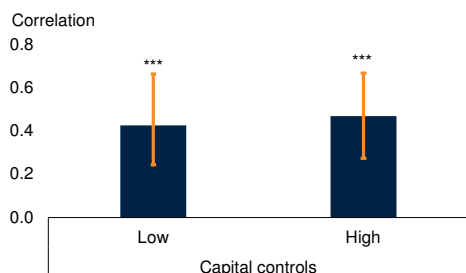
C. Panel shows the change in GDP (in response to a commodity price shock) explained by the reaction of fiscal policy (the “pours” component) as a share of the direct effect of the commodity price shock on output (the “rain” component). Bars show the averages of these shares for commodity-exporting EMDEs and advanced economies. Whiskers show the minimum and maximum range.

D. The orange bars represent the fraction of the change in GDP, in response to a commodity price shock, explained by the reaction of fiscal policy to the shock, averaged at the aggregate level. The red bars show the direct effect of a commodity price shock on GDP. The blue bars show the overall GDP response.

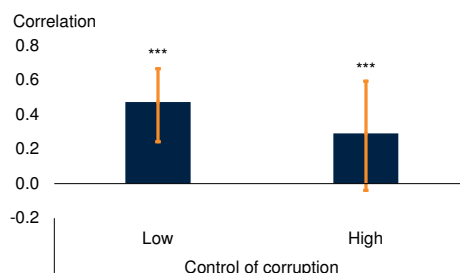
FIGURE 0.10 Correlates of fiscal procyclicality

Among commodity exporters, greater capital account restrictions are associated with more procyclical policy, on average. Stronger corruption control is associated with lower procyclicality.

A. Procyclicality and capital account openness



B. Procyclicality and corruption control



Sources: Arroyo Marioli and Végh (2023); Chinn and Ito (2006); International Monetary Fund; PRS Group (database); World Bank.

Note: Bars show average correlation between the (Hodrick-Prescott-filtered) cyclical components of real GDP and real government spending within groups. Whiskers show the 25th and 75th percentiles. *** indicates that the difference between the average correlation for the two country groups is statistically significant at the 10 percent level or better.

A. Based on Chinn-Ito index of financial openness. A country is classified as having high (low) capital account restrictions if its Chinn-Ito index score is below (above) the median. Sample has 36 countries with low capital controls and 56 countries with high capital controls.

B. Sample has 45 countries with low control of corruption and 28 with high control of corruption.

effective when surrounded by robust institutional frameworks. Medium-term expenditure frameworks can also help reduce procyclicality by enhancing fiscal discipline.

Chapter 3. Fiscal Policy Volatility: Drivers and Implications for Growth

Commodity-exporting EMDEs face a persistent challenge in managing the impact of volatile resource revenues on macroeconomic stability and in designing fiscal policies that support economic activity. In chapter 3, Arroyo Marioli and Vasishtha present a comprehensive study of fiscal policy volatility and its implications for growth.

The chapter addresses the following questions:

- Is fiscal policy more volatile in commodity-exporting EMDEs than in other EMDEs?
- What are the main drivers of fiscal policy volatility?
- What is the relationship between fiscal policy volatility and economic growth?

Contributions

The chapter makes three main contributions to the literature. *First*, it provides comprehensive evidence on the determinants of fiscal policy volatility for a large sample of commodity exporters (agricultural, metals, and energy exporters) and commodity importers. Previous studies have covered either a limited set of countries or mainly oil exporters.

Second, the chapter deepens the understanding of the implications of fiscal policy volatility by quantifying its impact on economic growth. It also examines the links between fiscal procyclicality (the focus of chapter 2) and fiscal policy volatility.

Third, it presents a comprehensive analysis of policies to reduce fiscal policy volatility by analyzing the roles of various macroeconomic and structural factors in driving such volatility. Additionally, it examines the experiences of a set of commodity-exporting countries to illustrate the use of SWFs and fiscal rules in coping with fiscal procyclicality and volatility. Insights from these cases complement the findings of the broader quantitative analysis and help identify best practices in the implementation of these fiscal frameworks and institutions.

Main findings

Chapter 3 offers five main findings.

Over 1990–2024, fiscal policy has been more volatile in EMDEs than in advanced economies, and more so in EMDE commodity exporters than in importers. Fiscal policy volatility, measured by the volatility of real primary government expenditure, is about 40 percent higher in EMDE commodity exporters than in importers (figure O.11.A). Fiscal policy volatility is also higher in commodity exporters when measured using alternative fiscal policy indicators—fiscal revenue, government consumption, and primary balance-to-GDP. Moreover, among EMDEs, the larger the commodity sector, the more volatile fiscal policy has tended to be, even when accounting for income levels.

Fiscal policy volatility has declined somewhat in EMDEs in recent decades. The volatilities of government expenditure, consumption, revenue, and primary balance were all lower, on average, during 2007–24 than in 1990–2006 (figure O.11.B). The reduction in fiscal volatility mirrors the observed increase in the ability of countries to pursue countercyclical fiscal policies following the 2007–09 global financial crisis, supported by efforts to strengthen institutional frameworks, including adopting fiscal rules.

Fiscal procyclicality and volatility are intertwined. Procyclicality and volatility have been strongly interlinked in EMDEs, especially commodity exporters, and driven by similar factors. EMDEs with more procyclical fiscal policies have tended also to display more volatile fiscal policies.

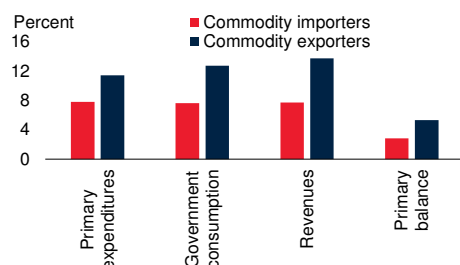
Fiscal policy volatility amplifies business cycle fluctuations and is detrimental to economic growth. Results from a counterfactual exercise show that if the average commodity-exporting EMDE were to adopt the policies of an average advanced economy in three areas—exchange rates, capital account openness, and the use of fiscal rules—it could have added about 0.2 percentage point in per capita growth every year by reducing fiscal policy volatility (figures O.11.C and O.11.D).

Structural policies can help reduce fiscal policy volatility. Institutional and policy variables account for a large share of the cross-country variation in fiscal policy volatility, with more political constraints and better institutions being associated with less volatile fiscal policy. Experiences of selected commodity exporters indicate that fiscal rules and SWFs

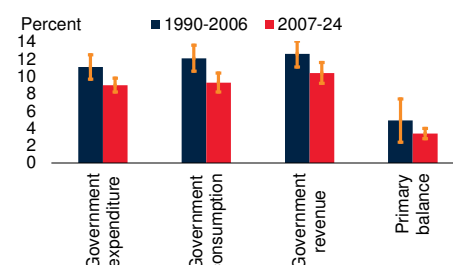
FIGURE 0.11 Fiscal policy volatility

Fiscal policy in commodity exporters has been more volatile than in commodity importers, on average. Fiscal policy volatility declined somewhat in EMDEs in the post-global financial crisis period. The dampening effect of fiscal volatility on growth can be reduced by avoiding restrictions on international capital movements, establishing a fiscal framework to discipline government spending, and adopting flexible exchange rate regimes. If the average commodity-exporting EMDE were to adopt the policies of an average advanced economy regarding exchange rates, capital account openness, and use of fiscal rules, it could have added about 0.2 percentage point in per capita growth every year by reducing fiscal volatility.

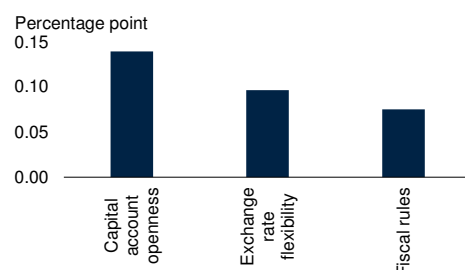
A. Fiscal policy volatility in EMDEs



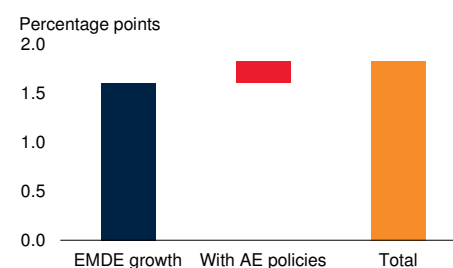
B. Evolution of fiscal policy volatility in EMDEs



C. Impact of volatility-reducing policies on per capita growth



D. Annual per capita growth in EMDE commodity exporters: Counterfactual scenario



Sources: Arroyo Marioli, Fatás, and Vasishtha (2024); Davoodi et al. (2022); World Bank; World Economic Outlook (database).

Note: AE = advanced economy; EMDE = emerging market and developing economy.

A. B. Panels show weighted averages by country group, of the standard deviations of the residuals obtained from regressing four dependent variables—log differences of real primary expenditures, real government consumption, real revenues, and the change in primary balance (percent of GDP)—on real GDP growth. Weights used are the PPP GDP shares in the respective group's total GDP.

A. Annual data for up to 146 EMDEs.

B. Annual data for up to 142 EMDEs over 1990–2006 and up to 144 EMDEs over 2007–24.

C. Figure shows the impact on per capita growth from a 1 standard deviation change in each of the three policy variables, based on estimates reported in chapter 3 (tables 3.4 and 3.6).

D. The middle column in the panel illustrates how applying the average advanced-economy policies along three dimensions (exchange rate flexibility, capital account openness, and fiscal rules) impacts GDP per capita growth in the average commodity-exporting EMDE. The last column shows the total commodity-exporting EMDE growth with these advanced-economy policies.

have been most effective when accompanied by robust institutional frameworks and a strong commitment to fiscal discipline.

Chapter 4. The Energy Transition: Fiscal Implications for Commodity Exporters

The global energy transition is driving profound changes in commodity demand, with declining reliance on fossil fuels and rising consumption of metals and minerals essential

for renewable technologies. For the many EMDEs that depend on commodities—especially oil and metals—for fiscal revenues, these shifts pose significant challenges and opportunities. While metal exporters may benefit from increased demand due to the metal-intensive nature of renewable technologies as well as growth in AI-related sectors, oil exporters face the prospect of shrinking revenues over the medium to long term. Effective fiscal management, robust governance, and transparent policy frameworks are increasingly critical to ensure that resource wealth translates into sustainable development.

In chapter 4, Lebrand and Vasishtha examine the fiscal implications of the energy transition through a granular lens, focusing on how metal commodity price shocks affect fiscal revenue and expenditure in exporting EMDEs in the *short term* and how the *long-term* shift away from fossil fuels will reshape government revenues for oil exporters.

The chapter addresses the following questions:

- How do metal price shocks affect fiscal revenue and expenditure in metal-exporting EMDEs over the short run?
- How do these effects depend on country characteristics, including fiscal policy regimes and frameworks?
- How is the energy transition likely to impact government revenues in oil-exporting EMDEs over the longer run?

Contributions

The chapter makes three main contributions to the literature. *First*, it offers a novel analysis of the impacts of metal price shocks on fiscal revenue and expenditure for metal-exporting EMDEs, using a newly constructed country-specific metal price index. While a significant body of research has examined the impact of oil price shocks on the global economy, as well as oil exporters and oil importers separately, cross-country studies on the impact of metal price shocks remain relatively scarce.¹⁰ Understanding how metal price shocks affect fiscal positions is both timely and policy relevant as the energy transition drives a substantial increase in demand for critical metals and minerals, raising concerns about supply reliability and price volatility. The chapter also examines how the effects of metal price shocks depend on country characteristics, including policy frameworks.

Second, the chapter complements the short-run analysis of metal price shocks—the horizon over which cyclical price fluctuations primarily manifest—with an assessment of the potential longer-run fiscal impacts of the energy transition on oil exporters. As noted above, a longer horizon is particularly relevant for oil exporters given that the energy

¹⁰ Exceptions include World Bank (2022b), which identifies the drivers of metal price swings and estimates how output in metal exporters and importers responds to metal price shocks. Previous studies on the responses of fiscal policy have focused on oil price shocks in certain countries or regions or on shocks to commodity price indexes (as opposed to commodity-specific price shocks).

transition represents a structural, permanent shift in fossil fuel demand. The chapter presents some illustrative pathways for fiscal revenues in major oil-exporting EMDEs related to the phasing out of fossil fuels based on scenarios developed by the International Energy Agency (IEA 2025).

Finally, it presents a detailed review of the literature on fiscal risks in fossil fuel exporters from the energy transition. A synthesis of the recent literature offers a broader perspective on fiscal risks beyond the direct impact on fiscal revenues and helps identify policy priorities for fossil fuel-exporting EMDEs.

Main findings

This chapter offers the following main findings.

A positive country-specific metal price shock leads to an increase in median real fiscal revenues in metal exporters, while median real fiscal expenditures remain little changed. A 1 percent increase in the metal price index is accompanied by a 0.6 percent cumulative increase in fiscal revenues after 10 quarters, the horizon at which the cumulative response peaks. In contrast, the median impact on fiscal expenditure is negligible (figure O.12.A). The median responses, however, mask substantial variation across countries.

The cumulative impacts of metal price shocks on revenues are highly correlated with the share of metals in total exports (figure O.12.B). No such correlation is found for expenditure responses, suggesting that factors beyond commodity dependence, such as fiscal frameworks and institutional capacity, likely play a greater role in shaping spending behavior (figure O.12.C). Moreover, expenditure responses display wider dispersion across countries compared with the response of revenues. The varying expenditure responses to metal price shocks across metal exporters partly reflect the presence and design of fiscal rules. For example, the conduct of fiscal policy in periods of similar commodity price increases differs between Peru and Chile, despite both countries being major copper exporters. While metal price fluctuations have roughly 40 percent stronger effects on fiscal revenue in Chile, their effects on fiscal expenditure are about half as large.

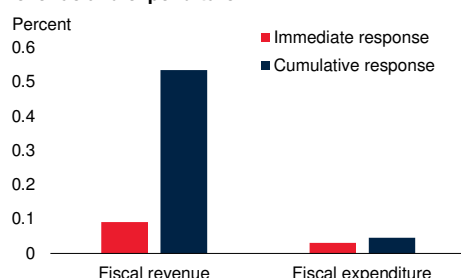
Illustrative scenarios indicate that the impact of the energy transition on oil-exporting EMDEs over the long run is likely to vary substantially across countries. Scenario analysis, comparing projected fiscal revenues with their prepandemic levels, suggests that high-income oil exporters are projected to fare better, on average, than lower-middle-income and low-income oil exporters (figure O.12.D). High-income countries—with more diversified economies, stronger technological and infrastructural capabilities, and greater financial resilience—are likely to be better equipped to adapt to falling global oil demand. Their capacity to attract investment in various sectors, including renewables, could help partly offset declining fossil fuel revenues.

The examination of potential fiscal risks from the energy transition supports a multi-pronged policy agenda for commodity exporters. For metal exporters, it will be important to embed transition scenarios in medium-term fiscal frameworks; adopt saving mechanisms and

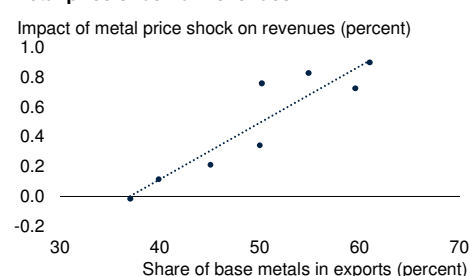
FIGURE O.12 Impact of metal price shocks in metal exporters and long-run transition scenarios in energy exporters

Overall, median fiscal revenues in metal exporters increase after a positive shock to metal prices, while median fiscal spending is little changed. Metal price shocks tend to have larger impacts on revenues in countries that are more dependent on metal exports. There is, however, no clear relationship between dependence on metal exports and the impact of metal price shocks on fiscal expenditures. For oil-exporting EMDEs, analysis based on IEA scenarios suggests that transition risks to fiscal revenues could vary substantially across countries, with high-income oil exporters projected to fare better in terms of lost revenues than others.

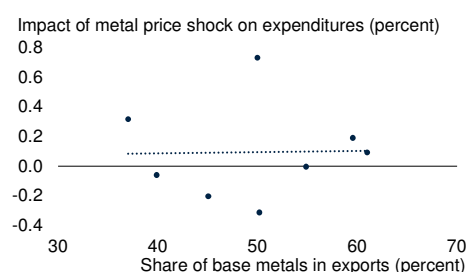
A. Median impacts of a metal price shock on fiscal revenue and expenditure



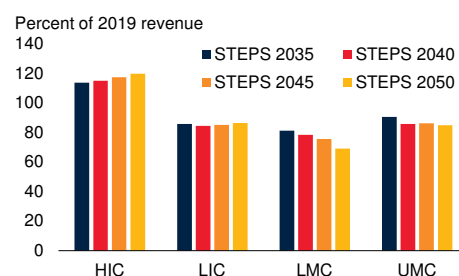
B. Share of base metals in exports and impact of a metal price shock on revenues



C. Share of base metals in exports and impact of a metal price shock on expenditures



D. Resource revenues under IEA STEPS, by country-income groups



Sources: IEA (2025); Natural Resource Governance Institute; World Bank.

Note: HIC = high-income country; LIC = low-income country; LMC = lower-middle-income country; STEPS = Stated policies scenario; UMC = upper-middle-income country.

A. Panel shows the median impact of a 1 percent increase in the country-specific metal price index based on the SVAR methodology. "Immediate response" refers to the response after 1 quarter. "Cumulative response" is the impact over 10 quarters.

B.C. Scatter plot of the average share of base metals in total exports (over 2017–24) and the cumulative impact of a metal price shock on revenue (panel B) and expenditure (panel C), using a SVAR model. Each dot represents one country observation.

D. Panel shows the average resource revenue path for each country group, derived from the STEPs. Revenues are expressed as a share of 2019 levels. For some countries, data for earlier years is used depending on availability.

buffers to avoid procyclical spending; prudently manage SOE-related fiscal risks; and channel temporary windfalls into productivity-enhancing public investment and economic diversification to limit over-reliance on a narrow set of commodities. For fossil fuel exporters, where the transition implies a gradual erosion of the tax base, similar principles apply with a different emphasis: priorities include integrating transition scenarios into fiscal planning; strengthening fiscal frameworks and buffers; managing SOE-related contingent liabilities and decommissioning risks; and developing alternative

revenue sources to preserve equity and macroeconomic stability. Across both groups, policy responses need to be tailored to country-specific circumstances, including fiscal space, commodity dependence, and institutional capacity.

Chapter 5. Managing the Impact of Commodity Price Volatility: Fiscal Policy Options

Many commodity exporters have modernized their fiscal policy management frameworks, including by adopting fiscal rules and fiscal institutions, such as fiscal councils, and establishing SWFs. As shown in chapters 1–4, these efforts have helped countries reduce fiscal procyclicality and volatility to some extent, improve fiscal sustainability, and mitigate the adverse impacts of commodity price fluctuations.¹¹ However, there is still considerable scope for further progress. In chapter 5, Mawejje and Vasishtha conduct an extensive literature review to examine the impact of fiscal frameworks and institutions on the management of fiscal policy in commodity-exporting EMDEs. The chapter also examines the role of market-based mechanisms—such as options, futures contracts, forward contracts, and swap contracts—as complementary tools to help countries smooth the fiscal impacts of commodity price volatility and improve fiscal sustainability.

It addresses the following questions:

- What fiscal frameworks and institutions have commodity-exporting EMDEs adopted since 2000?
- What has been the impact of fiscal frameworks and institutions on fiscal policy outcomes in commodity-exporting EMDEs?
- Under what conditions are fiscal frameworks and institutions in commodity-exporting EMDEs effective in achieving their objectives?

Contributions

The chapter contributes to a large and growing literature on the role of fiscal frameworks and institutions. *First*, it offers a comprehensive and systematic review of the literature on the impact of a broad range of fiscal frameworks and institutions on fiscal policy outcomes in EMDEs, particularly for commodity exporters. It also discusses the role of market-based mechanisms, such as options, futures, forwards, and swap contracts. *Second*, it examines the conditions that shape the efficacy of fiscal frameworks and institutions in supporting policy outcomes in commodity-exporting EMDEs. *Third*, it presents case studies to distill lessons from country experiences in the design and implementation of fiscal policy frameworks. *Fourth*, based on the comprehensive review of the literature and case studies, it offers a menu of policy options to strengthen fiscal policy outcomes in commodity-exporting EMDEs.

¹¹ Refer to, for example, Arroyo Marioli and Végh (2026); Arroyo Marioli, Fatás, and Vasishtha (2024); Arroyo Marioli and Vasishtha (2025); Céspedes and Velasco (2014); Frankel, Végh, and Vuletin (2013); Huidrom, Kose, and Ohnsorge (2018); Mawejje and Odhiambo (2024).

Main findings

This chapter presents the following main findings.

Many commodity-exporting EMDEs have strengthened their fiscal frameworks and institutions since 2000. This includes the adoption of fiscal rules, fiscal councils, the use of SWFs, as well as processes to improve fiscal transparency. Some countries have adopted a mix of these frameworks in an integrated way.¹² On balance, the adoption and strengthening of these frameworks and institutions are associated with better fiscal policy outcomes, including less fiscal procyclicality and volatility, enhanced fiscal sustainability, and improved growth prospects. However, country cases highlight that the efficacy of these frameworks often varies, underscoring that their mere presence is not sufficient to guarantee sound fiscal performance.

The effectiveness of fiscal frameworks and institutions fundamentally hinges on strong governance, adequate fiscal space, implementation capacity, and sustained political commitment. Policy outcomes are better in countries where governance institutions ensure transparency, control corruption, and impose constraints on the bureaucracy. Conversely, fiscal frameworks are less effective where countries lack the technical capacity and governance structures to ensure strong implementation. Strengthening governance, transparency, and institutional quality remains central to improving fiscal outcomes and fostering resilience to commodity price volatility.

Among the core fiscal tools, well-designed fiscal rules and SWFs help reduce fiscal procyclicality and foster long-term fiscal sustainability, particularly when complemented by robust monitoring mechanisms and independent oversight. Fiscal rules, especially those utilizing structural or cyclically adjusted balances, are associated with lower output volatility and improved fiscal sustainability. These benefits are most apparent when the rules include clearly defined escape clauses and strong legal enforcement procedures. SWFs, which are highly prevalent among commodity exporters (especially energy exporters), can serve multiple objectives, although the majority operate either as stabilization funds to insulate the budget from short-term price swings or as savings funds to build intergenerational wealth.

Beyond rules-based frameworks, the adoption of transparent budgetary institutions and MTEFs enhances policy credibility and resource allocation efficiency. Budget transparency is associated with lower borrowing costs, improved government spending efficiency, and enhanced accountability. MTEFs, which set multi-year budgetary targets, contribute to aggregate fiscal discipline and facilitate more strategic resource allocation. These institutional arrangements can strengthen fiscal governance by improving policy predictability, supporting informed decision-making, and reinforcing accountability in the management of public resources.

¹² In Brazil, Chile, and Mongolia, for example, fiscal rules are combined with multiyear expenditure ceilings and a fiscal council. In Botswana and Timor-Leste, flows in and out of the sovereign wealth funds are embedded in a fiscal rule.

Finally, market-based instruments offer specialized methods for managing short-term commodity price risks, although their implementation requires significant expertise and strong communication strategies. Hedging tools—such as options, futures, forward contracts, and swap contracts—can lock in future prices or insure against large price movements, reducing revenue volatility and improving a country's borrowing capacity. However, countries' experiences with market-based risk-management tools have been rather mixed, with the use of these instruments being constrained by technical complexity, cost, and political economy risks.

References

- Addison, T., and A. Lebdioui. 2022. “Public Savings in Africa: Do Sovereign Wealth Funds Serve Development?” WIDER Working Paper 2022/159, United Nations University World Institute for Development Economics Research, Helsinki.
- Alonso, V., C. Arroyo, O. Aydin, V. Balasundharam, H. R. Davoodi, G. Hegab, A. M. Nguyen, N. Salazar Ferro, G. Sher, A. Solovyeva, and N. Tchelishvili. 2025. “Fiscal Rules and Fiscal Councils: Recent Trends and Revisions since the Pandemic.” IMF Working Paper 25/198, International Monetary Fund, Washington, DC.
- Arroyo Marioli, F., and C. A. Végh. 2023. “Fiscal Procyclicality in Commodity-Exporting Countries: How Much Does It Pour and Why?” NBER Working Paper 31431, National Bureau of Economic Research, Cambridge, MA.
- Arroyo Marioli, F., and C. A. Végh. 2026. “Fiscal Procyclicality in Commodity-Exporting Countries: How Much Does It Pour and Why?” *American Economic Journal: Economic Policy* 18 (2): 309–45.
- Arroyo Marioli, F., A. Fatás, and G. Vasishtha. 2024. “Fiscal Policy Volatility and Growth in Emerging Markets and Developing Economies.” *International Review of Economics and Finance* 92 (C): 758–77.
- Arroyo Marioli, F., and G. Vasishtha. 2025. “Fiscal Policy Procyclicality and Volatility in Commodity-Exporting Emerging and Developing Economies: Determinants and Implications for Growth.” Policy Research Working Paper 11037, World Bank, Washington, DC.
- Beetsma, R., X. Debrun, X. Fang, Y. Kim, V. Lledó, S. Mbaye, and X. Zhang. 2019. “Independent Fiscal Councils: Recent Trends and Performance.” *European Journal of Political Economy* 57 (March): 53–69.
- Beetsma, R., X. Debrun, and R. Sloof. 2022. “The Political Economy of Fiscal Transparency and Independent Fiscal Councils.” *European Economic Review* 145 (June): 104118.
- Bleaney, M., and D. Greenaway. 2001. “The Impact of Terms of Trade and Real Exchange Volatility on Investment and Growth in Sub-Saharan Africa.” *Journal of Development Economics* 65 (2): 491–500.
- Bleaney, M., and H. Halland. 2009. “The Resource Curse and Fiscal Policy Volatility.” Discussion Papers 09/09, University of Nottingham, CREDIT.
- Bova, E., P. Medas, and T. Poghosyan. 2016. “Macroeconomic Stability in Resource-Rich Countries: The Role of Fiscal Policy.” IMF Working Paper 16/36, International Monetary Fund, Washington, DC.
- Bulte, E., R. Damania, and R. Deacon. 2005. “Resource Intensity, Institutions, and Development.” *World Development* 33(7):1029–44.

Carneiro, F. G., and L. Garrido. 2016. "Revisiting the Evidence on the Cyclicity of Fiscal Policy across the World." MFM Discussion Paper 16, World Bank, Washington, DC.

Céspedes, L. F., and A. Velasco. 2014. "Was this Time Different? Fiscal Policy in Commodity Republics." *Journal of Development Economics* 106 (C): 92–106.

Chang, H-J., and A. Lebdioui. 2020. "From Fiscal Stabilization to Economic Diversification: A Developmental Approach to Managing Resource Revenues." WIDER Working Paper Series 2020-108, World Institute for Development Economic Research (UNU-WIDER).

Cherif, R., and F. Hasanov. 2014. "Soaring of the Gulf Falcons: Diversification in the GCC Oil Exporters in Seven Propositions." IMF Working Paper 14/177, International Monetary Fund, Washington, DC.

Chinn, M. D., and H. Ito. 2006. "What Matters for Financial Development? Capital Controls, Institutions, and Interactions." *Journal of Development Economics* 81 (1): 163–92.

Coutinho, L., D. Georgiou, M. Heracleous, A. Michaelides, and S. Tsani. 2022. "Limiting Fiscal Procyclicality: Evidence from Resource-Dependent Countries." *Economic Modelling* 106 (January): 105700.

Csordás, S. 2018. "Commodity Exports and Labour Productivity in the Long Run." *Applied Economics Letters* 25(6): 362–65.

Cuddington, J. 1989. "Commodity Export Booms in Developing Countries." *World Bank Research Observer* 4 (2): 143–65.

Dabla-Norris, E., R. Allen, L. Zanna, T. Prakash, E. Kvintradze, V. Lledo, I. Yackovlev, and S. Gollwitzer. 2010. "Budget Institutions and Fiscal Performance in Low-Income Countries." IMF Working Paper 10/80, International Monetary Fund, Washington, DC.

Davoodi, H. R., P. Elger, A. Fotiou, D. Garcia-Macia, X. Han, A. Lagerborg, W. R. Lam, and P. Medas. 2022. "Fiscal Rules and Fiscal Councils: Recent Trends and Performance During the Covid-19 Pandemic." IMF Working Paper 22/11, International Monetary Fund, Washington, DC.

De Renzio, P., P. Gomez, and J. Sheppard. 2005. "Budget Transparency and Development in Resource-Dependent Countries." *International Social Science Journal* 57 (s1): 57–69.

Deaton, A. 1992. "Commodity Prices, Stabilization, and Growth in Africa." *Institute for Policy Reform Working Paper Series* 294803. Institute for Policy Reform. doi:10.22004/ag.econ.294803.

Debrun, X., and T. Kinda. 2017. "Strengthening Post-Crisis Fiscal Credibility: Fiscal Councils on the Rise—A New Dataset." *Fiscal Studies* 38 (4): 667–700.

- Devarajan, S. 2019. “How to Use Oil Revenues Efficiently.” In *Institutions and Macroeconomic Policies in Resource-Rich Arab Economies*, edited by K. Mohaddes, J. B. Nugent, and H. Selim, 218–36. Oxford Academic, <https://doi.org/10.1093/oso/9780198822226.001.0001>.
- Devarajan, S., and Q-T Do. 2023. “Taxation, Accountability, and Cash Transfers: Breaking the Resource Curse.” *Journal of Public Economics* 218: 104816.
- Elbadawi, I., R. Soto, and H. Youssef. 2017. “Sovereign Wealth Funds and Macroeconomic Stabilization in the Home Economy.” Economic Research Forum Working Paper 1175, Cairo.
- Fatás, A., B. Gootjes, and J. Mawejje. 2026. “Dynamic Effects of Fiscal Rules: Do Initial Conditions Matter?” *Journal of International Money and Finance* 161 (February): 103499.
- Frankel, J. A., C. A. Végh, and G. Vuletin. 2013. “On Graduation from Fiscal Procyclicality.” *Journal of Development Economics* 100 (1): 32–47.
- Gaspar, V., L. Jaramillo, and P. Wingender. 2016. “Tax Capacity and Growth: Is there a Tipping Point?” IMF Working Paper 16/234, International Monetary Fund, Washington D.C.
- Gelb, A., S. Tordo, H. Halland, N. Afraa, and G. Smith. 2014. “Sovereign Wealth Funds and Long-Term Development Finance: Risks and Opportunities.” CGD Policy Paper 041, Center for Global Development, Washington, DC.
- Ghosh, A. R., and J. D. Ostry. 1994. “Export Instability and the External Balance in Developing Countries.” *IMF Staff Papers* 41 (2): 214–35.
- Gill, I. S., I. Izvorski, W. van Eeghen, and D. De Rosa. 2014. *Diversified Development: Making the Most of Natural Resources in Eurasia*. Washington, DC: World Bank.
- Hagemann, R. 2011. “How Can Fiscal Councils Strengthen Fiscal Performance?” *OECD Journal: Economic Studies* 2011 (1): 1–24.
- Hesse, H. 2008. “Export Diversification and Economic Growth.” Commission on Growth and Development Working Paper 21, World Bank, Washington, DC.
- Huidrom, R., M. A. Kose, and F. Ohnsorge. 2018. “Challenges of Fiscal Policy in Emerging and Developing Economies.” World Bank Policy Research Working Paper 8455, World Bank, Washington, DC.
- IEA (International Energy Agency). 2025. *World Energy Outlook 2025*. Paris: International Energy Agency. November.
- IMF (International Monetary Fund). 2015. *Fiscal Monitor: The Commodities Rollercoaster: A Fiscal Framework for Uncertain Times*. October. Washington, DC: International Monetary Fund.
- IMF (International Monetary Fund). 2018. *Fiscal Transparency Handbook*. Washington, D.C: International Monetary Fund.

IMF (International Monetary Fund) and World Bank. 2024. “IMF-World Bank Non-Paper on Actions to Support Countries Faced with Liquidity Challenges.” International Monetary Fund and World Bank, Washington, DC.

International Country Risk Guide (database). PRS Group. Accessed on 18 December, 2025.

Isham, J., M. Woolcock, L. Pritchett, and G. Busby. 2005. “The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth.” *World Bank Economic Review* 19 (2):141–74.

Jacks, D. S., K. H. O’Rourke, and J. G. Williamson. 2011. “Commodity Price Volatility and World Market Integration Since 1700.” *The Review of Economics and Statistics* 93 (3): 800–13.

James, A., T. Retting, J. F. Shogren, B. Watson, and S. Wills. 2022. “Sovereign Wealth Funds in Theory and Practice.” *Annual Review of Resource Economics* 14: 621–46.

Kaminsky, G. L., C. M. Reinhart, and C. A. Végh. 2004. “When It Rains, It Pours: Procyclical Capital Flows and Macroeconomic Policies.” NBER Working Paper 10780, National Bureau of Economic Research, Cambridge, MA.

Kose, M. A., S. Kurlat, F. Ohnsorge, and N. Sugawara. 2017. “A Cross-Country Database of Fiscal Space.” Policy Research Working Paper 8157, World Bank, Washington, DC.

Lashitew, A. A., M. L. Ross, and E. Werker. 2021. “What Drives Successful Economic Diversification in Resource-Rich Countries?” *The World Bank Research Observer* 36 (2): 164–96.

Mawejje, J., and N. M. Odhiambo. 2024. “Fiscal Rules and the Cyclicity of Fiscal Policy in the East African Community.” *Applied Economics Letters* 31 (15): 1429–32.

McNabb, K., M. Danquah, and A. Tagem. 2021. “Tax Effort Revisited: New Estimates from the Government Revenue Dataset.” WIDER Working Paper 170, United Nations University World Institute for Development Economics Research, Helsinki.

Michaud, A. M., and J. Rothert. 2018. “Redistributive Fiscal Policies and Business Cycles in Emerging Economies.” *Journal of International Economics* 112 (C): 123–33.

Mooney, H., A. Wright, and K. Grenade 2018. “Fiscal Councils: Evidence, Common Features, and Lessons for the Caribbean.” IDB Policy Brief 300, Inter-American Development Bank, Washington, DC.

Nkurunziza, J., K. Tsowou, and S. Cazzaniga. 2017. “Commodity Dependence and Human Development.” *African Development Review* 29: 1–15.

Ossowski, R., and H. Halland. 2016. *Fiscal Management in Resource-Rich Countries: Essentials for Economists, Public Finance Professionals, and Policy Makers*. World Bank Studies. Washington, DC: World Bank.

- Papageorgiou, C., and N. Spatafora. 2012. "Economic Diversification in LICs: Stylized Facts and Macroeconomic Implications." IMF Staff Discussion Note 12/13, International Monetary Fund, Washington, DC.
- Piguillem, F., and A. Riboni. 2021. "Fiscal Rules as Bargaining Chips." *The Review of Economic Studies* 88 (5): 2439–78.
- Richaud, C., A. G. Mendes, A. Firmin, S. Matta, and S. Essl. 2019. "Fiscal Vulnerabilities in Commodity Exporting Countries and The Role of Fiscal Policy." MTI Discussion Paper 15, World Bank, Washington, DC.
- Schwartz, M. J., and D. W. Beuermann. 2021. *Economic Institutions for a Resilient Caribbean*. Washington, DC: Inter-American Development Bank.
- Talvi, E., and C. A. Végh. 2005. "Tax Base Variability and Procyclical Fiscal Policy in Developing Countries." *Journal of Development Economics* 78 (1): 156–90.
- Tornell, A., and P. R. Lane. 1998. "Are Windfalls a Curse? A Nonrepresentative Agent Model of the Current Account." *Journal of International Economics* 44 (February): 83–112.
- Tornell, A., and P. R. Lane. 1999. "The Voracity Effect." *American Economic Review* 89 (March): 22–46.
- UN Comtrade (database). United Nations. Accessed May 20, 2026. <https://comtradeplus.un.org>.
- UNCTAD (United Nations Conference on Trade and Development). 2021. *Commodities and Development Report 2021: Escaping from the Commodity Dependence Trap through Technology and Innovation*. Geneva: United Nations.
- UNCTAD (United Nations Conference on Trade and Development). 2024. *Pathways to Economic Diversification in Commodity-Dependent Developing Countries*. Geneva: United Nations.
- UNCTAD (United Nations Conference on Trade and Development). 2025. *The State of Commodity Dependence 2025*. Geneva: United Nations.
- van der Ploeg, F., and A. J. Venables. 2011. "Harnessing Windfall Revenues: Optimal Policies for Resource-Rich Developing Economies." *The Economic Journal* 121 (551): 1–30.
- Velasco, A. 1999. "A Model of Endogenous Fiscal Deficits and Delayed Fiscal Reforms." In *Budget Institutions and Fiscal Performance*, edited by J. M. Poterba and J. von Hagen, 76–92. Chicago: University of Chicago Press.
- Velasco, A. 2000. "Debts and Deficits with Fragmented Fiscal Policymaking." *Journal of Public Economics* 76 (April): 105–25.
- World Bank. 2009. *Global Economic Prospects: Commodities at the Crossroads*. Washington, DC: World Bank.

World Bank. 2017. “Economic Diversification: Guidance Note.” Trade and Competitiveness Global Practice, World Bank, Washington, DC.

World Bank. 2018. “The Role of Major Emerging Markets in Global Commodity Demand.” In *Global Economic Prospects: The Turning of the Tide?* June. Washington, DC: World Bank.

World Bank. 2021. *The Changing Wealth of Nations 2021: Managing Assets for the Future*. Washington, DC: World Bank.

World Bank. 2022a. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Bank. 2022b. “Causes and Consequences of Industrial Commodity Price Shocks.” In *Commodity Markets: Evolution, Challenges, and Policies*, edited by J. Baffes and P. Nagle, Chapter 4. Washington, DC: World Bank.

World Bank. 2025a. *Commodity Markets Outlook*. April. Washington, DC: World Bank.

World Bank. 2025b. *Global Economic Prospects*. June. Washington, DC: World Bank.

World Bank. 2026a. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Bank. 2026b. *Global Economic Prospects*. June. Washington, DC: World Bank.

World Economic Outlook (database). International Monetary Fund. Accessed April 15, 2026. <https://data.imf.org/en/datasets/IMF.RES:WEO>.

World Integrated Trade Solution (WITS) (database). World Bank. Accessed May 20, 2026. <https://wits.worldbank.org>.

Volatile revenues are obviously difficult to manage. ... The boom-and-bust phenomenon also makes it very hard for electorates to sort out when a government is making mistakes.

Sir Paul Collier (2007)

Professor of Economics and Public Policy,
The Blavatnik School of Government, University of Oxford

CHAPTER 1

Fiscal Policy Amidst Commodity Price Volatility: Trends and Challenges

Fiscal policy in commodity-exporting emerging market and developing economies (EMDEs) faces persistent challenges from booms and slumps in commodity prices. This chapter examines the evolution of fiscal outcomes in these economies since the turn of the century, with a focus on fiscal dynamics over commodity price cycles. Fiscal positions in commodity exporters are generally weaker than they were before the global financial crisis. Unlike the pre-crisis period—when commodity exporters built buffers and reduced debt amid sustained price booms—recent price swings have occurred against a backdrop of elevated debt and more constrained fiscal space. Sovereign debt risks have also risen more steeply in commodity exporters, likely reflecting their larger primary deficits relative to commodity importers during the 2010s. Over 2020–25, both fiscal revenue and expenditure shares of GDP have averaged lower in commodity exporters than in other EMDEs, albeit with substantial heterogeneity across energy, metal, and agricultural exporters. Fiscal performance in commodity exporters tends to comove with commodity cycles: primary balances typically improve and public debt accumulation slows during booms, while the opposite occurs during slumps. These dynamics largely reflect the strong comovement between revenue growth and commodity prices. Expenditure responses, however, differ across exporters: median spending growth remains broadly stable over the cycle in energy exporters, while it slows during booms relative to slumps in metal exporters, pointing to a countercyclical stance. In agricultural exporters, by contrast, spending often accelerates during booms and slows during slumps, consistent with procyclical fiscal behavior. In the face of revenue volatility, sovereign wealth funds emerge as a key stabilizing instrument, supporting countercyclical spending. Although fiscal frameworks have generally strengthened across EMDEs since 2000, commodity exporters continue to lag other EMDEs in institutional quality.

Introduction

Commodity prices have undergone large fluctuations in recent decades. The boom-bust cycle that started in the early 2000s was striking in terms of the range of commodities that experienced wide swings in their prices. Between 2006 and 2008, the prices of crude oil and wheat surged by over 100 percent, while the price of copper increased by 75 percent. However, this broad-based upswing in commodity prices was disrupted by the global financial crisis, which drove prices back to early 2006 levels by the end of 2008 (figures 1.1.A and 1.1.B). Prices rebounded in the early stages of the economic recovery, and by the end of 2010, prices of many commodities had returned close to or

Note: This chapter was prepared by Bram Gootjes and Garima Vasishtha.

surpassed their pre-crisis peaks. This rally eventually lost steam by 2011, giving way to a moderation in commodity prices through 2014, which subsequently culminated in a collapse in oil prices over the 2014–16 period. Throughout the 2010s, commodity prices generally remained well below their 2008 peaks, alongside softening growth in EMDEs relative to the early 2000s and an expansion in global commodity supply (Aslam et al. 2016).

Earlier this decade, commodity prices surged in the aftermath of the pandemic and Russia's invasion of Ukraine, more than doubling between March 2020 and December 2022. More recently, the conflict in the Middle East generated major disruptions in energy markets, leading to sharp commodity price increases. Although such price swings are a recurring feature of commodity markets, the gyrations in prices since 2020 have once again brought to the fore the complex and volatile relationship between commodity markets and fiscal policy in EMDEs. The severity of the pandemic-related shock has caused a large deterioration in fiscal deficits and an increase in public debt worldwide, putting pressure on existing fiscal frameworks and prompting many countries to allow deviations from numerical fiscal rules (Caselli et al. 2022; Gbohoui and Medas 2020).¹

Movements in commodity prices affect commodity exporters directly through government budgets and external trade balances.² Commodities are critical sources of export and fiscal revenues for about two-thirds of EMDEs and nearly 90 percent of low-income countries (LICs)—a stark contrast to advanced economies, where only about 13 percent of countries rely heavily on commodity exports (figure 1.1.C).³ Among EMDEs, about 25 percent are classified as agricultural commodity exporters, 23 percent as energy exporters, and 16 percent as metal exporters.

Dependence on commodity revenues is particularly high for energy exporters, where such revenues have averaged about 53 percent of total fiscal revenues since 2000 (figure 1.1.D). By comparison, revenues from metal exports made up about 14 percent of total fiscal revenues for metal exporters over this period, while agricultural commodities contributed roughly 11 percent for agricultural exporters. Such dependence on commodity revenues exposes governments to unpredictable price fluctuations, making it

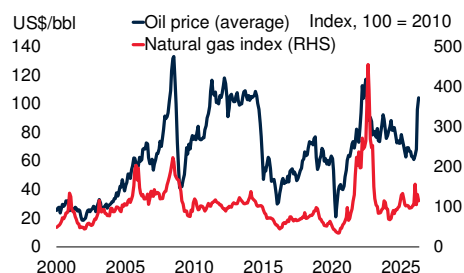
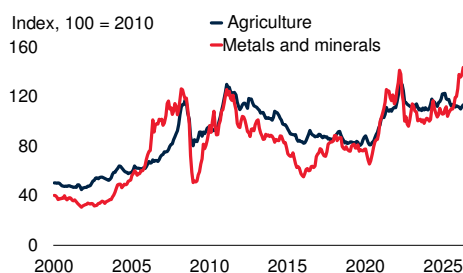
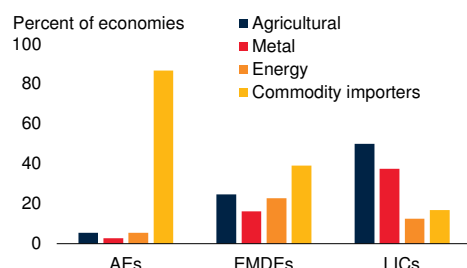
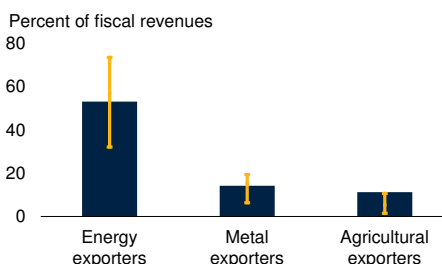
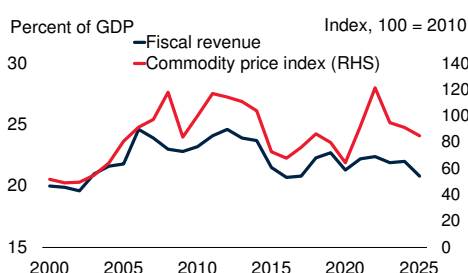
¹ As another illustration of the constraints posed by large and sustained movements in commodity prices on fiscal frameworks in commodity exporters, about one-fourth of these countries suspended their fiscal rules following the collapse in commodity prices in 2014 (Mihalyi and Fernández 2018).

² There are also indirect channels at play, such as changes in exchange rates, borrowing conditions, and asset prices. Changes in commodity prices lead to exchange rate volatility for economies where a few commodities represent a significant share of exports, in turn posing challenges for monetary policy (Drechsel, McLeay, and Tenreyro 2019; Ha, Kose, and Ohnsorge 2019; World Bank 2020a). Further, commodity booms are typically accompanied by strong bank credit growth and increased lending to borrowers who may prove to be less creditworthy during normal times. Rising commodity prices can also lead to lower country risk premiums and larger capital inflows in commodity exporters. These surges in capital inflows, if not managed wisely, can lead to financial crises when commodity prices collapse, and financial conditions tighten.

³ An economy is classified as a commodity exporter if, on average in 2017–19, either its combined exports of all commodities accounted for 30 percent or more of its total exports or its exports of any single commodity accounted for 20 percent or more of its total exports (World Bank 2025a). Economies are excluded if they reached either threshold only because of re-exports. Commodity importers are economies not classified as commodity exporters (table 1.1).

FIGURE 1.1 Global commodity prices and EMDE commodity dependence

Commodity prices have undergone large fluctuations in recent decades. Commodities are critical sources of export and fiscal revenues for about two-thirds of EMDEs and 90 percent of LICs. Commodity dependence is particularly high for energy exporters. Median fiscal revenue in commodity exporters comoves with commodity prices. Commodity dependence is also reflected in the growth performance of commodity exporters, which mirrors the swings in commodity prices.

A. Energy prices**B. Agricultural and metal prices****C. Share of commodity exporters, 2026****D. Share of resource revenue in total revenue****E. Fiscal revenues and commodity prices****F. Commodity prices and GDP growth in commodity exporters**

Sources: United Nations University World Institute for Development Economics Research (UNU-WIDER); World Bank; World Economic Outlook (database).

Note: AEs = advanced economies; bbl = billion barrels; EMDEs = emerging market and developing economies; LICs = low-income countries.

A. Blue line shows monthly average of Brent, Dubai, and West Texas Intermediate crude oil spot prices (equally weighted) in US\$/bbl. Red line shows monthly natural gas price index from the World Bank's Commodity Price Data ("Pink Sheet").

B. Monthly price indexes for agriculture and metals and minerals (excluding precious metals).

C. Share of agricultural, metal, and energy exporters, and commodity importers in advanced economies, EMDEs, and LICs in 2026. Sample includes 38 advanced economies and 154 EMDEs (including 24 LICs).

D. Unweighted average of resource revenue as a share of fiscal revenue for commodity exporters, based on the latest available data. Sample includes 12 agricultural exporters, 15 metal exporters, and 32 energy exporters. Whiskers show the interquartile range.

E. Panel shows the World Bank's aggregate commodity price index and median fiscal revenue for 94 commodity-exporting EMDEs.

F. Real GDP growth and the World Bank's commodity price index in real 2010 U.S. dollars. Aggregate growth for commodity exporters is calculated using GDP weights at average 2010–19 prices and market exchange rates. Sample includes 90 commodity exporters.

more difficult to maintain macroeconomic stability. This challenge is particularly pronounced in economies that export a relatively narrow set of commodities.

In principle, allowing fiscal balances to vary with the cycle—running primary surpluses in good times and deficits in bad times—supports macroeconomic stability, provided that debt remains sustainable and financing constraints are avoided. In practice, however, such countercyclical management has been difficult to sustain. Fiscal policy is typically more volatile in commodity-exporting EMDEs than in other EMDEs (chapter 3; Arroyo Marioli, Fatás, and Vasishtha 2024). Swings in commodity prices often result in highly volatile fiscal revenues in these countries (figures 1.1.E). These revenue swings also tend to spill over into public spending and fiscal balances, making fiscal policy more procyclical—expansionary in good times and contractionary in bad times—than in other EMDEs (chapter 2; Arroyo Marioli and Vasishtha 2025; Arroyo Marioli and Végh 2026). Commodity price fluctuations are also key drivers of the business cycle in commodity-exporting EMDEs—in contrast to advanced-economy commodity exporters—and are associated with high investment and consumption volatility (figure 1.1.F).⁴

Despite the large fluctuations in commodity prices that can destabilize the conduct of fiscal policy in commodity-exporting EMDEs, most studies have evaluated their fiscal behavior against the output cycle. Evidence that explicitly accounts for commodity price swings, while relatively limited, shows that such price volatility increases the propensity toward fiscal procyclicality. For example, estimates suggest that each additional dollar of commodity revenue raises public spending by about \$0.25, on average, with the marginal propensity to spend commodity revenues varying with country characteristics (Mendes and Pennings 2025). At the same time, this procyclical bias appears partly mitigable, as evidenced by the decline in procyclicality in commodity-exporting EMDEs in recent decades, likely reflecting efforts to strengthen public institutions and policy frameworks through the use of fiscal rules (chapter 2; Céspedes and Velasco 2014).

Yet, important gaps remain. Existing work rarely examines the heterogeneity across exporters of different types of commodities (energy, metals, and agriculture), even though their price cycles are only partly synchronized and their policy constraints differ. Moreover, it seldom compares fiscal outcomes in commodity exporters with those of commodity importers, making it difficult to assess whether fiscal trajectories are aligned or markedly different across these country groups. Filling these gaps is increasingly important, especially as global commodity prices display greater volatility, making fiscal management even more challenging for commodity-exporting EMDEs (World Bank 2025b).

To that end, this chapter addresses the following questions:

- How has fiscal policy in commodity-exporting EMDEs evolved since the turn of the century relative to commodity-importing EMDEs?

⁴ IMF (2015); Jacks, O'Rourke, and Williamson (2011); Richaud et al. (2019); and World Bank (2009, 2022).

- How does fiscal policy in commodity-exporting EMDEs comove with commodity price booms and slumps?
- How have fiscal policy frameworks and institutional arrangements in commodity-exporting EMDEs changed over time?
- How have these frameworks and institutions shaped fiscal dynamics over commodity price cycles?

Contribution to the literature

The chapter contributes to the literature in two ways. *First*, it systematically documents how fiscal indicators, as well as the policy and institutional frameworks that shape them, have evolved in commodity-exporting EMDEs since 2000. It draws attention to heterogeneity across different groups of commodity exporters (energy, metals, and agriculture), highlighting how sensitivity to commodity price movements differs across exporters of different commodities. Moreover, it contrasts the evolution of fiscal outcomes in commodity exporters with that in other EMDEs. The analysis is based on an extensive sample of up to 94 commodity exporters and 59 commodity importers, covering a comprehensive set of fiscal indicators, including primary balances, public spending, government revenues, and debt.

Second, the chapter examines the comovement between fiscal variables in commodity-exporting EMDEs and commodity price cycles. For these economies, the volatility of fiscal revenues is primarily influenced by commodity price movements rather than the output cycle, making price swings a central challenge. Despite the extant literature on the cyclical policy with respect to output cycles in EMDEs, very few studies have systematically examined the behavior of fiscal indicators during commodity price booms (a trough-to-peak rise in commodity prices) and slumps (a peak-to-trough decline in commodity prices) for such a large and diverse sample of countries.

Main findings

This chapter presents the following findings:

Reliance on commodity exports is generally associated with lower fiscal revenues. Over 2000–25, median fiscal revenues were about 3 percentage points of GDP lower in commodity-exporting EMDEs than in other EMDEs. This revenue gap is primarily driven by weaker tax collection in commodity exporters, highlighting a negative link between resource revenues and tax effort. These broad patterns, however, mask substantial heterogeneity across countries: fiscal revenues fluctuate with commodity price movements to varying degrees across commodity-exporting EMDEs, in part depending on the degree of resource dependence. A notable exception is the experience of metal exporters in the early 2010s, which sustained revenue growth through tax mobilization even as metal prices declined.

Although median primary expenditure in EMDEs has trended up since 2000, it constitutes a lower share of GDP in commodity exporters than in commodity importers, mirroring patterns in fiscal revenues. Since 2000, median primary expenditure in commodity-exporting EMDEs has averaged close to 3 percentage points of GDP lower than in other EMDEs. Within commodity exporters, expenditures tend to be higher in energy exporters than in agricultural and metal exporters. The composition of expenditure also varies considerably between commodity exporters and importers. Notably, infrastructure (that is, transport and communication) and R&D expenditures have accounted for a smaller share of GDP in commodity exporters, particularly since the 2010s. Similarly, public spending on health has made up a smaller share of GDP in commodity exporters.

Primary balance dynamics in commodity exporters tend to be more revenue-driven than in commodity importers. Primary balances improved markedly in commodity exporters in the first half of the 2000s alongside booming commodity prices. This progress was quickly reversed after the global financial crisis, and the 2010s were characterized by persistent and often widening primary deficits, driven largely by lower revenues. By contrast, commodity importers experienced continued improvements in their primary balances through the mid-2010s. Over 2000–25, average primary deficits were broadly similar across the two groups, but commodity exporters experienced much higher volatility.

The evolution of government debt in both commodity exporters and importers has followed a U-shaped pattern since 2000. Debt reductions prior to the global financial crisis were followed by rapid debt accumulation after 2010, amid worsening primary deficits. Meanwhile, the composition of public debt in EMDEs has shifted toward riskier sources of financing since the global financial crisis. Overall, sovereign debt risks in EMDEs have intensified relative to the pre-crisis period, with a more pronounced deterioration in commodity exporters compared to other EMDEs.

Fiscal outcomes in commodity-exporting EMDEs tend to comove with commodity price cycles, albeit to varying degrees across energy, metal, and agricultural exporters. Revenue growth accelerates sharply during booms and slows during slumps, most prominently in energy exporters and, to a lesser extent, in metal and agricultural exporters. Spending patterns are more varied. In energy exporters, (primary) expenditure growth remains broadly stable over the cycle; in metal exporters, it slows during booms relative to slumps—consistent with countercyclical fiscal management. By contrast, spending in agricultural exporters accelerates during booms and slows during slumps, pointing to procyclical policies. As a result of these dynamics, primary balances in energy and metal exporters tend to strengthen during booms and weaken during slumps, while changes in agricultural exporters are muted.

Fiscal governance frameworks have generally strengthened in both commodity exporters and importers since 2000. The adoption of fiscal rules and SWFs has been more prevalent in commodity exporters than in other EMDEs. To achieve their stated objectives, such frameworks need to be supported by strong institutions. However, commodity exporters are marred by persistent shortcomings in institutional environments—on average,

commodity exporters have ranked lower than other EMDEs on indicators of institutional quality. Among these factors, the presence of SWFs is most consistently associated with prudent fiscal policy management over the commodity price cycle across commodity-exporting EMDEs, while fiscal rules and public institutions have had more limited influence.

Evolution of fiscal outcomes in commodity exporters

This section discusses how fiscal outcomes in commodity-exporting EMDEs have unfolded since 2000. It examines the evolution of fiscal revenues, expenditures, primary balances, and government debt, highlighting differences and similarities both between commodity exporters and importers as well as across different types of commodity exporters (table 1.2 describes the data used). Commodity exporters constitute a very heterogeneous group, with reliance on commodities for fiscal and export revenues differing substantially across countries. Metal and agricultural exporters tend to be less reliant on commodity revenues than energy exporters are on energy income, although there is significant variation even within these groups. The resource sector is also less important to overall economic activity in metal exporters than it is for energy exporters (Baffes and Nagle 2022). Further, commodities differ in several respects, such as the basic structure of underlying markets, resource exhaustibility, and linkages with global activity. For example, metals and energy are used heavily for industrialization and infrastructure building, making their prices more strongly correlated with the global business cycle than those of agricultural commodities (World Bank 2022).

Fiscal revenue

Between 2000 and 2025, median fiscal revenue across commodity exporters averaged about 22 percent of GDP, but revenue outcomes varied considerably across exporters (figure 1.2.A).⁵ Energy exporters led the group, with fiscal revenue averaging about 27 percent of GDP, buoyed by resource revenues that contribute roughly 53 percent of total revenue, on average (figure 1.2.B). In contrast, metal exporters derived only about 14 percent of fiscal revenue from commodities, with fiscal revenue averaging about 22 percent of GDP (figure 1.2.C). Agricultural exporters generate even less revenue from commodities—about 11 percent of total revenue—and their average fiscal revenue stood at just 18 percent of GDP between 2000 and 2025 (figure 1.2.D).

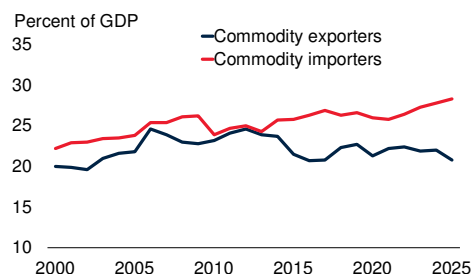
These patterns reflect substantial heterogeneity across commodity exporters in the role of the resource sector in the broader economy. Extraction and export of energy resources

⁵ Commodity price upswings may spur fiscal revenues via both direct and indirect channels. Direct channels include higher tax revenue from commodity exports as well as non-tax receipts (such as profits and royalties) from state-owned companies, particularly in countries where these companies carry out mining and oil production. Indirectly, rising commodity prices can increase revenues by stimulating economic growth in commodity-exporting EMDEs, either by increasing aggregate demand or by easing balance of payments constraints (Ocampo 2017; Rosnick and Weisbrot 2014). Consequently, fiscal indicators expressed as a share of GDP, such as primary balances or public debt, may improve not only because of revenue gains during booms but also due to higher nominal output.

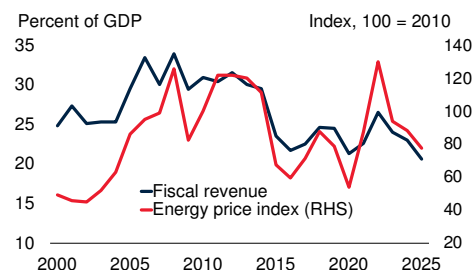
FIGURE 1.2 Fiscal revenue

Reliance on commodity exports is generally associated with lower fiscal revenue. Between 2000 and 2025, median fiscal revenue was about 3 percentage points of GDP lower in commodity-exporting EMDEs than in others. Much of this difference reflects challenges in collecting tax revenues. Among commodity exporters, fiscal revenues fluctuate with commodity prices to varying degrees: energy exporters are much more reliant on resource revenues than exporters of non-energy commodities.

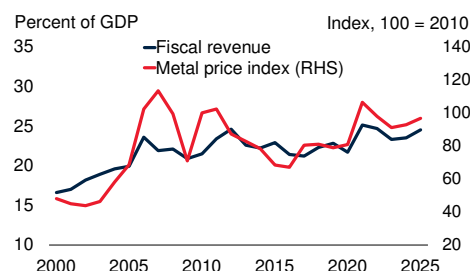
A. Fiscal revenue, by commodity exporter status



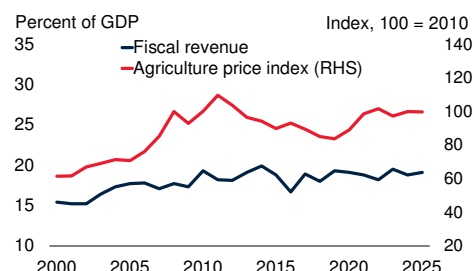
B. Fiscal revenue in energy exporters



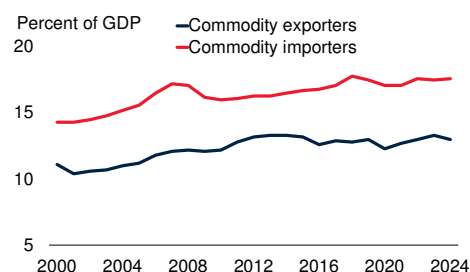
C. Fiscal revenue in metal exporters



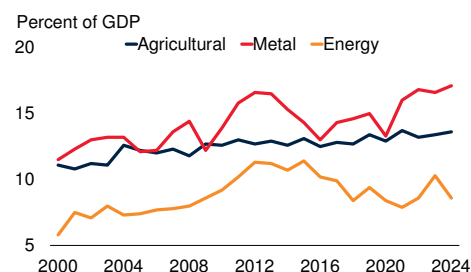
D. Fiscal revenue in agricultural exporters



E. Tax revenues, by commodity exporter status



F. Tax revenues, by type of commodity export



Sources: IMF World Revenue Longitudinal Data; World Bank; World Economic Outlook (database).

Note: EMDEs = emerging market and developing economies.

A. Median fiscal revenue (percent of GDP) for EMDE commodity exporters and commodity importers. Sample includes up to 94 commodity exporters and 59 commodity importers.

B. Panel shows median fiscal revenue (percent of GDP) for EMDE energy exporters and the World Bank energy price index in real 2010 U.S. dollars. Sample includes up to 35 energy exporters.

C. Panel shows median fiscal revenue (percent of GDP) for EMDE metal exporters and the World Bank metal price index, in real 2010 U.S. dollars. Sample includes up to 25 metal exporters.

D. Panel shows median fiscal revenue (percent of GDP) for EMDE agricultural exporters and the World Bank agricultural price index, in real 2010 U.S. dollars. Sample includes up to 38 agricultural exporters.

E. Panel shows median tax revenue (percent of GDP) for EMDE commodity exporters and commodity importers. Sample includes up to 84 commodity exporters and 55 commodity importers.

F. Tax revenue (percent of GDP) for EMDE agricultural, metal, and energy exporters. Sample includes up to 37 EMDE agricultural exporters, 24 metal exporters, and 35 energy exporters.

generally result in larger economic rents due to their scarcity, global demand, and higher prices compared with many metals and agricultural commodities (Gelb 2012). This translates to a higher share of revenue flowing to the government from energy resources compared with other resource types. Moreover, energy exporters tend to have less diversified economic linkages outside the resource sector, making energy revenues critical for government finances and economic activity.⁶ In addition, many metal and agricultural exporters are LICs, which are marred by relatively low revenue-raising capacity.⁷

Reflecting these differences in the links between fiscal capacity and resource dependence, fiscal revenues fluctuate with commodity price movements to varying degrees across commodity exporters. During the early 2000s, fiscal revenues in commodity exporters rose in tandem with rapid growth and increasing commodity prices. For the median exporter, revenues rose from roughly 20 percent of GDP in 2000 to 25 percent in 2006. Most of this increase was driven by energy and metal exporters: energy-exporting EMDEs saw revenues increase from 25 percent to 33 percent of GDP as energy prices—particularly oil—soared, while metal exporters' revenues rose from 17 percent to 24 percent of GDP on the back of sharply higher metal prices. By contrast, revenues in agricultural exporters only inched up from 15 percent to 18 percent of GDP, despite higher agricultural prices.

For energy exporters, this upward trend reversed abruptly during the global financial crisis. A steep drop in average nominal oil prices, from about \$97 per barrel in 2008 to about \$62 in 2009, and a prolonged slump in natural gas prices slashed fiscal revenues to roughly 29 percent of GDP by 2009. The 2014–16 oil-price collapse delivered another blow: revenues in energy exporters fell further to about 22 percent of GDP by 2016 and recovered only slowly thereafter, as prices remained well below their mid-2000s peaks.

Metal exporters fared somewhat better. Although metal prices dipped sharply during the global financial crisis, fiscal revenues declined only modestly, from 24 percent of GDP in 2006 to 21 percent in 2009. Revenues rebounded as prices recovered in 2010 and continued to rise briefly, even after prices began easing again in 2011. By 2012, revenue mobilization had peaked at 25 percent of GDP—nearly 50 percent higher (in nominal GDP terms) than at the turn of the century for the median metal exporter. Throughout the 2010s and into the 2020s, revenues fluctuated with commodity prices but never regained the sustained upward momentum of the early 2000s.

For agricultural exporters, fiscal revenues rose from 15 percent of GDP in 2000 to 20 percent in 2014. Compared with other commodities, price declines were milder during the global financial crisis, limiting revenue losses. However, once agricultural prices

⁶ In many EMDEs reliant on mineral extraction, the structural links between the resource sector and the broader economy tend to be less extensive than in their advanced economy peers, particularly where the mineral sector operates as an enclave economy (Baungsaard 2001). In these cases, the main macroeconomic impact from mineral extraction comes from the revenue collected by the government.

⁷ LICs account for 33 percent of agricultural exporters and 42 percent of metal exporters, compared with about 9 percent of energy exporters.

peaked in the early 2010s, revenue growth soon stalled. In the mid-2010s and early 2020s, fiscal revenues proved more fragile—first amid falling prices and later under the strain of overlapping crises that buffeted these economies.

The above trends in fiscal revenues in commodity exporters contrast with the experience of commodity importers. Since 2000, fiscal revenue as a share of GDP in commodity importers has followed a largely upward trajectory, resulting in a widening gap between the two groups of countries. Over 2000–25, revenue in the median commodity exporter averaged about 22 percent of GDP, roughly 3 percentage points lower than in the median commodity importer. By 2025, this gap had doubled, with median revenue in commodity exporters still at 22 percent of GDP, compared with 28 percent in commodity importers.

Tax revenues. Relatively weak revenue mobilization in commodity-exporting EMDEs largely reflects challenges in collecting tax revenues. Between 2000 and 2024, median tax revenues in commodity exporters averaged 12 percent of GDP, compared with 16 percent in importers (figure 1.2.E). The difference in tax revenues accounts for most of the gap in total fiscal revenues between the two groups of economies, with non-tax resource revenues offsetting only a portion of that gap.

This shortfall in tax revenues partly reflects a negative relationship between natural resource revenues and tax effort: EMDEs endowed with natural resources often substitute resource income for non-resource tax revenues (Benitez et al. 2023; Crivelli and Gupta 2014).⁸ Indeed, tax revenues represent a smaller share of GDP in exporters that are more reliant on commodity income: median tax revenue shares are notably higher in metal and agricultural exporters—averaging 14 and 13 percent of GDP, respectively—than in energy exporters, where tax revenues averaged just 9 percent of GDP (figure 1.2.F). Still, agricultural exporters made steady progress in mobilizing tax revenues between 2000 and 2016, while metal exporters achieved particularly strong gains from 2006 to 2013—even as metal prices fell sharply in 2009 and again in 2011—hinting at efforts to strengthen non-resource taxation. By contrast, energy exporters show little sign of similar progress: tax revenues peaked in the early 2010s during a period of high energy prices and fell sharply in subsequent years.

Fiscal expenditure

Although primary expenditure (excluding interest payments) has been on an upward trend across most EMDEs since 2000, commodity exporters have generally spent less. From 2000 to 2017, median primary expenditure in commodity-exporting EMDEs, as a share of GDP, gradually increased toward the levels of commodity importers, supported by strong revenue growth during the 2000s (figure 1.3.A). However, this

⁸ For instance, an analysis of the relationship between natural resource tax revenue and other tax revenue shows that an increase in one percentage point of GDP in the former is associated with a statistically significant reduction of 1.06 percentage points in the latter in LICs, and 0.96 percentage point in emerging market economies. In contrast, advanced economies show a positive, albeit small and insignificant, relationship (Benitez et al. 2023).

trend was reversed after 2018 as tax revenue mobilization weakened in commodity exporters and total revenues, especially in energy exporters, declined following earlier drops in oil prices. During the pandemic recession of 2020, primary expenditure rose sharply due to increased outlays on health and social protection, reaching highs of 30 percent of GDP in commodity importers and about 27 percent in exporters. Although spending began to normalize in subsequent years, the gap between commodity exporters and importers continued to widen, reaching over 5 percentage points of GDP by 2025.

Overall, fiscal spending in commodity-exporting EMDEs has closely tracked fiscal revenues. The main exception occurred during the 2010s, when primary expenditures rose even as revenues declined—reflecting greater fiscal space due to falling interest payments. Consistent with revenue patterns over the past two decades, primary expenditure as a share of GDP in energy exporters has been the highest, followed by metal and agricultural exporters (figure 1.3.B). However, this pattern shifted in the post-pandemic period, with metal exporters now allocating the largest share of GDP to primary spending.

In the 2000s and 2010s, commodity exporters generally incurred lower net interest payments as a share of total expenditure than commodity importers, reflecting their lower debt levels (figure 1.3.C). In both groups, interest payments declined throughout the 2010s amid historically low global interest rates. However, this trend reversed in recent years as tightening financial conditions drove up borrowing costs—particularly in commodity exporters, where revenues trended down and debt levels remained elevated. Between 2020 and 2025, net interest payments in these countries averaged about 7 percent of total expenditure, about 3 percentage points higher than the 2010–19 average. In contrast, net interest payments in commodity importers remained broadly in line with their pre-pandemic average. Among commodity exporters, agricultural exporters face the highest interest burden. Many of these economies are LICs, where borrowing costs tend to be higher due to elevated risk premiums in bond markets. Typically, agricultural exporters spend over 8 percent of the budget on interest payments.

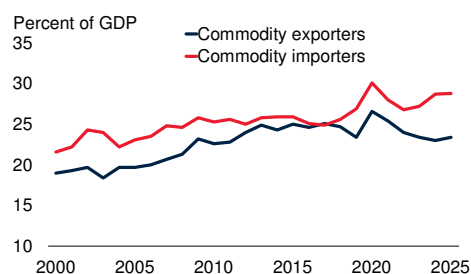
Composition of expenditures. Since 2000, the composition of fiscal expenditures in commodity-exporting EMDEs has diverged from that of commodity importers. While public spending on infrastructure and R&D was roughly equal as a share of GDP across both groups during 2000–09, such spending remained largely flat in commodity exporters but increased substantially in commodity importers over the following decade (figure 1.3.D).⁹ By 2020–21, public expenditures on infrastructure and R&D averaged just 1.7 percent of GDP in commodity exporters, compared with 2.8 percent in other EMDEs. With regard to social expenditures, public spending on education has shown a modest upward trend in commodity exporters since 2000, in contrast to a slight decline in importers. Meanwhile, although health spending increased markedly during the pandemic in both groups, it has been consistently lower in commodity exporters.

⁹ Infrastructure spending includes expenditures on transport and communication.

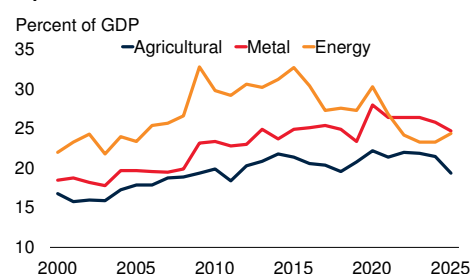
FIGURE 1.3 Fiscal expenditure

Reliance on commodity exports tends to be associated with lower primary expenditure. Over 2000–25, median primary expenditure in commodity-exporting EMDEs averaged about 3 percentage points of GDP lower than in other EMDEs. Among commodity exporters, energy exporters, on average, have higher expenditure-to-GDP ratios than agricultural and metal exporters. Interest payments have accounted for a lower average share of total expenditure in commodity exporters than in other EMDEs. Infrastructure and R&D spending account for a smaller share of GDP in commodity exporters compared with commodity importers.

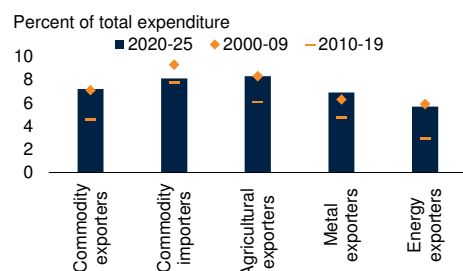
A. Primary expenditure, by commodity exporter status



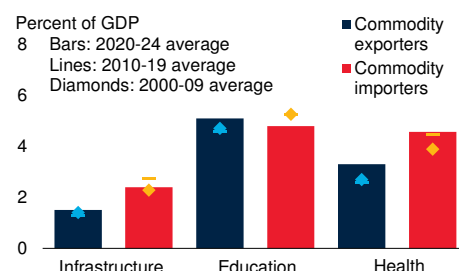
B. Primary expenditure, by type of commodity export



C. Net interest payments



D. Essential public expenditures



Sources: IMF GFS Government Expenditures by Function (accessed in May 2026); World Bank; World Economic Outlook (database).

Note: EMDEs = emerging market and developing economies.

A. Median primary government expenditure (percent of GDP) for EMDE commodity exporters and commodity importers. Sample includes up to 92 commodity exporters and 56 commodity importers.

B. Median government expenditure (percent of GDP) for EMDE agricultural, metal, and energy exporters. Sample includes up to 37 EMDE agricultural exporters, 25 metal exporters, and 34 energy exporters.

C. Net interest spending is defined as the difference between the primary balance and the overall balance. Bars, lines, and diamonds indicate simple averages over 2020–25, 2010–19, and 2000–09, respectively. Sample includes up to 56 commodity importers and 92 commodity exporters, including up to 37 agricultural exporters, 25 metal exporters, and 34 energy exporters.

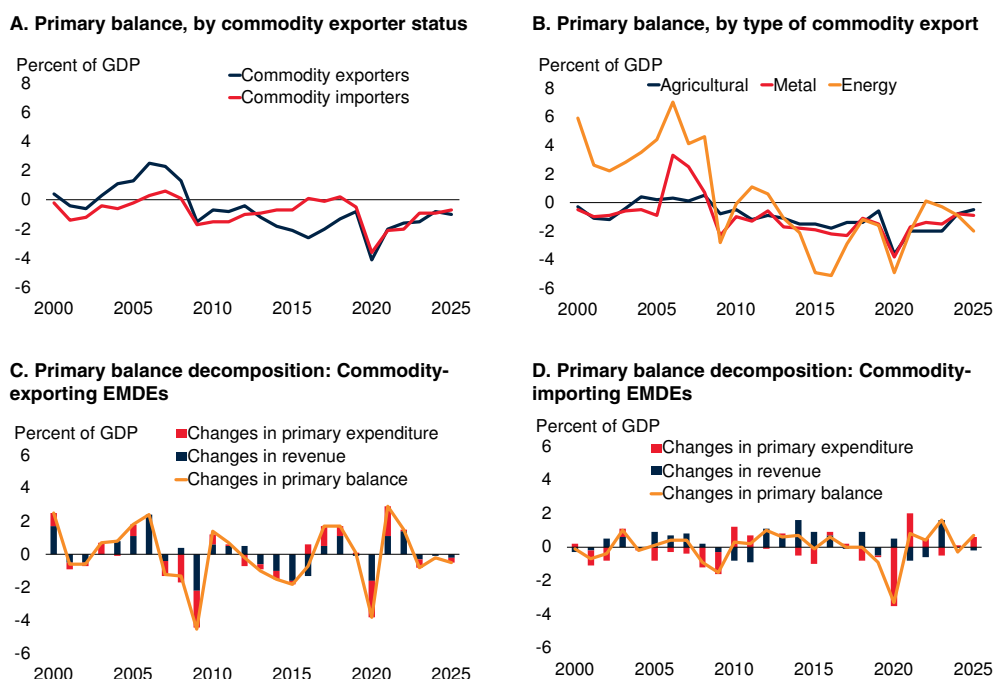
D. Infrastructure expenditure refers to spending on transport and communication. Blue bars indicate simple averages for EMDE commodity exporters over the period of 2020–24; blue lines are the averages over 2010–19; and blue diamonds are the averages of 2000–09. Red bars indicate simple averages for EMDE commodity importers over 2020–24; yellow lines are averages of 2010–19; and yellow diamonds are averages over 2000–09. Sample includes up to 23 EMDE commodity exporters and 21 commodity importers.

Primary balance

Primary balances in EMDEs improved markedly in the first half of the 2000s. This improvement was particularly notable for commodity exporters, where the median primary surplus as a share of GDP increased from 0.4 percent in 2000 to a peak of 2.5 percent just before the global financial crisis (figure 1.4.A). The substantial improvement was mainly driven by energy exporters, amid a sharp increase in fiscal revenues

FIGURE 1.4 Primary balance

Primary balances in EMDEs improved markedly in the first half of the 2000s, particularly for commodity exporters—driven mainly by energy exporters. This progress was reversed as commodity prices plummeted during the global financial crisis. The 2010s were characterized by persistent, and often widening, primary deficits in commodity exporters. The sharp increase in spending needs during the pandemic led to a substantial worsening of primary deficits in both commodity exporters and importers. Overall, changes in primary balances in commodity exporters tend to be more revenue driven than those in other EMDEs.



Sources: Kose et al. (2017; updated in Spring 2026); World Bank; World Economic Outlook (database).

Note: EMDEs = emerging market and developing economies.

A. Median primary balances (percent of GDP) for EMDE commodity exporters and commodity importers. Sample includes up to 92 commodity exporters and 56 commodity importers.

B. Median primary balances (percent of GDP) for EMDE agricultural, metal and energy exporters. Sample includes up to 37 agricultural exporters, 25 metal exporters, and 34 energy exporters.

C. Bars show average contributions of primary expenditure and revenue to changes in primary balance for EMDE commodity exporters. Sample includes up to 94 economies.

D. Bars show average contributions of primary expenditure and revenue to changes in primary balance for EMDE commodity importers. Sample includes up to 59 economies.

during the commodity boom (figure 1.4.B). However, this progress proved to be short-lived as commodity prices plummeted during the global financial crisis, leading to a sharp deterioration that turned primary surpluses into deficits. This decline was compounded by fiscal stimulus measures in metal and energy exporters, with primary expenditures rising by 3 and 6 percentage points, respectively, in 2009.

Throughout much of the first half of the 2010s, primary deficits in commodity exporters continued to worsen, reflecting sluggish output growth and a moderation in commodity

prices from 2011 to 2014, which culminated in a sharp decline through 2016. Although some recovery in commodity prices and economic activity helped narrow deficits in the second half of the decade, the 2010s were characterized by persistent—and often widening—primary deficits in commodity exporters. In contrast, primary balances in commodity importers improved through much of the 2010s, although generally remaining in deficit on account of stimulus implemented after the global financial crisis and anemic post-crisis growth (Kose et al. 2021). Over 2010–19, the median primary deficit in commodity exporters averaged 1.4 percent of GDP, twice as large as that in commodity importers.

The pandemic triggered a broad-based deterioration in government budgets. The sharp increase in spending needs, combined with a contraction in output, led to a substantial worsening of primary deficits in both commodity exporters and importers, with the median deficit increasing by nearly 3 percentage points in 2020. Following a post-pandemic rebound in output growth, and as countries sought to restore fiscal sustainability, primary deficits narrowed significantly over 2021–25, moving closer to balance in both commodity exporters and importers.

Sources of changes in primary balances. Decomposing the changes in primary balances in the last two decades reveals the sticky nature of fiscal policy management in commodity-exporting EMDEs. On average, changes in primary balances in these countries tend to be more revenue-driven than in commodity-importing EMDEs, where changes in expenditure play a relatively larger role (figures 1.4.C and 1.4.D). In particular, the deterioration in primary balances in commodity exporters in the 2010s was largely driven by reduced revenues linked to falling commodity prices. However, marking a break from this pattern, the deterioration of primary balances during the global recession episodes of 2009 and 2020 in commodity exporters and importers alike was driven by sharp increases in expenditures.

Government debt

Since 2000, the evolution of government debt in EMDEs has followed a U-shaped pattern (figure 1.5.A). Between 2000 and 2008, most EMDEs built fiscal space and reduced debt as primary balances improved significantly. This decline in government debt was especially pronounced among commodity exporters, fueled by strong revenue growth amid steadily rising commodity prices. During this period, median government debt fell by more than half in these countries, dropping from about 56 percent of GDP in 2000 to 25 percent in 2008.

Beyond improved fiscal balances, three additional factors contributed to debt reductions across EMDEs (Huidrom, Kose, and Ohnsorge 2016). First, many EMDEs made progress in reducing fiscal policy procyclicality, choosing to build fiscal buffers rather than fully spending windfall revenues (Frankel, Végh, and Vuletin 2013). Second, debt relief initiatives, including the Heavily Indebted Poor Countries (HIPC) Initiative and

the Multilateral Debt Relief Initiative (MDRI), helped reduce debt sharply in many LICs.¹⁰ Third, institutional arrangements in many EMDEs helped strengthen debt management in the early 2000s, reducing debt-to-GDP ratios (Anderson, Silva, and Velandia-Rubiano 2010; Frankel, Végh, and Vuletin 2013).

This progress was reversed following the global financial crisis, pointing once again to fiscal vulnerabilities induced by swings in commodity prices. Government debt increased markedly in commodity-exporting EMDEs in the aftermath of the commodity price plunge of 2011–16—and especially the oil price collapse of 2014–16—as fiscal deficits surged amid declining revenues and fiscal stimulus measures (World Bank 2018). The upward trend in EMDE government debt was exacerbated further by the COVID-19 pandemic and overlapping adverse shocks in subsequent years. Median government debt in commodity exporters and importers increased by about 10 percentage points and 7 percentage points, respectively, in nominal GDP terms, from 2019 to 2021. By 2025, median debt in commodity exporters had nearly doubled from its 2010 level, reaching 51 percent of GDP, while debt in commodity importers increased by about one-half to reach about 59 percent of GDP.

Although the U-shaped pattern in government debt is evident for all types of commodity exporters, the evolution of debt has been shaped by country- and commodity-specific factors (figure 1.5.B; World Bank 2022). For instance, in agricultural exporters, government debt as a share of GDP increased steadily from 2008 until the onset of the COVID-19 pandemic, after which it rose sharply. Energy exporters entered the global financial crisis with historically low debt levels but experienced a substantial increase in debt in the 2010s, particularly after the oil price plunge of 2014–16, as revenues plummeted and primary deficits worsened. In contrast, debt in metal exporters declined between 2008 and 2014, followed by a pronounced surge in subsequent years.

More recently, post-pandemic trends have diverged across exporters. Notably, while debt ratios in metal and energy exporters have returned to their pre-pandemic levels, debt in agricultural exporters has remained elevated above such levels, reflecting persistently high primary deficits in these countries. Weaker fiscal positions in agricultural exporters, compared to energy and metal exporters, can be explained in part by differences in price volatility and the ability of governments to manage resource revenues. Shocks to agricultural commodity prices are more permanent in nature, while industrial commodity price shocks tend to be more transitory (Kabundi, Vasishtha, and Zahid 2022).¹¹ Additionally, most agricultural exporters are LICs, which face long-standing challenges in mobilizing domestic revenues amid weaker institutions and a greater incidence of corruption compared to other EMDEs.

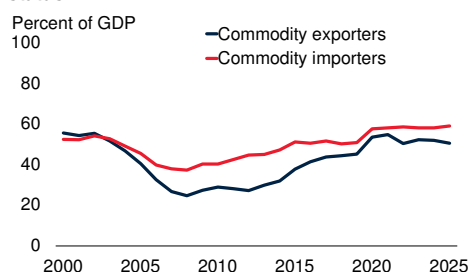
¹⁰ Thirty-two commodity-exporting developing countries benefited from substantial debt relief under the HIPC Initiative and the MDRI (Richaud et al. 2019).

¹¹ Empirical evidence based on a frequency-domain approach applied to 27 commodity price series over the period 1970–2019 indicates that the permanent component accounted for two-thirds of price variability. By comparison, it accounted for about 45 percent of price variability for metals (including base and precious) and less than 30 percent for energy (Kabundi, Vasishtha, and Zahid 2022).

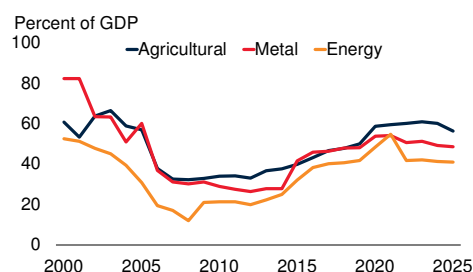
FIGURE 1.5 Government debt

The evolution of EMDE government debt since 2000 has followed a U-shaped pattern. In the run-up to the 2008–09 global financial crisis, declining debt bolstered EMDE fiscal space. The reduction in median government debt was particularly large for commodity exporters. This pattern was reversed over the subsequent decade, as median government debt rose markedly alongside the plunge in commodity prices over 2011–16. Meanwhile, the composition of EMDE debt has shifted toward riskier sources of financing since the global financial crisis, making EMDEs increasingly vulnerable to debt distress.

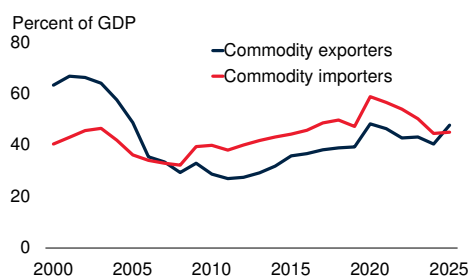
A. Government debt, by commodity exporter status



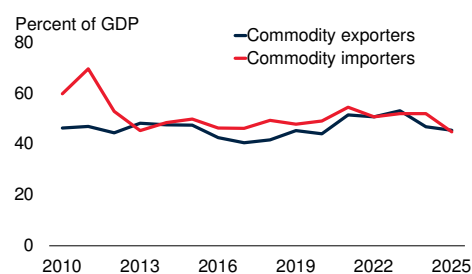
B. Government debt, by type of commodity export



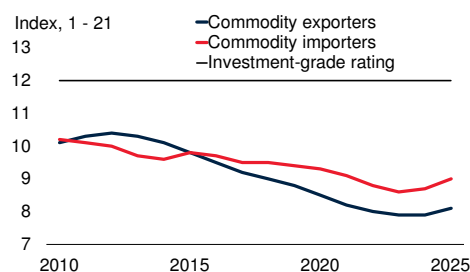
C. External debt



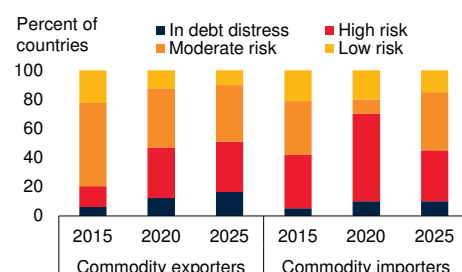
D. Government debt in foreign currency



E. Long-term sovereign debt ratings



F. IMF-WBG debt sustainability analysis



Sources: Kose et al. (2017; updated in Spring 2026); World Bank.

Note: EMDE = emerging market and developing economy.

A. Median government debt (percent of GDP) for up to 92 EMDE commodity exporters and 57 EMDE commodity importers.

B. Median government debt (percent of GDP) for EMDE agricultural, metal, and energy exporters. Sample includes up to 38 agricultural exporters, 25 metal exporters, and 33 energy exporters.

C. Median external debt (percent of GDP) for up to 84 EMDE commodity exporters and 54 EMDE commodity importers.

D. Median government debt in foreign currency (percent of total debt) for up to 23 EMDE commodity exporters and 19 EMDE commodity importers.

E. Simple averages of foreign currency long-term sovereign debt ratings. Sovereign debt ratings are converted to a numerical scale ranging from 1–21, with a higher value indicating a better rating. The horizontal line (at 12) indicates investment-grade rating. Sample includes up to 66 EMDE commodity exporters and 40 commodity importers.

F. Share of EMDE commodity exporters and importers in debt distress or at risk of debt distress, based on the joint World Bank-IMF Debt Sustainability Framework for Low-Income Countries (LIC-DSF). Sample includes up to 48 EMDE commodity exporters and 20 commodity importers.

Composition of debt. Alongside the buildup in debt, the composition of debt has shifted toward riskier sources of financing in both commodity exporters and importers, particularly since the global financial crisis. In the run-up to the crisis, median external debt—including obligations held by both the public and private sectors—declined by more than half in commodity exporters, from about 63 percent of GDP in 2000 to about 29 percent in 2008 (figure 1.5.C).¹² This was largely due to the decline in debt across LICs in the 2000s, driven by the HIPC Initiative and the MDRI. However, as these initiatives tapered off in the 2010s and underlying structural challenges continued to weigh on investment and growth, much of this progress was reversed (Ferry and Raffinot 2019). By 2025, external debt in commodity-exporting EMDEs had climbed back to about 48 percent of GDP, over 14 percentage points higher than its 2010–19 average, and exceeding that of commodity importers again.

Rising debt vulnerabilities in commodity exporters are also evident in the growing share of foreign-currency-denominated public debt. After some initial improvements in the early 2010s, the median share rose from 40 percent of total debt in 2017 to over 45 percent in 2025 (figure 1.5.D). These growing vulnerabilities are further reflected in a deterioration in long-term sovereign debt ratings. Although a similar decline is evident for commodity importers, downgrades in sovereign debt ratings have been more pronounced for commodity exporters (figure 1.5.E).

Many EMDEs are now increasingly vulnerable to debt distress, especially following the sharp rises in debt levels and borrowing costs in recent years. Among commodity exporters, the share of countries in debt distress has increased nearly threefold since 2015, reaching about 16 percent in 2025; an additional 35 percent are at high risk, while 39 percent face a moderate risk of debt distress (figure 1.5.F). Consequently, the overall debt risk profile in commodity exporters has deteriorated significantly since 2015, with the share of countries at low risk shrinking from about 22 percent to 10 percent. Commodity importers also face substantial debt vulnerabilities, although a significantly higher share of these countries is classified as being at low risk.

Fiscal policy during commodity booms and slumps

The previous section established broad patterns in the evolution of fiscal outcomes in commodity exporters since 2000, highlighting that fiscal performance in these countries is closely linked to movements in commodity prices, albeit to varying degrees across different types of commodity exporters. Building on these insights, this section examines commodity price cycles, a regular feature of commodity markets. It focuses on the comovement between these price cycles and key fiscal indicators in commodity-

¹² Distinguishing between public and private external debt is challenging because this distinction is not readily available in existing data sources. Nevertheless, private sector debt—whether domestic or external—can affect fiscal sustainability if explicit or implicit government guarantees create contingent liabilities (Kose et al. 2021). In such cases, governments may be required to assume private debt obligations in the event of borrower default (Cebotari 2008).

exporting EMDEs, thereby more formally examining fiscal dynamics during commodity booms and slumps.

This perspective complements, but differs from, the standard approach in the fiscal cyclicity literature which predominantly evaluates discretionary fiscal policy responses to output fluctuations and classifies them as procyclical, acyclical, or countercyclical.¹³ Because commodity price cycles and output cycles in commodity exporters are related but not fully synchronized, comparisons across the two approaches should be interpreted with caution. A key methodological constraint is that, while elasticities of government spending and revenues—and, by extension, fiscal balances—with respect to the output cycle are well established and widely used to construct cyclically adjusted fiscal indicators, elasticities of fiscal variables with respect to commodity prices are less well understood and mostly available for individual countries. This makes it difficult to credibly net out the direct effects of commodity price movements on fiscal variables, and hence to distinguish between the effects of automatic stabilizers and discretionary policy responses in cross-country analyses. Accordingly, the exercise presented in this section is explicitly correlational—it identifies broad patterns, not causes. As in the previous section, differences across the three groups of commodity exporters (energy, metal, and agricultural exporters) are highlighted.

Methodology

Identifying commodity price cycles. To identify commodity price cycles, standard techniques used to study business cycles are applied to global price indexes for energy, metals, and agriculture. The procedure employed here was introduced by Balatti (forthcoming) and is a modification of a widely used algorithm for dating business cycles, based on Cashin, McDermott, and Scott (2002), Harding and Pagan (2002), and World Bank (2022).¹⁴ Specifically, the business-cycle-specific approach of Harding and Pagan (2002) is refined to better identify turning points in commodity prices. The algorithm is applied to real commodity price indexes at a monthly frequency, taken from the World Bank Commodities Price Data (the Pink Sheet) (annex 1A).¹⁵ A *boom* in commodity markets is defined as a trough-to-peak rise in commodity prices; a *slump* is a peak-to-trough decline.¹⁶ A full *cycle* consists of both a boom and the subsequent slump.

¹³ Chapter 2 offers a detailed analysis of the cyclicity of fiscal policy in commodity-exporting EMDEs along these lines.

¹⁴ Other applications of this type of technique to identify commodity price cycles for a broad range of commodities include IMF (2012). Examples of studies focusing on metal price cycles include Roberts (2009) and Rossen (2015).

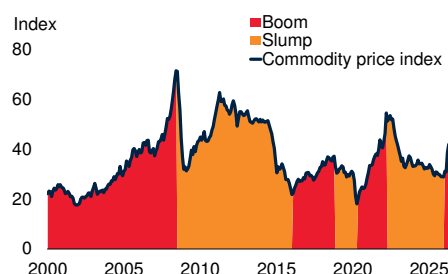
¹⁵ To identify turning points, data on real commodity prices are taken from January 1970 to April 2026. Similar results are obtained when nominal prices are used to identify turning points (results are available on request). The starting point for the sample is 1970 to leverage the full span of available data and ensure accurate identification of commodity price cycles.

¹⁶ To match the identification of the commodity price cycle, which is based on monthly data, with fiscal variables observed annually, the start of a boom or slump is defined as the first year after the relevant turning point. This approach reflects both the calendar-year basis of fiscal policy in most countries and the fact that government spending often responds with a lag.

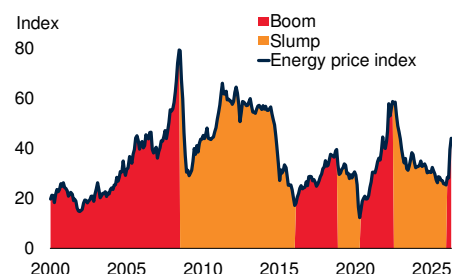
FIGURE 1.6 Commodity price cycles

Commodity price cycles are a repeated feature of commodity markets. Between January 2000 and April 2026, four boom and three slump phases are identified in the composite and energy price indexes. Metal prices exhibit slightly more frequent fluctuations, with four booms and slumps. Meanwhile, agriculture prices moved through longer cycles, with only two booms and three slumps.

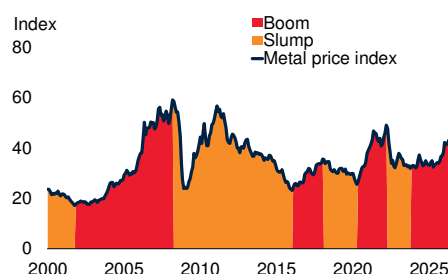
A. Composite commodity price index



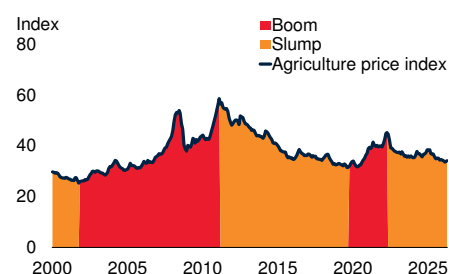
B. Energy price index



C. Metal price index



D. Agricultural price index



Sources: Balatti (forthcoming); U.S. Bureau of Labor Statistics; World Bank.

Note: Panels display commodity price booms and slumps identified using the algorithm in Balatti (forthcoming). To reflect the annual production cycle of many agricultural commodities, each phase (peak-to-trough or trough-to-peak) must last at least 12 months, while full cycles (peak-to-peak or trough-to-trough) must span a minimum of 36 months. The algorithm operates on actual (U.S. CPI-deflated) price levels rather than trend-adjusted data and incorporates an amplitude filter to exclude minor fluctuations, thereby capturing only significant booms and slumps.

Between January 2000 and April 2026, seven phases—four booms and three slumps—are identified based on turning points in both the overall commodity price index and the energy price index (figures 1.6.A and 1.6.B). Metal prices exhibited more frequent turning points, cycling through eight distinct phases—four booms and four slumps (figure 1.6.C). Agricultural prices were more stable, with five phases—two booms and three slumps (figure 1.6.D). Overall, the results reveal a degree of synchronization across commodity groups over time, alongside a trend toward shorter and more volatile cycles in recent years (World Bank 2024, 2025a).

Examining fiscal dynamics over cycles. Having identified these commodity price cycles, the analysis examines fiscal dynamics in commodity-exporting EMDEs over booms and slumps, using commodity-group-specific price cycles for each exporter category (for instance, fiscal dynamics in metal exporters are assessed against global metal price cycles). To control for trend components, the analysis is based on changes in fiscal

variables expressed in real terms—that is, growth in real primary expenditures, real revenues, and real public debt.¹⁷ While this approach does not remove the influence of automatic stabilizers, it filters out fiscal movements driven by large swings in nominal output. Primary balances are expressed as a share of GDP, following the literature. The significance of the fiscal response over commodity cycles is tested in two ways: (i) a non-parametric k -sample test, which assesses whether the distributions of changes in fiscal variables during booms and slumps are statistically identical; and (ii) a paired t -test based on within-country differences, which compares the distribution of changes in country-level fiscal variables between booms and slumps.¹⁸

Commodity-linked fiscal cycles

Results indicate that primary balances tend to comove strongly with commodity price cycles, improving during price booms and deteriorating during price slumps, with statistically significant differences between the two phases. As a share of GDP, the median primary balance rises and falls by 0.3 percentage point per year during booms and slumps, respectively (table 1.3).¹⁹ Consistent with this pattern, real public debt tends to accumulate rapidly during slumps (8.3 percent annual growth), while it grows only modestly during booms (0.7 percent).²⁰

Movements in primary balances largely reflect significant revenue fluctuations that are closely tied to commodity prices. In real terms, government revenues grow by 7.1 percent during typical boom years, compared with 2.7 percent during slumps. By contrast, patterns in expenditures are less pronounced across booms and slumps. Real government spending grows at broadly similar rates in booms (4.1 percent per year) and slumps (4.6 percent per year), with both tests indicating that the differences between the two phases are not statistically significant. This largely reflects modest differences in primary expenditure growth, which averages 4.5 percent during both booms and slumps. In contrast, interest payments comove with the cycle—rising sharply during slumps (7.9 percent) relative to booms (2.3 percent)—consistent with lower borrowing costs and stronger GDP growth during commodity price booms and higher borrowing costs during slumps. Overall, these findings suggest that median government spending in commodity exporters is broadly acyclical over commodity price cycles—contrasting with the procyclical expenditure patterns often identified in year-to-year panel regressions, typically evaluated relative to the output cycle.

¹⁷ Expenditures, revenues, and debt are expressed in real terms using country-specific GDP deflators.

¹⁸ Years in which countries received HIPC support are excluded. This ensures a clearer assessment of fiscal dynamics in commodity exporters across commodity price cycles.

¹⁹ Throughout this section, the reported changes in fiscal variables are expressed in percentage points per year.

²⁰ The first part of the chapter highlighted clear differences in fiscal policies before and after the 2008–09 global financial crisis, with one of the most striking shifts being a sharp rise in public debt accumulation. In light of these patterns, the analysis was conducted separately for the pre- and post-crisis subsamples. Results show that debt accumulation patterns over the commodity cycle changed in the post-crisis period, with debt increasing during both booms and slumps. However, these results (available on request) should be interpreted with caution, owing to the limited number of complete commodity price cycles available for analysis in the post-crisis era.

Heterogeneity across commodity exporters

The dynamics reported in the previous section are based on a pooled sample of all commodity-exporting EMDEs—an aggregation that can obscure important nuances in fiscal behavior across countries. A disaggregated look at energy, metal, and agricultural exporters confirms this, revealing substantial heterogeneity in the evolution of most fiscal indicators.

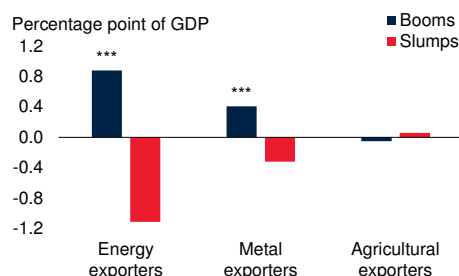
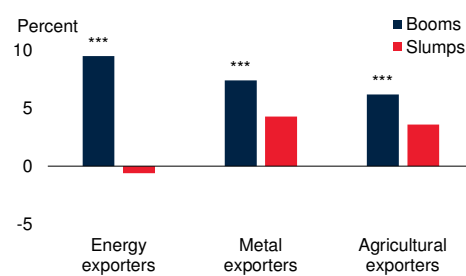
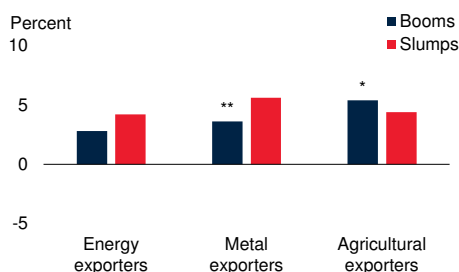
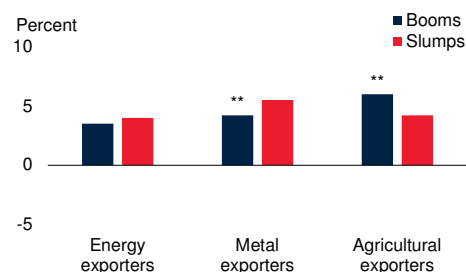
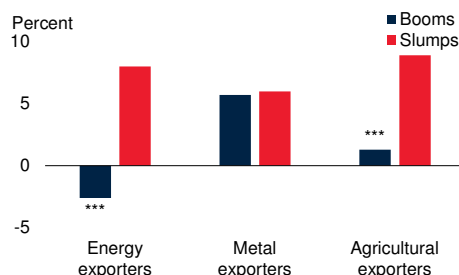
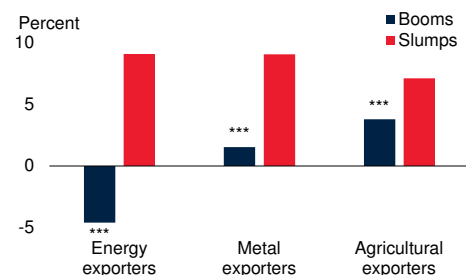
The strong cyclical pattern in median primary balances is primarily driven by energy and metal exporters. Among energy exporters, the median primary balance (as a share of GDP) increases by 0.9 percentage point per year during booms and decreases by 1.1 percentage points per year during slumps (figure 1.7.A). These swings reflect sizable revenue shifts: real revenue grows by 9.5 percent in booms and declines by 0.6 percent in slumps (figure 1.7.B). Metal exporters exhibit more muted—but still significant—responses, with the median primary balance improving by 0.4 percentage point during booms and deteriorating by 0.3 percentage point during slumps, consistent with their lower reliance on highly volatile resource revenues compared to energy exporters.

Expenditure dynamics also matter. Real total expenditure growth in energy exporters does not differ significantly between booms (2.8 percent) and slumps (4.2 percent), suggesting that spending remains broadly contained over the cycle (figure 1.7.C). Meanwhile, metal exporters show signs of countercyclical behavior: spending grows significantly faster during slumps (5.6 percent) than during booms (3.5 percent)—a pattern that holds when interest payments are stripped out (figure 1.7.D). In fact, interest payment growth remains broadly stable over the cycle for metal exporters, unlike in energy and agricultural exporters (figure 1.7.E). Together, these outcomes point to prudent spending responses among both energy and metal exporters over commodity price cycles, consistent with the aggregate results. This may seem at odds with some of the literature on fiscal procyclicality, but it aligns with evidence that in parts of Latin America and the Middle East—regions that host many energy and metal exporters—governments contained, and in some cases even reduced, spending during the commodity booms of the 2000s (Céspedes and Velasco 2014).

In contrast, changes in primary balances in agricultural exporters are more muted, with no significant differences in the median response of primary balances over commodity price cycles. This may partially reflect their lower dependence on commodity revenues compared to metal and, especially, energy exporters. However, it also masks important offsetting movements in revenue and expenditure components. For example, unlike in energy and metal exporters, real expenditure growth significantly accelerates from 4.4 percent during slumps to 5.4 percent during booms, driven by sharp swings in primary expenditures over the cycle. In contrast to energy and metal exporters, these dynamics are therefore consistent with a more procyclical pattern of (primary) spending among agricultural exporters. The stronger (weaker) expenditure growth during booms (slumps) consequently offsets the revenue gains (losses), leaving primary balances in agricultural exporters broadly unchanged between phases.

FIGURE 1.7 Fiscal dynamics over commodity cycles

Fiscal performance in commodity-exporting EMDEs tends to comove with commodity price cycles, although to varying degrees across countries. The median primary balance in energy exporters tends to strengthen during booms and weaken during slumps, reflecting sizable swings in revenue growth. Metal and agricultural exporters display more muted primary balance dynamics; revenue growth in metal exporters is relatively balanced over the cycle, while revenue gains in agricultural exporters during booms are offset by accelerating expenditure growth. While public debt growth follows similar trends across all three groups, agricultural exporters experience the largest debt buildup during both phases, consistent with their underlying fiscal dynamics.

A. Change in primary balance**B. Real revenue growth****C. Real total expenditure growth****D. Real primary expenditure growth****E. Real interest payment growth****F. Public debt growth**

Sources: Kose et al. (2017; updated in Spring 2026); World Bank; World Economic Outlook (database).

Note: ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively.

A.-F. Panels show median changes in the indicated fiscal variables during commodity price booms and slumps. Sample includes up to 38 agricultural exporters, 25 metal exporters, and up to 34 energy exporters.

These fiscal patterns translate into distinct public debt patterns over the commodity price cycle. For all commodity exporter groups, debt dynamics differ significantly between booms and slumps (figure 1.7.F). The differences are particularly stark for energy exporters, with real debt stocks declining by 4.6 percent per year during booms and rising by 9.1 percent during slumps. Metal and agricultural exporters tend to accumulate debt in both phases, though to varying degrees. In metal exporters, debt growth during commodity price booms is modest at 1.5 percent per year, accelerating to 9.1 percent in slumps—mirroring the pace seen in energy exporters. Agricultural exporters fare worse, with real debt rising by 3.8 percent annually during booms and accelerating to 7.1 percent during slumps. These observations underscore how underlying fiscal responses leave agricultural exporters most vulnerable to debt accumulation over the cycle.

Policy frameworks and institutions in commodity exporters

While fiscal policy plays a key role in shaping macroeconomic performance in commodity-exporting countries facing volatile commodity prices, such policies need to be supported by sustainable, well-designed, and stability-oriented fiscal frameworks. The institutional environment also plays a critical role, with evidence indicating that macroeconomic and growth outcomes tend to be better in commodity exporters with stronger economic and public institutions (Arezki and Bruckner 2010; Arezki, Hamilton, and Kazimov 2011; van der Ploeg 2011). In this context, this section first examines how two main fiscal governance arrangements—fiscal rules and SWFs—have evolved in commodity exporters over recent decades.²¹ Next, it examines how institutional quality in commodity exporters compares with that in other EMDEs.

Fiscal rules

A growing number of commodity-exporting EMDEs have adopted numerical fiscal rules over the past two decades to guide fiscal policy. The number of commodity-exporting EMDEs with at least one fiscal rule rose from 15 in 2000 to 50 in 2024, with a particularly strong increase in the 2000s—more than twofold between 2000 and 2010 (figure 1.8.A). A noticeable spike in adoption followed the global financial crisis, driven by heightened concerns about fiscal sustainability. In 2024, the share of commodity-exporting EMDEs with at least one fiscal rule in place was comparable with that of commodity importers, though the pace of adoption has been notably faster among exporters.

Fiscal rules impose lasting numerical constraints on budgetary aggregates, with the aim of promoting prudent fiscal policies. They are typically categorized into four main types:

²¹ Although some commodity exporters have also adopted medium-term expenditure frameworks and fiscal councils, these arrangements are less prevalent. Chapter 5 provides a comprehensive account of the different types of fiscal frameworks adopted by commodity-exporting EMDEs.

- i. *Budget balance rules*, which specify a maximum allowable fiscal deficit;
- ii. *Debt rules*, which establish an upper limit for the accumulation of public debt;
- iii. *Expenditure rules*, which constrain the growth of government spending or the overall size of government;
- iv. *Revenue rules*, which set a floor or a ceiling for government (tax) revenues.

Commodity-exporting EMDEs have often adopted a combination of fiscal rules, typically blending a sustainability anchor that restricts the accumulation of public debt with operational limits on public expenditures or fiscal deficits. Fewer countries have targeted a single fiscal indicator. Budget balance rules have been adopted most often, followed by debt and expenditure rules. Revenue rules are less common, partly because governments have limited control over annual revenues. Furthermore, the design of fiscal rules varies significantly across commodity-exporting countries, reflecting country-specific challenges and needs. Initially, the pace of adoption of fiscal rules was faster in agricultural and metal exporters, but by 2024, the share of energy exporters with fiscal rules had caught up (figure 1.8.B).

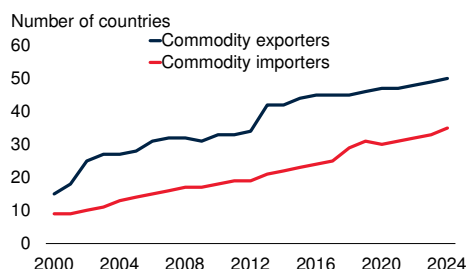
The experience with fiscal rules among commodity exporters has been mixed. A strand of the literature finds that the presence of fiscal rules has improved fiscal discipline in these countries by reducing fiscal procyclicality and improving fiscal balances (Apeti, Basdevant, and Salins 2023; Céspedes and Velasco 2014). However, other studies have found limited effects, indicating that commodity exporters with fiscal rules do not consistently demonstrate a significant improvement in the stabilizing role of government spending (Bova, Medas, and Poghosyan 2018; Coutinho et al. 2022). Moreover, fiscal rules have had limited success in mitigating the impact of resource revenue fluctuations on fiscal policy and in ensuring sustainability (Eyraud, Gbohoui, and Medas 2023; Richaud et al. 2019).

The mixed results on fiscal rule performance in commodity exporters are partly due to the inherent difficulty of designing rules that can withstand the fundamental uncertainty and volatility of commodity revenues, as well as rapid changes in the economic environment. Additionally, the lack of success may be attributed to weak compliance, which is influenced by the political dynamics associated with spending resource rents. Country experiences indicate that effective fiscal rules are typically easy to monitor, flexible, and based on a strong legal foundation (Caselli and Reynaud 2020; Guerguil, Mandon, and Tapsoba 2017). Broad institutional coverage and supporting mechanisms, such as fiscal councils and budget transparency, are also important (Gootjes and de Haan 2022). Finally, strong public institutions have been shown to play a critical role in creating an enabling environment in which fiscal rules can deliver lasting improvements in primary balances among commodity exporters (Fatás, Gootjes, and Mawejje 2026; World Bank 2026a). Chapter 5 provides a detailed description of the different types of fiscal rules as well as trends in their adoption over time and their effectiveness in promoting fiscal discipline in commodity exporters.

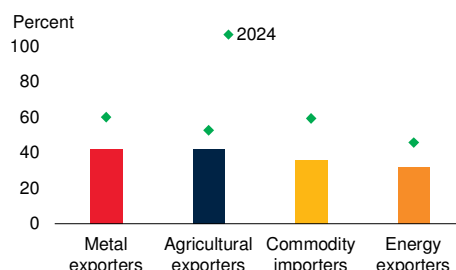
FIGURE 1.8 Fiscal rules and sovereign wealth funds

A growing number of EMDEs have adopted numerical fiscal rules over the past two decades, with particularly strong growth in commodity exporters in the 2000s. These trends have been accompanied by a substantial increase in the number of operational sovereign wealth funds (SWFs), which have tripled in commodity exporters since 2000. Among commodity exporters, SWFs are more prevalent in energy exporters than in metal and agricultural exporters.

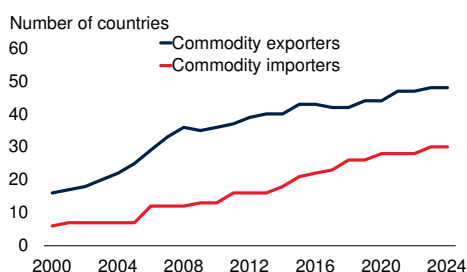
A. Fiscal rules



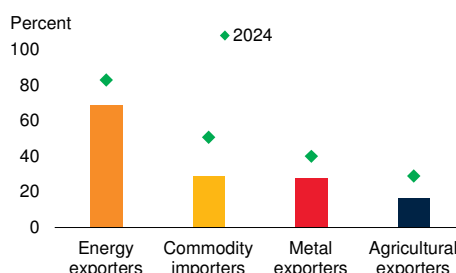
B. Fiscal rules, by type of commodity export (2000–24)



C. Sovereign wealth funds



D. Sovereign wealth funds, by type of commodity export (2000–24)



Sources: Alonso et al. (2025); Global SWF (database); World Bank.

A. Number of countries with at least 1 fiscal rule in place. Four types of fiscal rules are covered: expenditure rule, revenue rule, budget balance rule, and debt rule. Sample includes up to 50 EMDE commodity exporters and 35 commodity importers. Last observation is 2024.

B. Simple averages of shares of countries with at least one fiscal rule in place during 2000–24. Diamonds show the share in 2024. Sample includes 38 agricultural exporters, 25 metal exporters, 35 energy exporters, and 59 commodity importers.

C. Number of countries with sovereign wealth funds. Sample includes up to 48 EMDE commodity exporters and 30 commodity importers.

D. Simple averages of shares of countries with SWFs in place during 2000–24. Diamonds show the share in 2024. Sample includes 38 agricultural exporters, 25 metal exporters, 35 energy exporters, and 59 commodity importers.

Sovereign wealth funds

Over the past couple of decades, the adoption of SWFs by commodity-exporting EMDEs has increased substantially, with a particularly sharp rise in the early 2000s aligned with the surge in commodity prices (figure 1.8.C). Overall, the number of operational SWFs in these economies has tripled, rising from 16 in 2000 to 48 in 2024. As a result, more than half of commodity-exporting EMDEs now have SWFs, roughly twice the share in other EMDEs. Adoption has been especially widespread among energy exporters, with SWFs present in 83 percent of countries in 2024 (figure 1.8.D).

Although adoption has lagged among metal and agricultural exporters, SWFs had been established in 40 and 28 percent of these economies, respectively, by 2024.

SWFs are state-owned investment vehicles, established for a range of macroeconomic purposes. They can be classified into five main types, based on their primary objective (IMF 2008):

- i. *Short-term stabilization funds*, to insulate the budget and the economy from swings in commodity prices (usually oil);
- ii. *Long-term savings funds*, to transform income from nonrenewable resources into a diversified portfolio of assets, accumulating savings for future generations;
- iii. *Reserve investment corporations*, whose assets are often still counted as reserve assets and are established to increase the return on foreign exchange reserves;
- iv. *Development funds*, to help fund socioeconomic projects or promote industrial policies that raise potential output growth;
- v. *Contingent pension reserve funds*, to complement resources from individual pension contributions that cover pension liabilities on the government's balance sheet.

A range of factors can motivate the establishment of SWFs in commodity-dependent countries. First, there is a need to decouple resource windfalls from government expenditures that tend to intensify boom-bust cycles (Elbadawi, Soto, and Youssef 2017). By saving these windfalls in a fund, governments can pursue a more stable fiscal policy. Second, SWFs can also serve as a means of transferring resources to future generations. Third, excess reserves accumulated during good times may complicate the management of rigid exchange rate regimes, creating a rationale for establishing SWFs.²² Additionally, SWFs can foster more advanced investment and risk-management frameworks and enhance accountability and transparency in the management of government financial assets.

Evidence suggests that SWFs can enhance fiscal outcomes by smoothing government spending and reducing fiscal procyclicality (Coutinho et al. 2022; Sugawara 2014). However, SWFs may also pose risks when poorly managed. For example, rapid asset accumulation might trigger political demands for increased spending of commodity revenues, thereby making fiscal restraint more challenging. The effectiveness of SWFs hinges crucially on factors such as sound institutional frameworks and sustained political commitment—particularly transparent governance and prudent limits on fund managers' discretion (Bagattini 2011; Ossowski et al. 2008). Conversely, international experience shows that the absence of these elements can fragment the budget process and undermine the efficiency and transparency of resource allocation (Truman 2010).

²² The surge in commodity prices in the 2000s provides a clear illustration of these driving factors at play: soaring commodity prices, particularly for oil, generated large current account surpluses in commodity-exporting countries and prompted both the creation of new SWFs and a sharp increase in the assets of existing funds.

Chapter 5 provides a comprehensive discussion of the evolution of SWFs in commodity-exporting EMDEs and their effectiveness in promoting fiscal sustainability and mitigating fiscal policy procyclicality and volatility.

Institutional quality

Fiscal challenges in commodity-exporting EMDEs, many of which are LICs, have been accompanied by persistent shortcomings in their institutional environments. Since 2000, commodity exporters, on average, have ranked lower than other EMDEs on indicators of institutional quality, such as control of corruption, regulatory quality, political stability, and rule of law (figures 1.9.A–1.9.D). Among commodity exporters, indicators of institutional quality vary considerably. Except for government effectiveness, energy exporters tend to have the lowest scores on measures of institutional quality, while metal exporters generally score the highest (figure 1.9.E).²³ These differences are particularly stark for the indicator capturing “voice and accountability” (figure 1.9.F).

Institutional quality has been regarded as one of the potential explanations for the “natural resource curse”—the tendency of resource-rich countries to underperform in terms of economic growth and development outcomes (van Der Ploeg 2011).²⁴ A strand of the literature has argued that the variance in growth performance among resource-rich countries is mainly attributable to how resource rents are distributed through economic institutions (Mehlum, Moene, and Torvik 2006). However, the relationship between institutional quality and resource abundance is complex. On the one hand, institutional quality plays a vital role in shaping the effects of resource abundance on economic and financial development. On the other hand, institutional quality itself may be affected by natural resource rents through several channels (Badeeb, Lean, and Clark 2017; Khoshnoodi, Farouji, de Haan 2022).²⁵ Resource wealth can adversely affect the strength of institutions by allowing governments to avoid accountability, appease discord, and resist modernization (Isham et al. 2005). Resource wealth also provides an incentive to remain in power, prompting politicians to expand public sectors and provide inefficient subsidies and tax handouts, particularly where accountability and state competence are weak (Robinson, Torvik, and Verdier 2006). Furthermore, natural resources can lead politicians to hinder technological and institutional improvements, since such advances can weaken their power (Acemoglu and Robinson 2006). Evidence also shows that dependence on oil and other natural resources thwarts democracy and the quality of governance (for example, Ross 1999).

²³ Empirical evidence suggests that the effects of resource dependence on institutional quality and growth are more pronounced in the case of easily appropriable resources—such as oil, diamonds, and minerals—with concentrated production and revenues, substantial rents, and easy appropriation of rents through state-owned institutions (Auty 1997, 2001; Boschini, Pettersson, and Roine 2007; Isham et al. 2005; Woolcock, Pritchett, and Isham 2001). This contrasts with agricultural commodities, where rents are more dispersed throughout the economy.

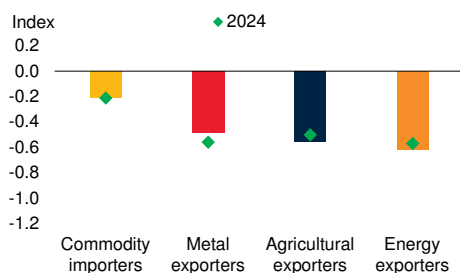
²⁴ The term “natural resource curse” was originally coined by Auty (1993).

²⁵ Studies confirming this finding include Abdulahi, Shu, and Khan (2019); Amiri et al. (2019); Antonakakis et al. (2017); and Hussain et al. (2021).

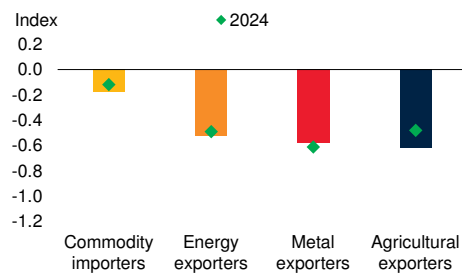
FIGURE 1.9 Institutional quality

Over the past two decades, commodity exporters, on average, have ranked lower than other EMDEs on indicators of institutional quality such as bureaucracy strength, control of corruption, democratic accountability, and law and order. With the exception of government effectiveness, energy exporters tend to exhibit the weakest institutional frameworks, while metal exporters generally score the highest.

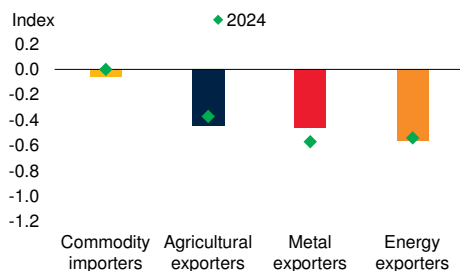
A. Control of corruption



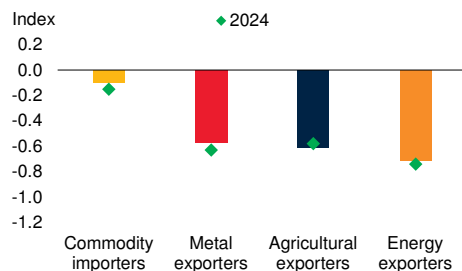
B. Regulatory quality



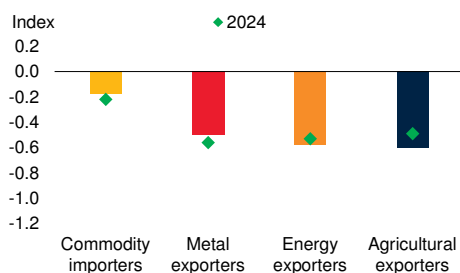
C. Political stability



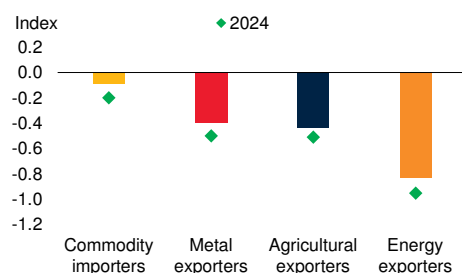
D. Rule of law



E. Government effectiveness



F. Voice and accountability



Sources: World Bank; Worldwide Governance Indicators.

Note: Bars show the simple cross-country averages of country-specific indexes averaged over 2000–24. Diamonds indicate values for 2024 (latest data). Sample includes 38 agricultural exporters, 25 metal exporters, 35 energy exporters, and 59 commodity importers. Indexes capture the traditions and institutions that shape how authority in a country is exercised, ranging from -2.5 (ineffective) to 2.5 (effective). Table 1.2 provides details.

Fiscal policy frameworks, institutional quality, and fiscal responses over commodity cycles

Building on the substantial developments and variation in fiscal policy frameworks and institutional arrangements in commodity exporters, this section examines how the comovement between fiscal indicators and commodity price cycles varies across these country-specific characteristics. Specifically, it assesses how fiscal responses over the cycle differ depending on the presence of fiscal rules, SWFs, and the quality of public institutions. Besides comparing differences in fiscal dynamics *between* booms and slumps—as done earlier—this section also investigates how these factors influence fiscal behavior *within* each phase of the commodity cycle across country groups. Only non-parametric *k*-sample tests are used to assess the statistical significance of differences in fiscal responses, as many countries did not change policy frameworks over time (that is, they consistently either had or lacked such frameworks), making paired tests infeasible.

Fiscal rules

Fiscal rules per se do not appear to be associated with more prudent fiscal management over the commodity cycle (table 1.4). The median primary balance response does not differ significantly across countries with and without fiscal rules during either booms or slumps (the within-phase comparison). Also, both groups show a statistically significant difference between the two phases (the between-group comparison). Revenue patterns point to a similar picture: the only notable difference is that median revenue growth during booms is somewhat stronger in countries without fiscal rules (7.6 percent) than in those with them (6.4 percent).

Expenditure dynamics likewise reveal no clear advantage from having a fiscal rule. Primary spending remains broadly stable over the cycle in both groups, with no significant within-phase differences. Countries with fiscal rules do tend to experience higher growth in interest payments than those without rules—in both booms and slumps—and debt rises more strongly during both phases in these countries.

Collectively, these patterns suggest that the mere presence of a fiscal rule is not enough to shape fiscal policy over the commodity price cycle in the typical commodity exporter. This may partly reflect endogenous adoption, with countries facing substantial fiscal pressures being more likely to introduce fiscal rules in the first place. However, the findings also echo prior work showing that fiscal rules have not uniformly improved fiscal positions in commodity-exporting EMDEs (Bova, Medas, and Poghosyan 2018; Coutinho et al. 2022; Villafuerte, López-Murphy, and Ossowski 2010). While some studies find positive effects, these results are largely based on year-to-year panel estimates showing improvements in (cyclically adjusted) fiscal balances or expenditure ratios relative to GDP (chapter 2 provides details).

Sovereign wealth funds

In commodity exporters, the presence of SWFs is strongly correlated with fiscal dynamics over the commodity cycle (table 1.5). Primary balances in countries with

SWFs comove more strongly with the cycle—improving more in booms and deteriorating more in slumps—compared to countries without SWFs. Consistent with these larger swings in primary balances, debt dynamics are much more pronounced in countries with SWFs.

These patterns cannot be explained solely by larger swings in nominal output and revenues, even though many adopters have been energy exporters. They also reflect sharp differences in expenditure dynamics between countries with and without SWFs. In countries with SWFs, median primary expenditure growth differs significantly over the cycle, slowing during booms (2.5 percent per year) and accelerating during slumps (4.2 percent per year). In countries without SWFs, the opposite pattern is observed: primary expenditures grow faster during booms (5.5 percent per year) than during slumps (4.5 percent per year), though the difference across phases is not statistically significant. The contrast is sharpest during booms, where the presence of a SWF is associated with significantly lower spending growth, while spending growth in the two country groups is similar during slumps.

Overall, these findings suggest that SWFs effectively support countercyclical fiscal management over the commodity cycle: by restraining spending in upswings, they can help build buffers that create room for a more expansionary stance when commodity prices decline. Instead, countries without such institutional anchors are more prone to the “voracity effect” in fiscal policy, as revenue windfalls fuel spending pressures that are difficult to contain.²⁶

Institutional quality

Fiscal dynamics show remarkably little variation by institutional quality over the commodity cycle (table 1.6).²⁷ Median primary balances, revenues, interest payments, and debt all comove strongly with the commodity cycle regardless of quality, while (primary) expenditures show no significant differences across phases. Similarly, within-phase differences in fiscal dynamics between countries with weaker and stronger institutions are not significant, with one exception: median real debt declines by 1.7 percent per year in countries with weaker institutions but rises by 2.5 percent per year in countries with stronger institutions. This may reflect stronger pressure to reduce debt during boom years in weaker institutional settings, although it is also likely to be a statistical artifact partly driven by sample composition.

Prima facie, these findings run counter to the conventional view on the role of institutional strength in driving fiscal behavior. As with fiscal rules, they suggest that correla-

²⁶ The “voracity effect” refers to a counterintuitive outcome in fiscal policy where positive income shocks (such as resource booms) lead to more than proportional increases in government spending, ultimately worsening fiscal balances instead of improving them. This typically arises from political fragmentation and weak institutions. For further details, refer to Tornell and Lane (1998, 1999) and Velasco (2000).

²⁷ The indicator is the simple average of six broad dimensions of institutional quality (that is, voice and accountability, regulatory quality, rule of law, government effectiveness, control of corruption, and political stability) taken from the World Bank’s Worldwide Governance Indicators database (refer to table 1.2).

tions that seem strong in annual analyses related to output cycles may appear less robust when fiscal responses are assessed with respect to commodity cycles. That does not mean that institutions are unimportant. Rather, institutional strength may matter somewhat less for the average medium-term response over commodity cycles, but can be critical in preventing sharp procyclical reactions to large shocks.

Conclusions and policy implications

Many EMDEs rely heavily on commodities as a source of fiscal and export revenues. This chapter examines the extent to which this reliance renders fiscal outcomes vulnerable to large commodity price fluctuations. It documents the evolution of fiscal indicators since the turn of the century, highlighting key differences in fiscal dynamics both between commodity exporters and importers, as well as among different types of commodity exporters. It also examines the comovement between fiscal indicators and commodity price cycles over this period.

The analysis reveals that the fiscal trajectories of commodity exporters diverge markedly from those of commodity importers, highlighting the vulnerability of fiscal policy in the former to swings in commodity prices. Commodity exporters typically exhibit lower fiscal revenues and primary expenditures (as shares of GDP) than commodity importers, a gap often coupled with weaker tax collection and a tendency for fiscal indicators to comove with commodity price cycles. During booms, primary balances improve, while slumps erode fiscal positions, reflecting the strong link between resource revenues and fiscal outcomes. Meanwhile, public debt ratios in both commodity exporters and importers have followed a U-shaped pattern since 2000, but sovereign debt risks have risen more steeply in commodity exporters, likely reflecting their larger primary deficits relative to commodity importers during the 2010s.

The evidence presented in the chapter highlights substantial differences among energy, metal, and agricultural exporters. Energy exporters are the most reliant on resource revenues and generally maintain higher fiscal revenues and primary expenditures as shares of GDP. Their primary balances are highly sensitive to commodity price cycles, with pronounced swings during booms and slumps. Metal exporters, while relatively less dependent on resource revenues, exhibit similar fiscal dynamics. Notably, both groups show prudent (primary) spending responses over commodity price cycles. Metal exporters even show signs of countercyclical behavior, with spending growth significantly lower during booms than during slumps. Agricultural exporters, however, display a contrasting pattern. They tend to face the highest interest burdens and are most susceptible to debt accumulation, with real expenditure growth during booms often offsetting revenue gains, leaving primary balances relatively unchanged across booms and slumps. In short, the procyclicality trap appears far more entrenched among agricultural exporters.

Additionally, the findings of this chapter suggest that the factors that matter for short-term management of commodity price shocks need not be the same as those that shape the average fiscal response over commodity price cycles. Evidence from panel regressions

focused on year-to-year changes may therefore point to different drivers than analyses centered on the broader commodity cycle, where other factors become more important. In a similar vein, results from analysis anchored in the output cycle do not necessarily yield the same insights as those from analysis anchored in commodity price cycles. Together, these findings point to the need for a differentiated policy mix for managing commodity price volatility over the short, medium, and long term.

To manage the persistent fiscal challenges that often accompany heavy resource reliance, it is essential to adopt policies that safeguard fiscal and macroeconomic stability in the face of global commodity price volatility. The analysis in this chapter—together with the broader literature—points to the following menu of priorities for policy makers in commodity exporters, which are discussed in further detail in chapter 5. The appropriate responses, however, must be tailored to country-specific circumstances, including the degree of commodity reliance, fiscal space, market flexibility, and the quality of domestic institutions.

- *Non-resource revenue mobilization:* Commodity exporters lag other EMDEs in domestic revenue mobilization, primarily due to weaker tax collection. Revenue weakness constrains governments' ability to provide public services, conduct countercyclical policies, repay debt, and implement redistributive measures. In commodity exporters, the tendency to substitute natural resource income for non-resource tax revenues can hinder the development of comprehensive tax systems. Building tax collection capacity is a critical component of state building and institutional development (Gaspar, Jaramillo, and Wingender 2016). Expanding and diversifying the tax base is essential for fiscal sustainability in commodity exporters. In this context, digitalization and other technological innovations have the potential to improve tax administration systems and processes.
- *Public expenditure management:* Commodity exporters typically allocate a smaller share of GDP to infrastructure, R&D, health, and education compared to importers. Enhancing public investment management can help convert commodity booms into long-term assets, fostering sustainable development. In some countries, there may be room to shift spending more toward growth-enhancing expenditure. This includes reforms to poorly targeted subsidies in many EMDEs that can help make their public finances and economies more resilient to commodity price fluctuations. For example, following the 2014–16 oil price plunge, many energy-exporting EMDEs undertook energy subsidy reforms to discourage wasteful energy consumption, reallocate spending to programs better targeted to the vulnerable, and restore fiscal space (IMF 2017; World Bank 2020b, 2020c).²⁸

²⁸ As another example of expenditure reallocation, better public spending in agriculture in Sub-Saharan Africa has been shown to be essential for improving agricultural productivity (Goyal and Nash 2017). Government investment in local agricultural research and development, removal of urban subsidies, improvements in rural infrastructure, and efforts to facilitate access to financial services can lay the foundation for important agricultural productivity gains.

- *Fiscal rules:* Fiscal rules, on their own, are often not enough to smooth the impact of commodity price cycles on fiscal positions in commodity exporters. Designing rules that can withstand the inherent uncertainty and volatility of commodity revenues, along with rapid changes in the macroeconomic environment, is intrinsically difficult. Most rules impose annual numerical limits on fiscal variables, often relative to GDP, and may therefore lack appropriate features to deal with the challenges related to commodity dependence and price volatility. Even so, when credibly enforced, rules can make a difference. Related analysis finds that metal exporters with fiscal rules display more prudent spending patterns over the cycle, with spending growth better contained during booms—consistent with the countercyclical expenditure responses documented here (World Bank 2026b). More broadly, the literature shows that fiscal rules that are flexible enough to accommodate commodity cycles and are embedded in medium-term expenditure frameworks can help build fiscal space, improve the management of revenue windfalls, and strengthen policy outcomes. Rules lacking these attributes risk inducing expenditure procyclicality and undermining fiscal credibility. Moreover, the effectiveness of fiscal rules is heavily influenced by structural factors such as public institutions and compliance.
- *Sovereign wealth funds:* SWFs can be useful vehicles for saving windfall revenues during commodity price upswings. The presence of SWFs is associated with more prudent fiscal management over the commodity cycle, particularly by helping to smooth government spending. Countries with SWFs tend to restrain spending during booms and support more expansionary policy during slumps, contributing to more stable fiscal management. Energy-exporting EMDEs have been the most active adopters of SWFs, and related evidence suggests that SWF presence is strongly associated with more disciplined fiscal behavior over the cycle (World Bank 2026b). At the same time, SWFs can pose risks when weak governance fuels political pressures to spend accumulated assets. Their effectiveness, therefore, is often found to depend on strong institutional and governance frameworks, since poor management can fragment the budget process and undermine fiscal sustainability.
- *Institutional quality:* Fiscal dynamics over full commodity price cycles do not appear to vary much by institutional quality. While the role of strong public institutions may be less evident in the average fiscal response over commodity cycles, it can still be crucial when large shocks hit and procyclical pressures intensify (Céspedes and Velasco 2014; World Bank 2026b). This matters because resource abundance can deliver lasting gains, especially when countries combine a robust long-term strategy for resource extraction with effective short- to medium-term expenditure management that allocates revenues toward economic and social priorities. Commodity exporters often lag other EMDEs on measures of institutional quality and governance. Strengthening governance frameworks is essential for prudent fiscal management and effective policy implementation. Chapters 2 and 3 explore these issues in greater depth, focusing on how fiscal and external policy settings, together with institutional characteristics, influence the degree of fiscal procyclicality and volatility.

In sum, strengthening fiscal resilience in commodity exporters requires building buffers in good times, reinforcing institutions, and diversifying revenue sources. As global commodity markets become increasingly volatile, these priorities will become even more important. This chapter highlights the policy levers that can help countries navigate future cycles more effectively.

ANNEX 1A Methodology for dating turning points in commodity prices

Following the literature, turning points in commodity price series are identified using the algorithm proposed by Balatti (forthcoming), which is based on well-established techniques for dating business cycles. Earlier work by Cashin, McDermott, and Scott (2002), Harding and Pagan (2002), and World Bank (2022) has also extended these techniques to analyze commodity price cycles. Peaks (troughs) in series y_t are identified whenever $\{y_t > (<) y_{t+k}\}$ where $k = 1, \dots, K$, and $K = 12$, in line with Cashin, McDermott, and Scott (2002). The minimum cycle length is 36 months. After the turning points—peaks and troughs—are identified, the intervals between these points are classified as boom and slump phases.

To identify turning points, the original Bry-Boschan algorithm is modified to account for peculiarities of commodity prices, as in Balatti (forthcoming), and building on Cashin, McDermott, and Scott (2002) and Harding and Pagan (2002). Specifically, (1) a phase (from peak-to-trough or from trough-to-peak) must be at least 12 months long, owing to the dominance of the annual production process in many agricultural commodities; (2) a cycle (peak-to-peak or trough-to-trough) must be at least 36 months, which is the minimum time needed to encompass at least two harvests for annual crops; (3) smoothing is not applied to the original price series; and (4) the algorithm is applied to the actual level of prices (deflated by the CPI), rather than trend-adjusted price series; (5) an explicit amplitude restriction is incorporated to prevent the identification of negligible fluctuations as “regular” cycles and to distinguish between boom and slump phases accurately. Calibrated at a 15 percent threshold, this criterion addresses limitations observed in previous methodologies, ensuring that only relevant price movements are classified as cycles.

TABLE 1.1 Sample of economies

Commodity exporters				
Agriculture		Energy		Metals
Argentina	Senegal	Algeria	Qatar	Armenia
Belize	Seychelles	Angola	Russian Federation	Bhutan
Benin	Solomon Islands	Azerbaijan	Saudi Arabia	Botswana
Brazil	Sudan	Bahrain	South Sudan	Burkina Faso
Burundi	Tajikistan	Bhutan	Timor-Leste	Central African Republic
Cabo Verde	Tanzania	Bolivia	Trinidad and Tobago	Chile
Chad	Togo	Brunei Darussalam	Turkmenistan	Congo, Dem. Rep.
Comoros	Uganda	Cameroon	United Arab Emirates	Eritrea
Costa Rica	Ukraine	Chad	Venezuela, RB	Guinea
Côte d'Ivoire	Uruguay	Colombia	Yemen, Rep.	Kosovo
Ethiopia	Uzbekistan	Congo, Rep.		Kyrgyz Republic
Fiji	West Bank and Gaza	Ecuador		Liberia
Gambia, The	Zimbabwe	Equatorial Guinea		Mauritania
Guatemala		Gabon		Mongolia
Guinea-Bissau		Ghana		Mozambique
Honduras		Guyana		Namibia
Kenya		Indonesia		Niger
Lao PDR		Iran, Islamic Rep.		Papua New Guinea
Madagascar		Iraq		Peru
Malawi		Kazakhstan		Sierra Leone
Mali		Kuwait		South Africa
Nicaragua		Libya		Sudan
Paraguay		Myanmar		Suriname
Rwanda		Nigeria		Tajikistan
São Tomé and Príncipe		Oman		Zambia
Commodity importers				
Afghanistan	Dominican Republic	Lebanon	Nepal	St. Kitts and Nevis
Albania	Egypt, Arab Rep.	Lesotho	North Macedonia	St. Lucia
Antigua and Barbuda	El Salvador	Malaysia	Pakistan	St. Vincent and the Grenadines
Bahamas, The	Eswatini	Maldives	Palau	Syrian Arab Republic
Bangladesh	Georgia	Marshall Islands	Panama	Thailand
Barbados	Grenada	Mauritius	Philippines	Tonga
Belarus	Haiti	Mexico	Poland	Tunisia
Bosnia and Herzegovina	Hungary	Micronesia, Fed. Sts.	Romania	Türkiye
Cambodia	India	Moldova	Samoa	Tuvalu
China	Jamaica	Montenegro	Serbia	Vanuatu
Djibouti	Jordan	Morocco	Somalia	Viet Nam
Dominica	Kiribati	Nauru	Sri Lanka	

Source: World Bank.

Note: An economy is classified as a commodity exporter if, on average in 2017–19, either its combined exports of all commodities accounted for 30 percent or more of its total exports, or its exports of any single commodity accounted for 20 percent or more of its total exports. Economies are excluded if they reached either threshold only because of re-exports. Commodity importers are economies not classified as commodity exporters. Commodity export status can change over time, implying the possibility of reclassification.

TABLE 1.2 Definitions and sources of variables

Variable	Definition	Source
Government expenditure	General government total expenditure (percent of GDP)	IMF
Primary balance	Primary balance (percent of GDP)	World Bank
Government debt	General government gross debt (percent of GDP)	World Bank
Government revenue	General government revenue (percent of GDP)	IMF
Tax revenue	Tax revenue (percent of GDP)	IMF
Interest payments	Difference between the primary balance and the overall balance (percent of total expenditure)	IMF
R&D and infrastructure expenditures	Expenditures on communications, transportation, and R&D (percent of GDP)	IMF
Education expenditures	Government expenditure on education (percent of GDP)	World Bank
Health expenditures	Domestic general government health expenditure (percent of GDP)	World Bank
External debt	Total external debt stocks (percent of GDP)	World Bank
Private sector external debt	Domestic credit to the private sector (percent of GDP)	World Bank
Short-term external debt	Short-term external debt stocks (percent of GDP)	World Bank
External debt in foreign currency	External debt in foreign currency (percent of total debt)	World Bank
Sovereign debt rating	Foreign currency long-term sovereign debt ratings (index from 1 to 21)	World Bank
Fiscal rules	Countries with at least one fiscal rule in place	Alonso et al. (2025)
Sovereign wealth funds	Countries with at least one sovereign wealth fund in place	Global SWF
Control of corruption	Perceptions of the extent to which public power is exercised for private gain, including petty and grand forms of corruption and the "capture" of the state by elites and private interests (index from -2.5 to 2.5)	Worldwide Governance Indicators (WGI), World Bank
Government effectiveness	Perceptions of the quality of public services and the civil service (including its independence from political pressures), the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies (index from -2.5 to 2.5)	WGI (World Bank)
Rule of law	Perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular regarding contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence (index from -2.5 to 2.5)	WGI (World Bank)
Regulatory quality	Perceptions of the ability of the government to formulate and implement sound policies and regulations that promote private sector development (index from -2.5 to 2.5)	WGI (World Bank)
Political stability	Perceptions of the likelihood of political instability and/or politically motivated violence, including terrorism (index from -2.5 to 2.5)	WGI (World Bank)
Voice and accountability	Perceptions of the extent to which a country's citizens can participate in selecting their government, as well as freedom of expression and association, and benefit from a free media (index from -2.5 to 2.5)	WGI (World Bank)

Source: World Bank.

TABLE 1.3 Fiscal dynamics in commodity exporters during commodity price booms and slumps

	(1)	(2)	(3)	(4)
	Booms	Slumps	<i>k</i> -sample test (<i>p</i> value)	Paired <i>t</i> -test (<i>p</i> value)
Change in primary balance	0.32	-0.32	0.00	0.00
Revenue growth	7.10	2.73	0.00	0.00
Expenditure growth	4.08	4.57	0.24	0.78
Primary expenditure growth	4.49	4.46	0.92	0.69
Interest payment growth	2.26	7.85	0.00	0.00
Public debt growth	0.68	8.27	0.00	0.00

Source: World Bank.

Note: All variables are expressed as percentage changes, except the primary balance, which is measured as a change in its ratio to GDP. Columns (1) and (2) show the median change (or growth) in each fiscal variable during commodity price booms and slumps, respectively. Annex 1A provides a description of the methodology used to identify booms and slumps. Column (3) presents the *p*-value from a non-parametric *k*-sample test, which assesses whether the distributions of the groups being compared are statistically identical. Column (4) reports the *p*-value from a paired *t*-test based on within-country differences between booms and slumps.

TABLE 1.4 Fiscal dynamics in commodity exporters during commodity price cycles: The role of fiscal rules

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Without fiscal rules		With fiscal rules		Within-phase comparison		Between-group comparison	
	<i>Booms</i>	<i>Slumps</i>	<i>Booms</i>	<i>Slumps</i>	<i>Booms</i>	<i>Slumps</i>	<i>Without fiscal rules</i>	<i>With fiscal rules</i>
Change in primary balance	0.35	-0.39	0.30	-0.20	0.78	0.23	0.00	0.00
Revenue growth	7.57	3.00	6.43	2.38	0.08	0.37	0.00	0.00
Expenditure growth	4.28	4.74	3.57	4.42	0.31	0.60	0.44	0.16
Primary expenditure growth	4.73	4.71	4.24	4.34	0.50	0.51	0.93	0.95
Interest payment growth	-0.51	6.10	4.76	10.62	0.00	0.00	0.00	0.00
Public debt growth	-0.50	7.92	2.50	9.58	0.00	0.03	0.00	0.00

Source: World Bank.

Note: All variables are expressed as percentage changes, except the primary balance, which is measured as a change in its ratio to GDP. Columns (1)–(4) show the median change (or growth) in each fiscal variable during the indicated phases. Columns (5)–(8) present the *p*-value from a nonparametric *k*-sample test, which assesses whether the distributions of the groups being compared are statistically identical. Annex 1A provides a description of the methodology used to identify booms and slumps.

TABLE 1.5 Fiscal dynamics in commodity exporters during commodity price cycles: The role of SWFs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Without SWFs		With SWFs		Within-phase comparison		Between-group comparison	
	<i>Booms</i>	<i>Slumps</i>	<i>Booms</i>	<i>Slumps</i>	<i>Booms</i>	<i>Slumps</i>	<i>Without SWFs</i>	<i>With SWFs</i>
Change in primary balance	0.13	-0.11	0.86	-0.70	0.00	0.00	0.02	0.00
Revenue growth	6.74	3.64	7.85	0.10	0.16	0.00	0.00	0.00
Expenditure growth	4.97	4.73	2.50	4.18	0.00	0.47	0.77	0.04
Primary expenditure growth	5.50	4.47	2.62	4.35	0.00	0.92	0.20	0.07
Interest payment growth	2.39	7.22	1.81	8.49	0.75	0.28	0.00	0.00
Public debt growth	2.51	7.27	-1.53	10.09	0.00	0.01	0.00	0.00

Source: World Bank.

Note: All variables are expressed as percentage changes, except the primary balance, which is measured as a change in its ratio to GDP. Columns (1)–(4) show the median change (or growth) in each fiscal variable during the indicated phases. Columns (5)–(8) present the p-value from a nonparametric *k*-sample test, which assesses whether the distributions of the groups being compared are statistically identical. Annex 1A provides a description of the methodology used to identify booms and slumps.

TABLE 1.6 Fiscal dynamics in commodity exporters during commodity price cycles: The role of institutional quality

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Weaker institutions		Stronger institutions		Within-phase comparison		Between-group comparison	
	<i>Booms</i>	<i>Slumps</i>	<i>Booms</i>	<i>Slumps</i>	<i>Booms</i>	<i>Slumps</i>	<i>Weaker institutions</i>	<i>Stronger institutions</i>
Change in primary balance	0.23	-0.23	0.42	-0.37	0.23	0.34	0.00	0.00
Revenue growth	7.39	2.74	6.76	2.84	0.53	0.95	0.00	0.00
Expenditure growth	4.08	4.72	4.10	4.52	0.93	0.90	0.46	0.27
Primary expenditure growth	4.75	4.87	4.36	4.36	0.49	0.56	0.85	1.00
Interest payment growth	0.56	7.31	2.79	8.49	0.28	0.27	0.00	0.00
Public debt growth	-1.68	8.18	2.48	9.23	0.00	0.21	0.00	0.00

Source: World Bank.

Note: All variables are expressed as percentage changes, except the primary balance, which is measured as a change in its ratio to GDP. Columns (1)–(4) show the median change (or growth) in each fiscal variable during the indicated phases. Columns (5)–(8) present the p-value from a nonparametric *k*-sample test, which assesses whether the distributions of the groups being compared are statistically identical. The institutional quality indicator is based on a median sample split of the simple average of six broad dimensions of governance (that is, voice and accountability, regulatory quality, rule of law, government effectiveness, control of corruption, and political stability). Table 1.2 offers more details on these variables.

References

- Abdulahi, M. E., Y. Shu, and M. A. Khan. 2019. "Resource Rents, Economic Growth, and the Role of Institutional Quality: A Panel Threshold Analysis." *Resources Policy* 61 (June): 293–303.
- Acemoglu, D., and J. A. Robinson. 2006. "Economic Backwardness in Political Perspective." *American Political Science Review* 100 (1): 115–31.
- Alonso, V., C. Arroyo, O. Aydin, V. Balasundharam, H. R. Davoodi, G. Hegab, A. M. Nguyen, N. Salazar Ferro, G. Sher, A. Solovyeva, and N. Tchelishvili. 2025. "Fiscal Rules and Fiscal Councils: Recent Trends and Revisions since the Pandemic." IMF Working Paper 25/198, International Monetary Fund, Washington, DC.
- Amiri, H., F. Samadian, M. Yahoo, and S. J. Jamali. 2019. "Natural Resource Abundance, Institutional Quality and Manufacturing Development: Evidence from Resource-Rich Countries." *Resources Policy* 62 (August): 550–60.
- Anderson, P. R. D., C. S. Silva, and A. Velandia-Rubiano. 2010. "Public Debt Management in Emerging Economies: Has This Time Been Different?" Policy Research Working Paper 5399, World Bank, Washington, DC.
- Antonakakis, N., J. Cunado, G. Filis, and F. Perez de Gracia. 2017. "Oil Dependence, Quality of Political Institutions and Economic Growth: A Panel VAR Approach." *Resources Policy* 53 (September): 147–63.
- Apeti, A. E., O. Basdevant, and V. Salins. 2023. "Do Fiscal Rules Foster Fiscal Discipline in Resource-Rich Countries?" IMF Working Paper 23/088, International Monetary Fund, Washington DC.
- Arezki, R., and M. Bruckner. 2010. "Commodity Windfalls, Polarization, and Net Foreign Assets: Panel Data Evidence on the Voracity Effect." IMF Working Paper 10/209, International Monetary Fund, Washington, DC.
- Arezki, R., K. Hamilton, and K. Kazimov. 2011. "Resource Windfalls, Macroeconomic Stability and Economic Growth." IMF Working Paper 11/142, International Monetary Fund, Washington, DC.
- Arroyo Marioli, F., A. Fatás, and G. Vasishtha. 2024. "Fiscal Policy Volatility and Growth in Emerging Markets and Developing Economies." *International Review of Economics and Finance* 92 (April): 758–77.
- Arroyo Marioli, F., and C. A. Végh. 2026. "Fiscal Procyclicality in Commodity Exporting Countries: How Much Does it Pour and Why?" *American Economic Journal: Economic Policy* 18 (May): 309–45.
- Arroyo Marioli, F., and G. Vasishtha. 2025. "Fiscal Policy Procyclicality and Volatility in Commodity-Exporting Emerging and Developing Economies: Determinants and Implications for Growth." Policy Research Working Paper 11037, World Bank, Washington, DC.

- Aslam, A., S. Beidas-Strom, R. Bems, O. Celasun, S. K. Çelik, and Z. Kóczán. 2016. "Trading on Their Terms? Commodity Exporters in the Aftermath of the Commodity Boom." IMF Working Paper 16/27, International Monetary Fund, Washington DC.
- Auty, R. M., ed. 1993. *Sustaining Development in Mineral Economies: The Resource Curse Thesis*. London: Routledge.
- Auty, R. M. 1997. "Natural Resource Endowment, the State and Development Strategy." *Journal of International Development* 9 (4): 651–63.
- Auty, R. M., ed. 2001. *Resource Abundance and Economic Development*. Oxford and New York: Oxford University Press.
- Badeeb, R. A., H. H. Lean, and J. Clark. 2017. "The Evolution of the Natural Resource Curse Thesis: A Critical Literature Survey." *Resources Policy* 51 (March): 123–34.
- Bagattini, G. Y. 2011. "The Political Economy of Stabilisation Funds: Measuring their Success in Resource-Dependent Countries." IDS Working Papers 356, Institute of Development Studies at the University of Sussex Brighton.
- Baffes, J., and P. Nagle, eds. 2022. *Commodity Markets: Evolution, Challenges, and Policies*. Washington, DC: World Bank.
- Balatti, M. Forthcoming. "Cracking Commodity Cycles: Uncovering the Hidden Clock and Decoding the Drivers." World Bank, Washington, DC.
- Baunsgaard, T. 2001. "A Primer on Mineral Taxation." IMF Working Paper 01/139, International Monetary Fund, Washington, DC.
- Benitez, J. C., M. Mansour, M. Pecho, and C. Vellutini. 2023. Building Tax Capacity in Developing Countries. IMF Staff Discussion Note 23/006, International Monetary Fund, Washington, DC.
- Boschini, A. D., J. Pettersson, and J. Roine. 2007. "Resource Curse or Not: A Question of Appropriability." *Scandinavian Journal of Economics* 109 (3): 593–617.
- Bova, E., P. Medas, and T. Poghosyan. 2018. "Macroeconomic Stability in Resource-rich Countries: The Role of Fiscal Policy." *Journal of Banking and Financial Economics* 1 (9): 103–22.
- Caselli, F., and J. Reynaud. 2020. "Do Fiscal Rules Cause Better Fiscal Balances? A New Instrumental Variable Strategy." *European Journal of Political Economy* 63 (June): 101873.
- Caselli, F., H. Davoodi, C. Goncalves, G. H. Hong, A. Lagerborg, P. Medas, A. Minh Nguyen, and J. Yoo. 2022. "The Return to Fiscal Rules." IMF Staff Discussion Note, International Monetary Fund, Washington, DC.
- Cashin, P., C. J. McDermott, and A. Scott. 2002. "Booms and Slumps in World Commodity Prices." *Journal of Development Economics* 69 (1): 277–96.

- Cebotari, A. 2008. "Contingent Liabilities: Issues and Practice." IMF Working Paper 08/245. International Monetary Fund, Washington, DC.
- Céspedes, L. F., and A. Velasco. 2014. "Was this Time Different? Fiscal Policy in Commodity Republics." *Journal of Development Economics* 106 (C): 92–106.
- Collier, P. 2007. *The Bottom Billion: Why the Poorest Countries Are Failing and What Can Be Done About It*. Oxford University Press.
- Coutinho, L., D. Georgiou, M. Heracleous, A. Michaelides, and S. Tsani. 2022. "Limiting Fiscal Procyclicality: Evidence from Resource-Dependent Countries." *Economic Modelling* 106 (January): 105700.
- Crivelli, E., and S. Gupta. 2014. "Resource Blessing, Revenue Curse? Domestic Revenue Effort in Resource-Rich Countries." *European Journal of Political Economy* 35 (September): 88–101.
- Drechsel, T., M. McLeay, and S. Tenreyro. 2019. "Monetary Policy for Commodity Booms and Busts." Paper presented at the Federal Reserve Bank of Kansas City Jackson Hole Economic Policy Symposium, Jackson Hole, Wyoming, August 22–24.
- Elbadawi, I., R. Soto, and H. Youssef. 2017. "Sovereign Wealth Funds and Macroeconomic Stabilization in the Home Economy." Economic Research Forum Working Paper 1175, Cairo.
- Eyraud, L., W. Gbohoui, and P. Medas. 2023. "A New Fiscal Framework for Resource-Rich Countries." IMF Working Paper 23/230. International Monetary Fund, Washington, DC.
- Fatás, A., B. Gootjes, and J. Mawejje. 2026. "Dynamic Effects of Fiscal Rules: Do Initial Conditions Matter?" *Journal of International Money and Finance* 161 (February): 103499.
- Ferry, M., and M. Raffinot. 2019. "Curse or Blessing? Has the Impact of Debt Relief Lived up to Expectations? A Review of the Effects of the Multilateral Debt Relief Initiatives for Low-Income Countries." *The Journal of Development Studies* 55 (9): 1867–191.
- Frankel, J., C. A. Végh, and G. Vuletin. 2013. "On Graduation from Fiscal Procyclicality." *Journal of Development Economics* 100 (1): 32–47.
- Gaspar, V., L. Jaramillo, and P. Wingender. 2016. "Tax Capacity and Growth: Is There a Tipping Point?" IMF Working Paper 16/234, International Monetary Fund, Washington, DC.
- Gbohoui, W., and P. Medas. 2020. "Fiscal Rules, Escape Clauses, and Large Shocks." Special Series on Fiscal Policies to Respond to COVID-19, International Monetary Fund, Washington, DC.
- Gelb, A. H. 2012. "Economic Diversification in Resource-Rich Countries." In *Beyond the Curse; Policies to Harness the Power of Natural Resources*, edited by R. Arezki, T.

Gylfason, and A. Sy, Washington, DC: International Monetary Fund.

Global SWF (database). Global SWF, Singapore. Accessed on December 13, 2024. <http://globalswf.com>.

Gootjes, B., and J. de Haan. 2022. “Do Fiscal Rules Need Budget Transparency to Be Effective?” *European Journal of Political Economy* 75 (December): 102210.

Goyal, A., and J. Nash. 2017. *Reaping Richer Returns: Public Spending Priorities for African Agriculture Productivity Growth*. Washington, DC: World Bank.

Guerguil, M., P. Mandon, and R. Tapsoba. 2017. “Flexible Fiscal Rules and Countercyclical Fiscal Policy.” *Journal of Macroeconomics* 52 (June): 189–220.

Ha, J., M. A. Kose, and F. Ohnsorge, eds. 2019. *Inflation in Emerging and Developing Economies: Evolution, Drivers, and Policies*. Washington, DC: World Bank.

Harding, D., and A. Pagan. 2002. “Dissecting the Cycle: A Methodological Investigation.” *Journal of Monetary Economics* 49 (2): 365–81.

Huidrom, R., M. A. Kose, and F. Ohnsorge. 2016. “Challenges of Fiscal Policy in Emerging and Developing Economies.” Policy Research Working Paper 7725, World Bank, Washington, DC.

Hussain, M., Z. Ye, A. Bashir, N. I. Chaudhry, and Y. Zhao. 2021. “A Nexus of Natural Resource Rents, Institutional Quality, Human Capital, and Financial Development in Resource-Rich High-Income Economies.” *Resources Policy* 74 (December): 102259.

IMF (International Monetary Fund). 2008. *Sovereign Wealth Funds—A Work Program*. Monetary and Capital Markets and Policy Development Review Departments. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2012. “Resilience in Emerging Market and Developing Economies: Will It Last?” In *World Economic Outlook: Coping with High Debt and Sluggish Growth*, Chapter 4. October. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2015. *World Economic Outlook: Adjusting to Lower Commodity Prices*. October. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2017. “Building Fiscal Capacity in Fragile States.” IMF Policy Paper, Washington, DC.

Isham, J., M. Woolcock, L. Pritchett, and G. Busby. 2005. “The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth.” *World Bank Economic Review* 19 (2): 141–74.

- Jacks, D. S., K. H. O'Rourke, and J. G. Williamson. 2011. "Commodity Price Volatility and World Market Integration Since 1700." *The Review of Economics and Statistics* 93 (3): 800–13.
- Kabundi, A., G. Vasishtha, and H. Zahid. 2022. "The Nature and Drivers of Commodity Price Cycles." In *Commodity Markets: Evolution, Challenges, and Policies*, edited by J. Baffes and P. Nagle, Washington, DC: World Bank.
- Khoshnoodi, A., M. D. Farouji, and J. de Haan. 2022. "The Effect of Natural Resources Rents on Institutional and Policy Reform: New Evidence." *Resources Policy* 78 (December): 102856.
- Kose, M. A., S. Kurlat, F. Ohnsorge, and N. Sugawara. 2017. "A Cross-Country Database of Fiscal Space." Policy Research Working Paper 8157, World Bank, Washington, DC.
- Kose, M. A., P. Nagle, F. Ohnsorge, and N. Sugawara. 2021. *Global Waves of Debt: Causes and Consequences*. Washington, DC: World Bank.
- Mendes, A., and S. Pennings. 2025. "One Rule Fits All? Heterogenous Fiscal Rules for Commodity Exporters when Price Shocks Can be Persistent: Theory and Evidence." *Review of Economic Dynamics* 55: 101239.
- Mehlum, H., K. Moene, and R. Torvik. 2006. "Institutions and the Resource Curse." *The Economic Journal* 116 (508): 1–20.
- Mihalyi, D., and L. Fernández. 2018. "How Did Fiscal Rules Hold Up in the Commodity Price Crash?" Natural Resource Governance Institute, New York.
- Ocampo, J. A. 2017. "Commodity-Led Development in Latin America." In *Alternative Pathways to Sustainable Development: Lessons from Latin America*, edited by G. Carbonnier, H. Campodónico, and S. Tezanos Vázquez, 51–76. Boston: Brill | Nijhoff.
- Ossowski, R., M. Villafuerte, P. A. Medas, and T. Thomas. 2008. "Managing the Oil Revenue Boom: The Role of Fiscal Institutions." IMF Occasional Paper 260, International Monetary Fund, Washington, DC.
- Richaud, C., A. G. M. Galego, F. Ayivodji, S. Matta, and S. Essl. 2019. "Fiscal Vulnerabilities in Commodity Exporting Countries and the Role of Fiscal Policy." MTI Discussion Paper 15, World Bank, Washington, DC.
- Roberts, M. C. 2009. "Duration and Characteristics of Metal Price Cycles." *Resources Policy* 34 (3): 87–102.
- Robinson, J. A., R. Torvik, and T. Verdier. 2006. "Political Foundations of the Resource Curse." *Journal of Development Economics* 79 (2): 447–68.

Rosnick, D., and M. Weisbrot. 2014. "Latin American Growth in the 21st Century: The 'Commodities Boom' That Wasn't." CEPR Reports and Issue Briefs 2014–09, Center for Economic and Policy Research.

Ross, M. L. 1999. "The Political Economy of the Resource Curse." *World Politics* 51 (2): 297–322.

Rossen, A. 2015. "What are Metal Prices Like? Comovement, Price Cycles and Long-Run Trends." *Resources Policy* 45 (C): 255–76.

Sugawara, N. 2014. "From Volatility to Stability in Expenditure: Stabilization Funds in Resource-Rich Countries." IMF Working Paper 14/43, International Monetary Fund, Washington, DC.

Tornell, A., and P. R. Lane. 1998. "Are Windfalls a Curse? A Nonrepresentative Agent Model of the Current Account." *Journal of International Economics* 44 (February): 83–112.

Tornell, A., and P. R. Lane. 1999. "The Voracity Effect." *American Economic Review* 89 (March): 22–46.

Truman, E. M. 2010. *Sovereign Wealth Funds: Threat or Salvation?* Peterson Institute Press: Peterson Institute for International Economics.

UN Comtrade (database). United Nations. Accessed May 20, 2026. <https://comtradeplus.un.org>.

van der Ploeg, F. 2011. "Natural Resources: Curse or Blessing?" *Journal of Economic Literature* 49 (2): 366–420.

Velasco, A. 2000. "Debts and Deficits with Fragmented Fiscal Policymaking." *Journal of Public Economics* 76 (April): 105–25.

Villafuerte, M., P. López-Murphy, and R. Ossowski. 2010. "Fiscal Policy in Oil Producing Countries During the Recent Oil Price Cycle." IMF Working Paper 10/028, International Monetary Fund, Washington, DC.

Woolcock, M., L. Pritchett, and J. Isham. 2001. "The Social Foundations of Poor Economic Growth in Resource-Rich Countries." In *Resource Abundance and Economic Development*, edited by R. M. Auty, 76–92. Oxford and New York: Oxford University Press.

World Bank. 2009. *Global Economic Prospects: Commodities at the Crossroads*. Washington, DC: World Bank.

World Bank. 2018. *Global Economic Prospects: Broad-Based Upturn, but for How Long?* January. Washington, DC: World Bank.

World Bank. 2020a. *Global Economic Prospects: Slow Growth, Policy Challenges*. January. Washington, DC: World Bank.

World Bank. 2020b. *Commodity Markets Outlook: Implications of COVID-19 for Commodities*. April. Washington, DC: World Bank.

World Bank. 2020c. *Global Economic Prospects*. June. Washington, DC: World Bank.

World Bank. 2022. “Commodity Price Cycles: Drivers and Policies.” In *Global Economic Prospects*, 111-54. January. Washington, DC: World Bank.

World Bank. 2024. *Commodity Markets Outlook*. October. Washington, DC: World Bank.

World Bank. 2025a. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Bank. 2025b. *Commodity Markets Outlook*. April. Washington, DC: World Bank.

World Bank. 2026a. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Bank. 2026b. *Global Economic Prospects*. June. Washington, DC: World Bank.

World Economic Outlook (database). International Monetary Fund. Accessed April 15, 2026. <https://data.imf.org/en/datasets/IMF.RES:WEO>.

*The tendency to under-save mineral wealth is pronounced during booms.
The temptation to spend the windfall from high world prices is sometimes
irresistible.*

Jeffrey A. Frankel (2011b)

James W. Harpel Professor of Capital Formation and Growth,
Harvard Kennedy School, Harvard University

CHAPTER 2

Fiscal Procyclicality in Commodity Exporters: An Enduring Challenge

Extensive empirical evidence indicates that fiscal policy is predominantly procyclical in emerging market and developing economies (EMDEs) and countercyclical or acyclical in advanced economies. This chapter investigates the cyclical nature of fiscal policy in commodity-exporting EMDEs and highlights the enduring challenges posed by fiscal procyclicality. Over the past four decades, fiscal policy has been more procyclical in commodity-exporting EMDEs than in other EMDEs, on average. Fiscal procyclicality amplifies business cycles and, on net, hurts economic growth, with fiscal policy in the average EMDE commodity exporter exacerbating the negative impact of a decline in commodity prices on output by more than one-fifth. A stronger rule of law, easier access to international financial markets, and the presence of fiscal rules and sovereign wealth funds have all been associated with lower fiscal policy procyclicality. A strong commitment to fiscal discipline is critical for these institutional and policy frameworks to be effective in achieving their objectives.

Introduction

A sizable body of empirical literature has focused on the cyclicity of fiscal policy in emerging market and developing economies (EMDEs). Evidence indicates that fiscal procyclicality is pervasive in these economies: fiscal policy is expansionary in good times and contractionary in bad times.¹ As government spending increases in good times, falling revenues and limited access to borrowing in bad times make the inevitable adjustment even more painful. Thus, fiscal policy itself can become a source of instability (Arroyo Marioli and Végh 2023). The role of fiscal policy as a potential source of macroeconomic instability is particularly relevant in commodity exporters, given the significant response of fiscal variables to commodity price shocks. As the experience of recent decades suggests, governments have difficulties in establishing macroeconomic policy frameworks that are effective in helping maintain steady growth in the face of commodity price swings (IMF 2015; UNCTAD 2021; World Bank 2022). These challenges in formulating fiscal policy in commodity-exporting EMDEs have once again been brought to the fore by the sizable swings in commodity prices in recent years (figure 2.1.A).

Note: This chapter was prepared by Francisco Arroyo Marioli and Garima Vasishtha.

¹ Refer to Kaminsky, Reinhart, and Végh (2004) and Talvi and Végh (2005) for early contributions to empirical research on the procyclicality of fiscal policy. More recent contributions include Carneiro and Garrido (2016), Frankel, Végh, and Vuletin (2013), Michaud and Rother (2018), and Richaud et al. (2019). For studies documenting evidence for select groups of commodity-exporting countries, refer to Bova, Medas, and Poghosyan (2016) and Céspedes and Velasco (2014), among others.

Commodities are important sources of export and fiscal revenues for about two-thirds of EMDEs and nearly nine-tenths of low-income countries (LICs). Energy exporters are generally more reliant on commodity exports than metal and agricultural exporters (figures 2.1.B and 2.1.C; chapter 1). This reliance leaves governments exposed to frequent commodity price swings, as commodity markets are often hit by large, persistent shocks as well as longer-lasting episodes of booms and slumps (figure 2.1.D).² These dynamics complicate fiscal management by heightening the potential trade-offs between short-term macroeconomic stabilization and long-term fiscal sustainability (World Bank 2022).

The booms and busts in government revenues attributable to commodity prices tend to make fiscal policy both more procyclical and more volatile in commodity-exporting EMDEs, amplifying business cycles and ultimately harming growth. Rising commodity prices can lead to procyclical increases in public spending and tax cuts. Conversely, declines in commodity prices can trigger procyclical tax increases and cuts in public expenditures due to reduced revenues from commodity production and exports. Moreover, because tax cuts and increases in public spending are generally easier to implement and more difficult to reverse politically than tax increases and reductions in public spending, government deficits and debt positions can ratchet up over time. This secular deterioration, in turn, makes it more difficult to implement countercyclical fiscal policy in bad times. In sum, procyclical fiscal policy in commodity exporters can amplify the impact of commodity price movements on economic activity, lead to inefficient interruptions in government investment and services delivery, and introduce a bias toward a deterioration in fiscal positions.

In the years ahead, the challenges associated with procyclical fiscal policies in commodity exporters may be compounded by the shifts in commodity price behavior that have characterized the post-pandemic period. Since 2020, the average duration of commodity price cycles has nearly halved compared to the pre-pandemic period (World Bank 2025b). This reflects a combination of macroeconomic shocks—such as the 2020 global recession, geopolitical conflicts, and extreme weather events—and structural factors, including the energy transition and increasing geoeconomic fragmentation.³ Enduring procyclical fiscal policies would be detrimental to sustainable growth and impede progress in achieving broader development goals.

Within this context of the inherent volatility of commodity prices and the associated implications for fiscal policy, this chapter offers a detailed exploration of the cyclical nature of fiscal policy in commodity-exporting EMDEs. Specifically, it addresses the following questions:

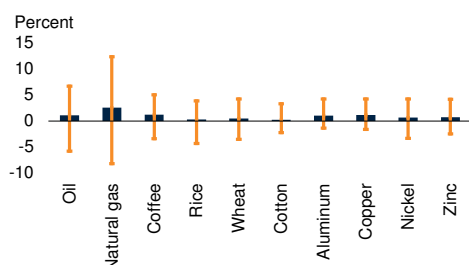
² Commodity prices have undergone repeated cycles over the past five decades, with the average cycle lasting about six years and price slumps lasting somewhat longer than booms (Balatti forthcoming; World Bank 2022).

³ Severe alterations in weather patterns affect climate-sensitive industries such as agriculture and fishing. Droughts can reduce harvests, while floods can affect both harvests and transportation. At the same time, the energy transition can generate gains for other commodities, especially metals that are used heavily in low-carbon technologies.

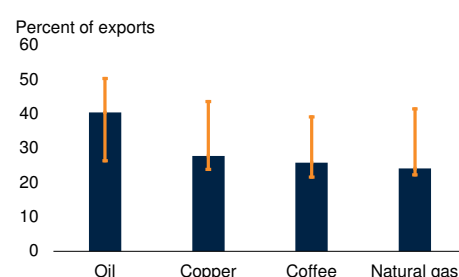
FIGURE 2.1 Commodities: price volatility and importance for exports and revenues

Commodity prices have fluctuated widely in recent years. Energy exporters are more reliant on commodity exports than agricultural and metal exporters. Resource revenues are an important source of fiscal revenue for commodity exporters, particularly energy exporters. Commodity prices have undergone frequent cycles over the past five decades, with slumps lasting longer than booms.

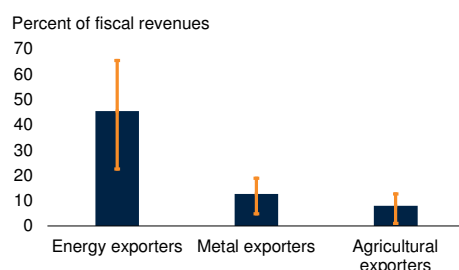
A. Commodity price movements since 2020



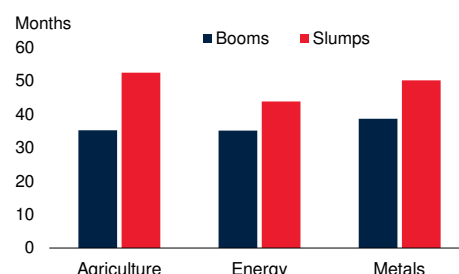
B. Share of EMDE exports of key commodities



C. Resource revenues as share of total fiscal revenues



D. Duration of commodity booms and slumps



Sources: Balatti (forthcoming); UN Comtrade (database); United Nations University World Institute for Development Economics Research (UNU-WIDER); World Bank; World Integrated Trade Solution (WITS, database).

Note: EMDEs = emerging market and developing economies.

A. Bars show the average month-on-month change in commodity prices from January 2020 to June 2026. Whiskers show the interquartile ranges. The commodities used (from the World Bank's Pink Sheet database) are crude oil (average of West Texas Intermediate, Brent, and Dubai); natural gas index; coffee, Arabica; rice, Thai 5 percent; wheat, U.S. hard red winter; cotton, A Index; aluminum; copper; nickel; and zinc.

B. Panel shows the median share of exports accounted for by oil, copper, coffee, and natural gas for EMDE exporters of that commodity. The number of countries in the sample is 12 for oil, 5 for copper, 4 for coffee, and 6 for natural gas. Whiskers indicate interquartile ranges. Based on latest available data.

C. Unweighted average of resource revenues as a percentage of fiscal revenues for EMDE commodity exporters. Sample includes 30 energy exporters, 14 metal exporters, and 10 agricultural exporters. Whiskers show interquartile ranges.

D. Panel shows the average length (in months) of a phase (boom or slump). Based on 27 global commodity prices. Last observation is June 2026.

- How does the cyclicity of fiscal policy differ in commodity-exporting EMDEs relative to other EMDEs?
- How does the cyclicity of fiscal policy vary with macroeconomic and institutional characteristics?
- How does fiscal procyclicality affect economic growth in commodity-exporting EMDEs?

- Which policy interventions can help improve the quality of fiscal policy by reducing procyclicality?

Contributions to the literature

This chapter makes four main contributions to the literature. *First*, it provides comprehensive evidence on fiscal procyclicality for a large sample of commodity exporters (agricultural, metals, and energy exporters) and commodity importers. Existing studies have covered either a geographically limited set of countries or mainly oil exporters. *Second*, it examines how fiscal cyclicity varies with the macroeconomic and institutional characteristics of countries, shedding light on why some commodity exporters are better able to “manage abundance” than others.⁴ *Third*, it deepens the understanding of the implications of fiscal procyclicality for economic growth. The chapter quantifies how procyclical fiscal policy responses have amplified business cycles in commodity-exporting EMDEs during periods of rising commodity prices, focusing on the 2003–08 commodity price boom as an illustrative example. *Finally*, it presents a comprehensive analysis of policies to reduce fiscal policy procyclicality.

Main findings

The chapter offers the following main findings:

Over the past four decades, fiscal policy has tended to be more procyclical in EMDEs than in advanced economies, and more so in EMDE commodity exporters than commodity importers. The average correlation between the cyclical components of real GDP and real government spending—the measure of fiscal cyclicity—is 0.42 for EMDEs while it is slightly negative for advanced economies. Within EMDEs, the correlation is 0.45 for commodity exporters and 0.37 for commodity importers. Although fiscal procyclicality has generally trended downward in EMDEs in recent decades, it has fallen less among commodity exporters than in other EMDEs.

Fiscal procyclicality has amplified the business cycle in commodity-exporting EMDEs. Because of its procyclical nature, fiscal policy in the average EMDE commodity exporter has increased the impact of commodity price shocks on output by more than one-fifth, relative to the counterfactual in which fiscal policy does not respond to the price shock. In contrast, fiscal policy in advanced-economy commodity exporters has, on average, offset the output effect of a commodity price shock by reacting countercyclically. When hit by a commodity price shock of the same magnitude, the change in output in the average commodity-exporting EMDE has tended to be more than three times larger than that in its average advanced-economy counterpart, because of the opposite responses of fiscal policy in the two country groups.

Structural policies can help reduce fiscal procyclicality. In particular, robust public institutions, stronger rule of law, greater capital account openness, fiscal rules to constrain government spending, and sovereign wealth funds (SWFs) have all been

⁴The notion of “managing abundance” was stressed by Cuddington (1989).

associated with lower fiscal procyclicality. Fiscal rules and SWFs have been most effective when surrounded by robust institutional frameworks. Medium-term expenditure frameworks can also help lower procyclicality by improving fiscal discipline.

Fiscal policy procyclicality

Conceptual definitions

Because the concept of fiscal policy cyclicity is important to guiding actual policy, it is critical to define policy cyclicity in terms of policy instruments (such as government expenditure) rather than outcomes (such as the fiscal balance). Following the literature, this chapter measures fiscal cyclicity as the correlation between annual percentage changes in real (primary) government expenditure and real GDP: a positive correlation indicates procyclicality while a negative correlation indicates countercyclicality.⁵ These correlations are calculated for 182 countries using annual data for 1980–2024.

Economies are placed into two groups—“commodity exporters” and “commodity importers”—by applying the classification criteria used in World Bank (2025a). An economy is classified as a commodity exporter if, on average in 2017–19, either its combined exports of all commodities accounted for 30 percent or more of its total exports or its exports of any single commodity accounted for 20 percent or more of its total exports. Economies are excluded if they reached either threshold only because of re-exports (imports that were exported without being changed). The sample comprises 96 commodity-exporting economies, of which 91 are EMDEs and five are advanced economies. Commodity importers are economies not classified as commodity exporters (table 2.1). The panel is unbalanced due to a lack of available data for some countries for the whole sample period.

Basic features of procyclicality

The analysis of the correlation-based measure of fiscal expenditure procyclicality reveals four stylized facts. First, fiscal policy in EMDEs was procyclical from 1980–2024, while that in advanced economies was acyclical, on average (figure 2.2.A). The correlation between the cyclical components of real government expenditure and real GDP for EMDEs is 0.42 while that for advanced economies is slightly negative.

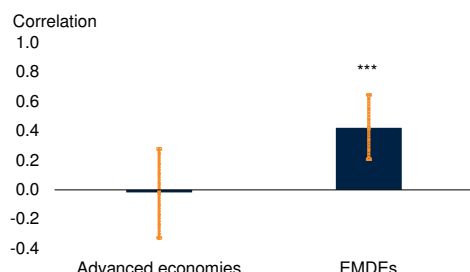
Second, although fiscal expenditure was procyclical among all EMDEs in the sample, it was about 22 percent more procyclical in commodity exporters than in commodity importers, on average (figure 2.2.B). The correlation between the cyclical components of real government spending and real GDP for commodity exporters is 0.45 compared with 0.37 for commodity importers, with both coefficients as well as the difference between them being statistically significant. Commodity exporters tend to have more procyclical fiscal policy than commodity importers, regardless of their major commodity export—agriculture, metals, or energy. Moreover, this procyclical nature of fiscal

⁵ For details about this measure, refer to Frankel, Végh, and Vuletin (2013) and Kaminsky, Reinhart, and Végh (2004). The analysis here uses the Hodrick-Prescott filter to detrend the time series. The results are robust to the use of alternative filters, such as the Baxter-King filter.

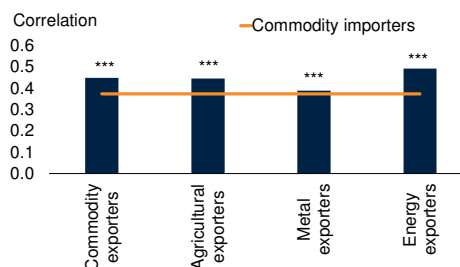
FIGURE 2.2 Procyclicality of government expenditures

Over the past four decades, fiscal policy in EMDEs has been strongly procyclical, while fiscal policy in advanced economies has been acyclical, on average. Commodity-exporting EMDEs tend to display significantly higher procyclicality than other EMDEs, regardless of their major commodity export—agriculture, metals, or energy. This procyclical nature of fiscal spending in commodity exporters has been widespread across all EMDE regions and country-income groups.

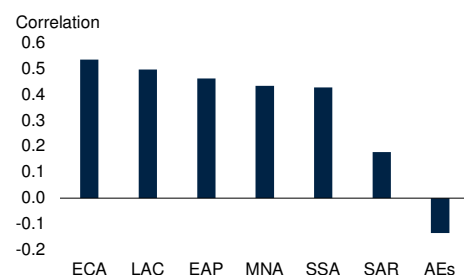
A. Fiscal procyclicality: EMDEs versus advanced economies



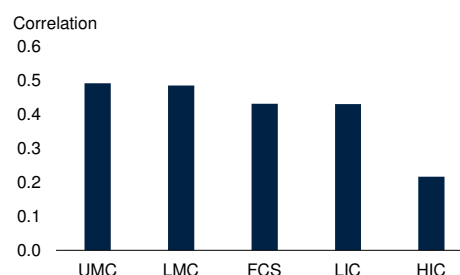
B. Fiscal procyclicality in EMDEs: Commodity exporters versus importers



C. Fiscal procyclicality in commodity exporters, by region



D. Fiscal procyclicality in commodity exporters, by income group



Sources: Arroyo Marioli and Végh (2023); International Monetary Fund; World Bank.

Note: AEs = advanced economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; FCS = fragile and conflict-affected situations; HIC = high-income countries; LAC = Latin America and the Caribbean; LIC = low-income countries; LMCs = lower-middle-income countries; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; UMC = upper-middle-income countries. Bars show average correlation between the (Hodrick- Prescott-filtered) cyclical components of real GDP and real government spending within groups. The sample period is 1980–2024.

A. Sample includes 38 advanced economies and 151 EMDEs. *** indicates that the difference between the average correlation for the two country groups is statistically significant at the 10 percent level or better. Whiskers show the 25th and 75th percentiles.

B. Sample of EMDEs includes 91 commodity exporters (37 agricultural, 24 metal, and 34 energy exporters) and 60 commodity importers. *** indicates that the difference between the average correlation for the particular country group and that for commodity importers is statistically significant at the 10 percent level or better.

C. Panel shows the average procyclicality measure for the various country groups. Sample includes 9 countries in ECA, 17 in LAC, 9 in EAP, 11 in MNA, 44 in SSA, 1 in SAR, and 5 advanced economies.

D. Panel shows the average procyclicality measure for the various country groups. Sample includes 26 UMCs, 29 LMCs, 27 FCS, 21 LICs, and 14 HICs.

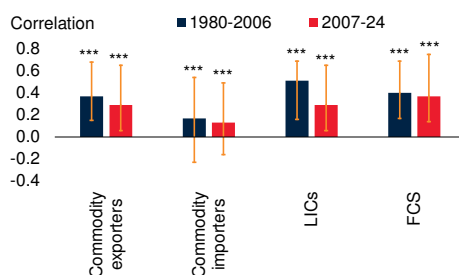
expenditure has been widespread across all EMDE regions (figure 2.2.C). Third, the degree and nature of fiscal procyclicality have varied across country income groups. Fiscal policy was about half as procyclical in high-income commodity exporters as in other country-income groups (figure 2.2.D).

Fourth, fiscal procyclicality has declined over the past four decades. To examine the evolution of fiscal procyclicality, first, the sample is split into two subperiods: 1980–

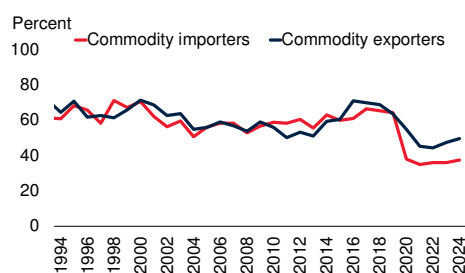
FIGURE 2.3 Evolution of fiscal procyclicality

On average, fiscal procyclicality has declined in commodity exporters over the past few decades. Nevertheless, fiscal policy in commodity exporters over 2007–24 was about twice as procyclical as in commodity importers, on average. The share of countries running procyclical fiscal policies has declined over the past few decades, with a particularly sharp drop in the aftermath of the pandemic, as primary spending surged due to increased outlays on health and social protection.

A. Shifts in fiscal procyclicality, 1980–2024



B. Share of countries with procyclical fiscal policy



Sources: Arroyo Marioli and Végh (2023); International Monetary Fund; World Bank.

Note: FCS = fragile and conflict-affected situations; LICs = low-income countries.

A. Bars show the average correlation between the (Hodrick-Prescott-filtered) cyclical components of real GDP and real government spending within groups. For 1980–2006, the sample includes 90 commodity exporters, 91 commodity importers, 22 LICs, and 31 FCS. For 2007–24, it includes 95 commodity exporters, 95 commodity importers, 21 LICs, and 31 FCS.

B. Share of countries with procyclical policies based on five-year rolling windows. Sample includes up to 186 countries.

2006 and 2007–24. This division reflects the observed increase in the willingness and ability of countries to pursue countercyclical fiscal policies following the 2007–09 global financial crisis (Alvarez and De Gregorio 2014; Végh and Vuletin 2014). This is confirmed by the finding that fiscal procyclicality in both commodity exporters and importers was lower during 2007–24 than during 1980–2006. Nevertheless, fiscal policy in commodity exporters over 2007–24 was about twice as procyclical as in commodity importers, on average (figure 2.3.A). The second way the evolution of cyclicity is explored is by examining changes in the share of countries running procyclical fiscal policies. These shares have declined over the past few decades, with a particularly sharp drop after 2019 as primary expenditures surged due to increased outlays on health and social protection. Compared to the mid-1990s, the share of countries with procyclical fiscal policies declined by about 21 percentage points and 31 percentage points for commodity exporters and importers, respectively (figure 2.3.B).

Determinants of fiscal procyclicality

To assess how fiscal cyclicity has varied with the macroeconomic and institutional characteristics of countries, this section first compares fiscal cyclicity across different groups of EMDEs. The country groupings are based on such macroeconomic characteristics as the degree of capital account openness, the exchange rate regime, and the level of external debt. In addition, the relationship between fiscal cyclicity and variables representing political economy and institutional characteristics is examined, with the choice of these variables guided by the literature on fiscal cyclicity. Next, cross-country

regressions are used to disentangle the roles of various macroeconomic and institutional factors in driving procyclicality.

Restrictions on international financial transactions. Countries with stronger restrictions on capital flows tend to have more limited access to international financial markets, with a higher cost of borrowing (Froemel and Paczos 2024). This may increase the procyclicality of fiscal policy by making the government's access to funds particularly limited during recessions, forcing government expenditures to shrink, thus amplifying the economic downturn and the cycle.⁶ Indeed, data show that fiscal policy in commodity-exporting countries with more capital account restrictions has tended to be more procyclical than in those with fewer restrictions (figure 2.4.A).⁷ On average, the correlation between the cyclical components of real government spending and real GDP for countries with more capital controls is 0.47 compared with 0.43 for countries with fewer capital controls; the difference between the correlations is statistically significant.

Exchange rate regime. Contrary to the conventional view that pegging an exchange rate to a stable foreign currency tends to discipline domestic fiscal policy, flexible exchange rates have sometimes been associated with greater fiscal discipline because of the immediacy of the repercussions of imprudent fiscal policies (Tornell and Velasco 2000). It therefore remains ambiguous whether the degree of fiscal procyclicality will be higher in countries with fixed or flexible exchange rate regimes. The data show that the correlation between the cyclical components of government spending and GDP is higher (0.46) under fixed exchange rate regimes than under flexible exchange rates (0.44), although the difference between the two is not statistically significant (figure 2.4.B).

External debt. The correlation between the cyclical components of real government spending and real GDP is likely to be higher the higher external debt is, as the risk of an unexpected change in financial market conditions may constrain the government's ability to conduct countercyclical fiscal policy. However, this notion is not borne out by the data. Fiscal cyclicality is found not to have varied significantly with the level of external debt over the sample period. The correlation between the cyclical components of real GDP and real government spending is essentially the same for countries with low and high external debt.⁸

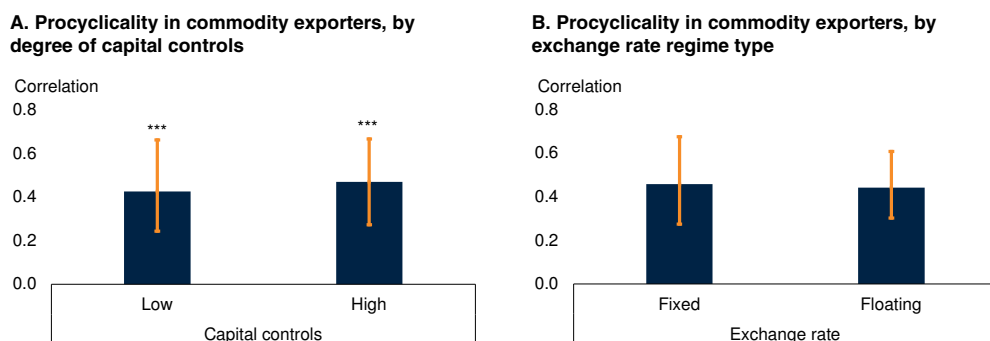
⁶ For details of this argument, refer to Kose et al. (2010). This is also in line with insights from real business cycle models, where a steeper upward-sloping supply of funds (which makes borrowing from the rest of the world more costly) implies a more procyclical fiscal policy, as exemplified in Fernandez et al. (2021).

⁷ The results shown in figures 2.4 and 2.5 are broadly similar when an alternative threshold (the lower and upper one-third of observations) is used to classify countries into "low" and "high" groups for capital account openness, political risk, control of corruption, and law and order.

⁸ The degree of fiscal procyclicality can also potentially vary with the stance of the business cycle. In some countries, the lack of access to international credit markets during recessions introduces an asymmetry in their fiscal policy response in bad times versus good times. This could also be driven by the relationship between fiscal multipliers and the stance of the business cycle, with multipliers in bad times being larger than those in good times (Auerbach and Gorodnichenko 2012, 2013). This notion, however, is not supported by a comparison of procyclicality in expansions and recessions over the sample period under consideration.

FIGURE 2.4 Fiscal procyclicality and macroeconomic characteristics

Among commodity exporters, greater capital account restrictions are associated with more procyclical policy, on average. The relationship between fiscal procyclicality and exchange rate flexibility is ambiguous in theory. Even so, flexible exchange rates have sometimes been associated with greater fiscal discipline.



Sources: Arroyo Marioli and Végh (2023); Chinn and Ito (2006); Ilizetzi, Reinhart, and Rogoff (2022); World Bank.

Note: Bars show average correlation between the cyclical components of real GDP and real government spending within groups. The cyclical components are derived using the Hodrick-Prescott filter. Vertical lines show 25th and 75th percentiles. *** indicates that the difference between the means for the two country groups is statistically significant at the 10 percent level or better.

A. Based on Chinn-Ito index of financial openness. A country is classified as having high (low) capital account restrictions if its Chinn-Ito index score is below (above) the median. Sample includes 36 countries with low capital controls and 56 countries with high capital controls.

B. Sample has 65 countries with fixed exchange rates and 29 with floating rates, based on the classification in Ilizetzi, Reinhart, and Rogoff (2022).

Political economy factors. Extensive research has documented the role of political economy factors in driving fiscal procyclicality. Political pressures in good times tend to prompt policy makers to reduce taxes or increase spending, thereby reducing primary surpluses. Given that more volatile primary surpluses create greater opportunities for fiscal appropriation, higher volatility of output—and therefore the tax base—tends to make fiscal policy more procyclical (Talvi and Végh 2005).

The dispersion of political power and the related “voracity effect”—in which various fiscal claimants (including government ministries, provinces, and unions) attempt to appropriate resources in good times without considering the effects of their actions on other claimants—is another channel through which political economy factors can affect fiscal cyclicity (Tornell and Lane 1999). As the intensity of such fiscal competition increases in good times, the rise in government spending could be greater than the windfall gains in revenues, resulting in procyclical fiscal expansion. The more claimants there are (that is, the more dispersed the power), the higher government spending may tend to be in good times. In a similar vein, in political environments characterized by corruption, voters may seek to limit government resources—commonly referred to as “starving the beast”—by advocating for reduced taxes and increased transfers, to prevent the misappropriation of public funds by corrupt officials (Alesina, Campante, and Tabellini 2008).

Quality of institutions. The quality of institutions plays an important role in the ability of countries to conduct countercyclical fiscal policy.⁹ Indeed, institutional factors, such as law and order, have been found to play a larger role than financial indicators (such as financial openness and domestic credit to the private sector) in explaining differences in fiscal cyclicity between advanced and developing economies (Calderón and Schmidt-Hebbel 2008). Government stability and law and order can help reduce fiscal procyclicality, partly by curtailing arbitrary government discretion and extending the horizon of policy decision-making.

To analyze the linkages between fiscal cyclicity and institutional quality, five indicators of institutional quality from the PRS Group database are used: political risk, quality of bureaucracy, control of corruption, government stability, and law and order (table 2.2). The association between fiscal cyclicity and the presence of fiscal rules is also examined, as such rules form a significant part of fiscal institutions in many commodity-exporting countries (chapter 1).

The results indicate that fiscal policy has tended to be more procyclical in commodity exporters that rank higher on political risk, with a correlation of 0.45 between the cyclical components of real GDP and real government spending. The corresponding correlation is 0.32 for countries with lower political risk (figure 2.5.A). The difference between the average correlations for the two country groups is statistically significant. This may be partly because governments in countries with higher political risk are likely to prioritize short-term outcomes to stay in power.

Likewise, commodity-exporting countries with lower-quality bureaucracy have often implemented more procyclical fiscal policies than those with higher-quality bureaucracies, although the difference between the two country groups is not statistically significant (figure 2.5.B). Stronger bureaucracies can support more effective, rules-based policy management and help curb unproductive discretionary spending.

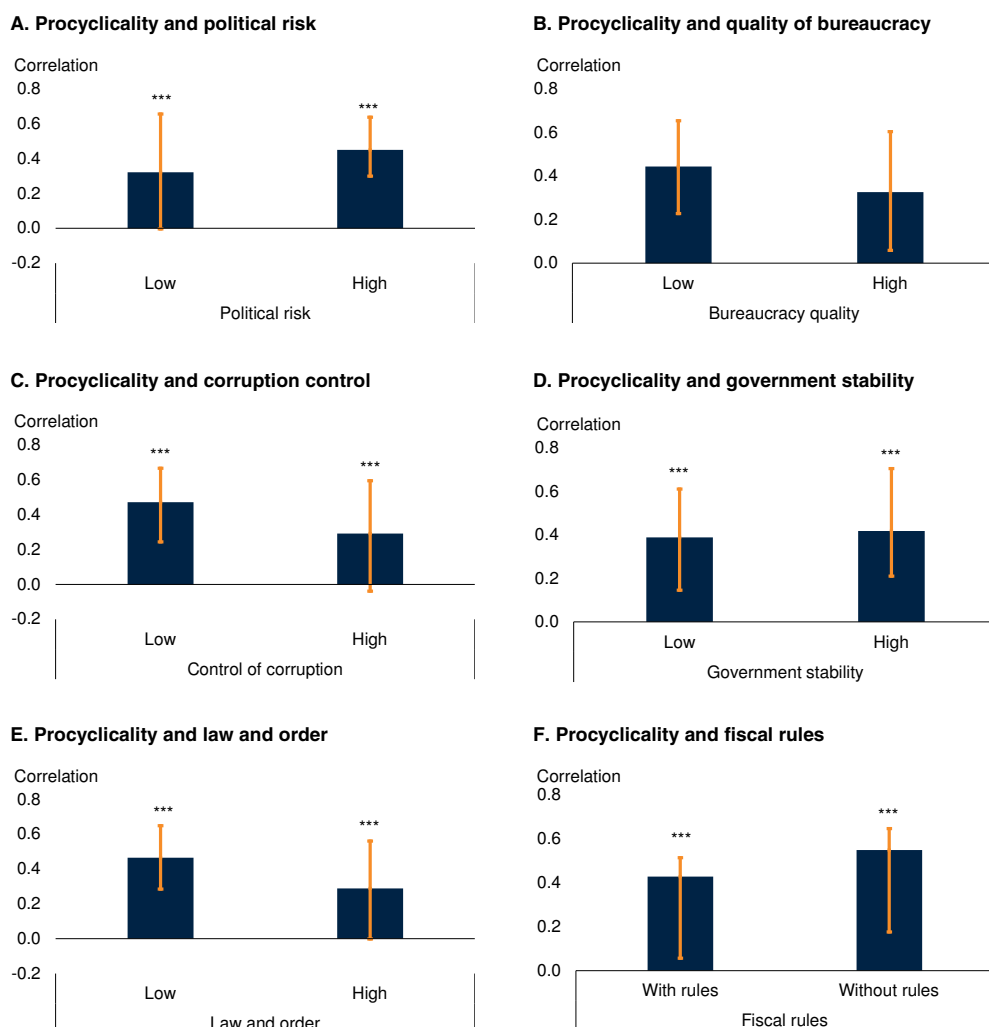
Commodity exporters with better control of corruption have demonstrated lower fiscal procyclicality than those with weaker corruption control, and the difference between the procyclicality measures for the two country groups is statistically significant (figure 2.5.C). Weaker control of corruption makes it easier to capture rents. Countries that rank higher on measures of government stability are likely to demonstrate less fiscal procyclicality than those with lower government stability, although this relationship is not borne out in the data (figure 2.5.D). A more stable government should allow for the formulation of fiscal policy with a longer horizon, weakening the incentive for procyclical policy. Better law and order has been associated with less procyclical fiscal policy (figure 2.5.E). The difference between the procyclicality measures for countries ranked lower on the law and order index and those ranked higher is statistically significant.

Many commodity exporters have enacted fiscal rules, often in conjunction with stabilization funds—which put aside revenue in good times that can be tapped into in

⁹ For example, refer to Calderón, Duncan, and Schmidt-Hebbel (2016); Carneiro and Garrido (2016); Céspedes and Velasco (2014); Frankel, Végh, and Vuletin (2013); and Jalles et al. (2023).

FIGURE 2.5 Fiscal procyclicality and institutional characteristics

The degree of procyclicality tends to be higher, on average, among commodity exporters with higher political risk. Higher-quality bureaucracies, stronger corruption control, and stronger rule of law are all associated with lower procyclicality. The presence of fiscal rules also has a dampening effect on procyclicality



Sources: Arroyo Marioli and Végh (2023); Davoodi et al. (2022); International Monetary Fund; PRS Group (database); World Bank.

Note: Bars show average correlation between the (Hodrick Prescott-filtered) cyclical components of real GDP and real government spending within groups. Whiskers show 25th and 75th percentiles. *** indicates that the difference between the means for the two country groups is statistically significant at the 10 percent level or better.

A. Countries with high (low) political risk are defined as those with political risk above (below) the sample median. Sample includes 49 countries with high political risk and 24 countries with low political risk.

B. Sample includes 48 countries with low bureaucracy quality and 25 with high bureaucracy quality. The difference between the means for the two country groups is not statistically significant.

C. Sample includes 45 countries with low control of corruption and 28 with high control of corruption.

D. Sample includes 32 countries with high government stability and four with low government stability.

E. Sample includes 24 countries with high scores (above sample median) for the law-and-order index and 49 countries with low (below sample median) scores.

F. Sample includes 28 countries with fiscal rules and 20 without fiscal rules.

bad times. Fiscal rules may signal the intent of the government to dampen, if not eliminate, fiscal procyclicality as well as to safeguard long-term fiscal sustainability. Over the past four decades, the presence of fiscal rules has been associated with lower procyclicality in commodity-exporting EMDEs (figure 2.5.F). However, the increased use of fiscal rules has only partially shielded these countries from fiscal procyclicality, as evidenced by the continued procyclicality of fiscal policies, on average, after such rules are adopted. Nevertheless, there is evidence that some features of a second generation of fiscal rules—such as the use of cyclically adjusted targets and well-defined escape clauses, combined with strong legal and enforcement arrangements—have been associated with reduced procyclicality (Bova, Carcenac, and Guerguil 2014). The experiences of commodity-exporting economies suggest that fiscal rules or SWFs are most effective in achieving their stated objectives when they are well-designed, closely linked to broader policy objectives, and supported by strong institutions and political commitment (World Bank 2024).

Armed with the insights from the correlates of fiscal procyclicality established above, the remainder of this section uses cross-country regressions to identify the main drivers of fiscal procyclicality in commodity exporters.¹⁰ The dependent variable is the correlation between the annual percentage changes in real government spending and real GDP. The explanatory variables are intended to capture the four explanations for the existence of procyclical fiscal policy described above. These are capital account openness (measured by an index of financial openness), institutional quality (measured by an index of control of corruption), political economy factors (measured by an index of political constraints, which reflects the extent to which policy changes are inhibited by institutional and political factors), and macroeconomic stability (measured by the standard deviation of GDP).

The estimated coefficients of each of these four variables have the expected sign (table 2.3). More open capital accounts and better control of corruption are found to help reduce fiscal procyclicality while greater output volatility is associated with higher procyclicality. However, the coefficient of the political constraints index is not statistically significant, suggesting either that the “voracity effect” does not operate or that the political constraints index fails to capture it. The variables are jointly significant and explain about 28 percent of procyclical behavior across countries.¹¹

Cross-country regressions are also used to analyze the role of institutional variables in driving fiscal cyclicity, as highlighted by the correlations reported in the previous

¹⁰ For an empirical analysis of the drivers of fiscal procyclicality in OECD countries, refer to Lane (2003). For an analysis of the role of financial and institutional variables, refer to Calderón and Schmidt-Hebbel (2008) and Calderón, Duncan, and Schmidt-Hebbel (2016). Ilzetzki (2011) provides a novel political economy explanation of fiscal procyclicality based on disagreements among successive governments on the distribution of public spending, and examines different theories of procyclicality by running numerical simulations in calibrated models.

¹¹ To check the robustness of the results, GDP per capita, the size of the public sector relative to GDP, and openness (the sum of exports and imports as a share of GDP) were included as controls, one at a time (following Lane 2003). While GDP per capita was significant at the 5 percent level, the two other control variables were not. In all three cases, the F-test for the joint significance of the three relevant explanatory variables was significantly different from zero at least at the 10 percent level.

section. The roles of SWFs and fiscal rules are also explored. To capture SWFs, a dummy variable is included that takes the value of 1 if a country has a SWF, and 0 otherwise. SWFs can play an important role in reducing procyclicality by promoting the accumulation of government savings during commodity price booms, to be drawn down to some extent during price slumps. The results show that greater government stability, better law and order, and the presence of fiscal rules and SWFs have all tended to reduce fiscal procyclicality (table 2.4).¹² Overall, the analysis therefore provides empirical evidence that better institutions are associated with lower fiscal procyclicality. These results are consistent with country case studies that show that SWFs and fiscal rules are most effective in meeting their goals when supported by strong institutions (World Bank 2024).

The effects of fiscal policy procyclicality on output growth

Procyclical fiscal policy has been found to amplify the effect of a shock to economic activity on output—that is, “when it rains, it pours,” using the analogy of Kaminsky, Reinhart, and Végh (2004). Such shocks could originate from various sources, including the financial sector or supply or demand shocks associated with external or domestic developments.¹³ This section examines how increases in commodity prices have affected the behavior of fiscal policy and, in turn, output growth. Following Arroyo Marioli and Végh (2023), the total impact of changes in commodity prices on output can be decomposed into two components. First, the “rain” component: in response to an increase in commodity prices, production rises in the commodity sector and other related sectors, and the associated increases in income generate further increases in private spending and output. Higher output and spending, in turn, boost fiscal revenue, reducing the primary fiscal deficit. The second component depends on the response of fiscal policy. If the reduction in the fiscal deficit is conserved, fiscal policy will play a countercyclical role, dampening the increase in demand and activity. If instead the reduction in the fiscal deficit leads the government to increase spending or lower taxes, fiscal policy will increase the effect of the shock on output. There will then be a “pours” component, with procyclical fiscal policy amplifying the business cycle.

Methodology

To estimate the effect of fiscal policy on output, the analysis proceeds in four steps, using data for a sample of EMDEs and advanced economies for the period 1980–2019. Given that panel estimations can be sensitive when the cross-sectional dimension is not large, the pandemic years are excluded to avoid results being driven by outsized events.

¹² Although fiscal rules may reduce procyclicality, the existence of fiscal procyclicality may prompt policy makers to adopt fiscal rules. To account for this potential endogeneity, instrumental variable estimation (two-stage least squares) is used, with bureaucracy quality (from the PRS database) as an instrument.

¹³ Kaminsky, Reinhart, and Végh (2004) focused on net capital inflows, finding that such flows were associated with an increase in government expenditure in EMDEs, while net capital outflows were associated with a decline in government expenditure. A variety of other drivers could lead to procyclical fiscal behavior.

First, to quantify the effects of changes in commodity prices on output, panel regressions are used to estimate the response of real GDP to changes in country-specific commodity price indexes.¹⁴ Two control variables are used: overall terms of trade (which include terms of trade for all traded goods and services, not just commodities) to control for trade effects, and the lagged dependent variable to capture underlying growth unrelated to commodity prices. Results show that a 10 percent increase in commodity export prices increases output by 0.63–0.85 percent in EMDE commodity exporters and 0.18–0.26 percent in advanced-economy commodity exporters (table 2.5).

Second, panel regressions are used to estimate a fiscal policy reaction function (that is, the response of government spending to changes in commodity prices). The results show that EMDEs increase government spending when commodity export prices rise, indicating a procyclical fiscal policy (table 2.6). Specifically, a 10 percent increase in commodity export prices leads to an increase in government spending of about 0.6–0.8 percent. In contrast, advanced economies respond countercyclically: a 10 percent increase in commodity export prices elicits a reduction in government spending of about 0.7–1.2 percent. Third, an average fiscal multiplier is estimated for commodity exporters using a panel structural vector autoregression (SVAR) model. The model is based on the Blanchard and Perotti (2002) identification method, employing quarterly data for GDP and government expenditure from the IMF’s International Financial Statistics database for the period 1990–2019. In computing the “pours” component, the value of the multiplier after four quarters is used (0.88).

Finally, the “amplification” effect (the “pours” component) of fiscal policy on output is obtained by combining the fiscal response in the second step with the fiscal multiplier obtained from the third step. The “pours” component represents changes in output growth that are due solely to changes in government expenditure in response to the initial shock. The “pours” component is then formally measured by:

$$Pours = \Delta CEP \times \text{fiscal reaction elasticity} \times \text{fiscal multiplier} \times \frac{g}{y}, \quad (2.1)$$

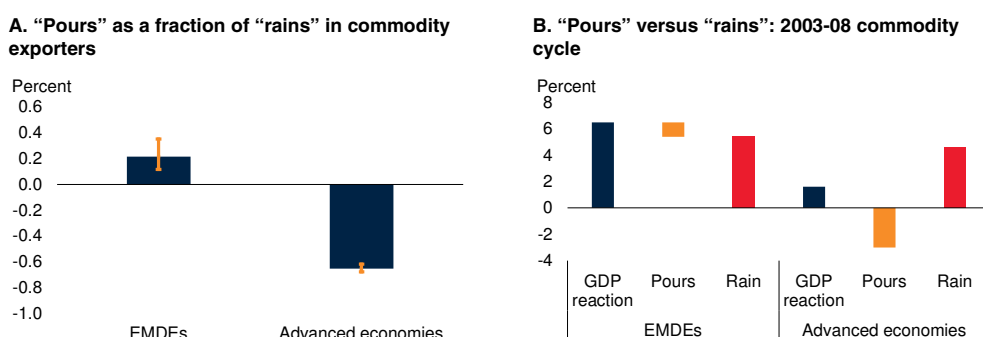
where CEP is the commodity export price, *fiscal reaction elasticity* is the estimated coefficient in the fiscal regression, and $\frac{g}{y}$ is the ratio of government spending to GDP (computed as the average over the sample period for each country). Intuitively, changes in commodity export prices (CEP) trigger a fiscal reaction (elasticity), which in turn affects GDP via the fiscal multiplier. The fiscal reaction is adjusted by the size of the government to measure the final impact in percentage points of GDP.¹⁵

¹⁴ The country-specific commodity export price index is an index that weights commodity prices by their relevance in a country’s exports. This index is a better measure of a commodity price shock for a particular country than global commodity price indexes that might include goods not exported by that country.

¹⁵ The fiscal reaction elasticity is estimated using a panel of 15 commodity exporters (4 advanced economies and 11 EMDEs). The fiscal multiplier is estimated for the same panel following Blanchard and Perotti (2002). Government size is represented by average government expenditure as a share of GDP for each country. The availability of quarterly data is critical for the Blanchard and Perotti (2002) identification method. This method assumes that output responds to government spending within the period, but that government spending does not respond to GDP. In other words, all contemporaneous correlation is attributed to fiscal policy affecting GDP. Refer to Ilzetzki, Mendoza, and Végh (2013) for a detailed discussion.

FIGURE 2.6 The amplification effect of procyclical fiscal policy on output

Fiscal policy in commodity-exporting EMDEs has tended to amplify the effects of commodity price shocks on output, while in advanced economies it has tended to dampen the effects. More than three-fourths of the difference in growth between major commodity-exporting EMDEs and advanced economies during the 2003–08 commodity price boom can be explained by the difference in the cyclical policy between the two groups of countries.



Sources: Arroyo Marioli and Végh (2023); International Monetary Fund; World Bank.

Note: EMDEs = emerging market and developing economies.

A.B. The sample includes 4 advanced economies (Australia, Canada, New Zealand, and Norway) and 11 EMDEs (Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Honduras, Indonesia, Russian Federation, South Africa, and Ukraine).

A. Panel shows the change in GDP (in response to a commodity price shock) explained by the reaction of fiscal policy (the "pours" component) as a share of the direct effect of the commodity price shock on output (the "rain" component). Bars show the averages of these shares for commodity-exporting EMDEs and advanced economies. Whiskers show the minimum and maximum range.

B. The orange bars represent the fraction of the change in GDP, in response to a commodity price shock, explained by the reaction of fiscal policy to the shock, averaged at the aggregate level. The red bars show the direct effect of a commodity price shock on GDP. The blue bars show the overall GDP response.

Impact of procyclical fiscal policy on output

The results indicate that, if an increase in the export commodity price index boosts output by 1.0 percentage point (the "rains" effect), procyclical fiscal policy in commodity-exporting EMDEs increases GDP by a further 0.21 percentage point (the "pours" effect), boosting the total change in GDP to 1.21 percentage points (figure 2.6.A). In contrast, fiscal policy in commodity-exporting advanced economies dampens the effect on output by reacting in the opposite direction, reducing GDP by 0.65 percentage point. This leaves the net increase in GDP at 0.35 percentage point for advanced economies. These estimates suggest that, when faced with a commodity price shock of the same magnitude, the overall change in GDP in EMDEs could exceed the change in advanced economies by more than a factor of three solely because of the different fiscal policy reactions.

The above approach is applied to the commodity price boom of 2003–08 to illustrate the role of fiscal policy. During this period, commodity export prices (in U.S. dollar terms) increased by about 76 percent for EMDEs and 66 percent for advanced economies in the sample. The analysis estimates the direct effect of the commodity price shock on output (the "rains" component) by applying the 2003–08 cumulative price shock to the estimated parameters. The results indicate the effect on output was 5.4 percent for EMDEs and 4.6 percent for advanced economies—that is, a difference of 0.8 percentage

point (figure 2.6.B). The procyclical response of fiscal policy in EMDEs (“pours” component) added another 1.1 percentage points to growth, bringing EMDE growth to 6.5 percent over this period.

In contrast, fiscal policy in advanced economies reacted in a countercyclical fashion, subtracting about 3 percentage points from growth and bringing advanced-economy growth to 1.6 percent. In other words, of the 4.9 percentage points difference between total EMDE and advanced-economy growth in the sample, 4.1 percentage points (or 84 percent) is accounted for by differences in fiscal policy responses—procyclical in EMDEs and countercyclical in advanced economies.

To summarize, fiscal procyclicality amplifies the effect of commodity price shocks on economic growth in EMDEs. In the sample period examined, fiscal policy in the average EMDE commodity exporter is estimated to have increased the effect of a commodity price shock on output by more than one-fifth. The results indicate that fiscal policy has tended to amplify the business cycle in EMDE commodity exporters, whereas it had a dampening effect in advanced-economy commodity exporters.

Fiscal institutions and frameworks

The results of the empirical analysis presented above highlight the role of political pressures in driving fiscal policy procyclicality in commodity-exporting EMDEs. This section delves deeper into how well-designed and credible institutional mechanisms—fiscal rules, SWFs, and medium-term expenditure frameworks—can help foster fiscal discipline and counteract tendencies toward procyclicality. It also underscores the importance of strong governance more generally in facilitating countercyclical fiscal policies in these economies. These issues are discussed in further detail in chapter 5.

Fiscal rules

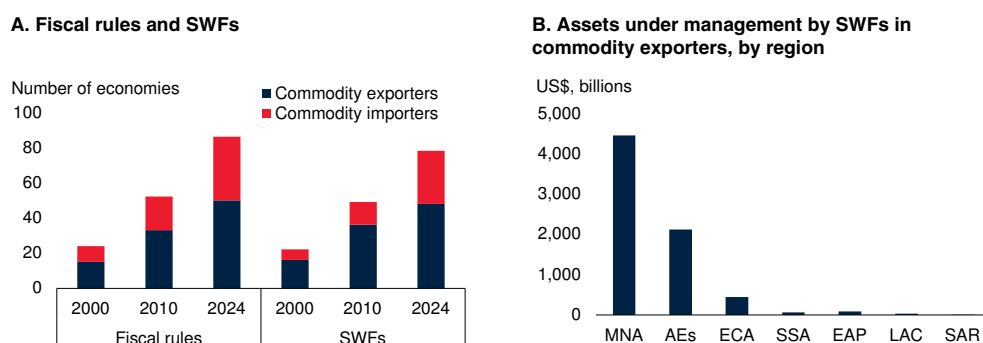
Fiscal rules can help deliver better fiscal outcomes by leaving less space for discretionary spending, which tends to be procyclical and to exacerbate the business cycle (thereby adding more fiscal volatility). Fiscal rules can also provide a strong signal of prudence in fiscal policy (Debrun and Kumar 2008). Well-designed fiscal rules have been found to help lower fiscal deficits and fiscal procyclicality.¹⁶

Until the early 1990s, only a handful of EMDEs had fiscal rules, and virtually no LICs did. Since then, a growing number of EMDEs have adopted such rules—including commodity exporters (chapter 1; Davoodi et al. 2022). By 2024, 50 commodity-exporting EMDEs had at least one fiscal rule in place (figure 2.7.A). The use of fiscal

¹⁶ For empirical evidence on the importance of well-designed fiscal rules in helping to deliver lower fiscal deficits, refer to Caselli and Reynaud (2020), Dahan and Strawczynski (2013), Debrun et al. (2008), and Fabrizio and Mody (2006). Badinger and Reuter (2017), Caselli and Reynaud (2020), Céspedes and Velasco (2014), and Martorano (2018) provide evidence on the association between fiscal rules and lower procyclicality.

FIGURE 2.7 Fiscal rules and SWFs

Since the early 1990s, fiscal rules have been adopted and sovereign wealth funds (SWFs) introduced by a growing number of EMDEs, particularly commodity exporters, to strengthen their fiscal frameworks. Among the major emerging market regions, the Middle East and North Africa ranks the highest in terms of total assets under management by SWFs—more than twice that in advanced-economy commodity exporters.



Sources: Alonso et al. (2025); International Monetary Fund; Sovereign Wealth Fund Institute; World Bank.

Note: AEs = advanced economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SSA = Sub-Saharan Africa; SWF = sovereign wealth fund.

A. Number of EMDEs with fiscal rules and SWFs.

B. Amount of SWF assets under management in commodity-exporting countries, as of 2024.

rules has been associated with more fiscal discipline, albeit only when they are well-designed (Caselli and Reynaud 2020; World Bank 2026).¹⁷ Additionally, the success of fiscal rules crucially depends on effective institutions and governance, underpinned by the rule of law and strong accountability mechanisms (Ardanaz, Cavallo, and Izquierdo 2023; Bergman and Hutchison 2015). Fiscal rules can act as a constraint on the ability of incumbent politicians to generate political business cycles using fiscal expansions to instigate booms. Fiscal frameworks that do not involve formal rules but rely on transparent and credible strategies backed by proper fiscal institutions could also provide a viable approach to ensuring fiscal discipline (World Bank 2023).

Sovereign wealth funds

Over the past few decades, the number of SWFs established by commodity-exporting EMDEs has increased rapidly (chapter 1). Many of these economies have established SWFs as stabilization funds to channel windfall gains during commodity booms into savings that can be withdrawn during slumps to limit the impact on fiscal balances. Among the major emerging market regions, the MNA region ranks the highest in terms of total assets under management of SWFs—more than twice that in advanced-economy commodity exporters (figure 2.7.B).

¹⁷ Refer to, for example, Apeti, Basdevant, and Salins (2023); Bergman, Hutchison, and Jensen (2016); and Tapsoba (2012). It is important to note that establishing causality from fiscal rules to fiscal discipline is not straightforward because of endogeneity issues (more disciplined and prudent governments are more likely to adopt fiscal rules) and reverse causality issues (many fiscal rules are adopted after a crisis).

In practice, the effectiveness of such stabilization funds in moderating fluctuations in government spending, and hence output, has varied across countries (Gill et al. 2014; Lim and Zhang 2021). Although poor fiscal governance has hampered the successful implementation of sovereign stabilization funds in many EMDEs, the overall experience has been positive for smoothing the path of government spending (Sugawara 2014). There is evidence that SWFs can be effective in reducing fiscal procyclicality in some countries (Agenor 2016; Coutinho et al. 2022). In oil-exporting countries, stabilization funds have been associated with reduced macroeconomic variability and lower inflation (Shabsigh and Ilahi 2007).

An appropriate institutional framework and strong long-term political commitment, including transparent governance of the stabilization fund and prudent constraints on the discretion of fund managers, are critical for the effectiveness of these funds (Bagattini 2011; Ossowski et al. 2008). Strong institutions help to shield these funds from political influences (Koh 2017; Mohaddes and Raissi 2017). In this context, sovereign wealth and stabilization funds work well to reduce government expenditure volatility in countries where fiscal rules are implemented, but their effectiveness is hampered where controls are inadequate and integration with the budget is limited (Le Borgne and Medas 2007; Sugawara 2014). More broadly, cross-country evidence shows a strong causal link running from better institutions to less procyclical or more countercyclical fiscal policy in EMDEs (Frankel, Végh, and Vuletin 2013).

Medium-term expenditure frameworks

Medium-term expenditure frameworks (MTEFs) are intended to establish or enhance credibility in the budgetary process and to set out spending plans consistent with prevailing economic conditions and medium-term policy objectives (Raudla, Douglas, and MacCarthaigh 2022).¹⁸ Such frameworks can enhance clarity on expenditure objectives and help ensure a transparent budgetary process in which government agencies allocate public resources in line with strategic priorities. MTEFs foster greater fiscal transparency and accountability by providing a clear basis for monitoring government performance against approved plans, making it easier to hold governments accountable for their fiscal policies.

The number of countries with MTEFs has increased notably over the past three decades. Initially adopted by a few advanced economies in the early 1980s to address public overspending, MTEFs became widely accepted as integral components of fiscal governance throughout the 1990s and 2000s. Among EMDEs, MTEFs were introduced to strengthen public finance management and to realign expenditures with long-term development needs (World Bank 1998). The adoption of MTEFs accelerated in the aftermath of financial crises, with the objective of reconciling short-term pressures with longer-term priorities (Raudla, Douglas, and MacCarthaigh 2022).

¹⁸ Vlaicu et al. (2014) estimated that the number of countries with MTEFs increased from 11 in 1990 to 132 at the end of 2008. The lack of data makes it difficult to estimate the current number of countries with MTEFs.

Evidence suggests that credible MTEFs can significantly improve fiscal discipline (Frankel 2011a; Vlaicu et al. 2014; World Bank 2013). Robust implementation of these frameworks is closely related to linkages with broader economic and social policy objectives, the reliability of the relevant data, and the forecasting capability of the authorities (Allen et al. 2017). The success of these frameworks crucially depends on strong government ownership and support (Schiavo-Campo 2009). For example, South Africa, a commodity exporter, introduced an MTEF when government debt was high, the central government was underspending, and provincial governments were overspending. With widespread support at the top levels of government, the underspending and overspending were both reduced following the introduction of the MTEF (World Bank 2013).

MTEFs need clearly defined legal frameworks and strong supporting institutions to be effective. They can also complement other fiscal frameworks to achieve desired fiscal policy objectives. For example, when combined with fiscal rules, MTEFs can improve fiscal balances and the quality of budget forecasts. More advanced MTEFs can also be associated with lower spending volatility and higher spending efficiency. However, MTEFs may fail to meet their objectives where institutions are weak and where key government functions are hindered by capacity constraints in critical technical and administrative areas. Improvements in fiscal discipline following the adoption of MTEFs tend to be transient in nature, especially in the case of frameworks lacking comprehensive metrics for monitoring and evaluating fiscal performance. In addition, lack of fiscal transparency can impair budget credibility and increase uncertainty about fiscal policy and outturns in EMDEs.¹⁹

Institutional quality and governance

Resource abundance can be advantageous to a country if the government has a sound long-term plan for extracting resources and a robust mechanism for using resource revenues to meet economic and social needs and achieve sustained economic growth. However, resource wealth can undermine institutions and longer-term growth by promoting rent-seeking, corruption, and the squandering of resources through unproductive spending, poor-quality investment, and the depletion of government savings. For mineral-rich countries, there is also evidence that mineral wealth can provoke or fuel internal conflicts (Collier and Hoeffler 2005). In general, resource-rich countries with stronger economic and political institutions tend to have better macroeconomic and growth outcomes (Arezki and Bruckner 2010; Arezki, Hamilton, and Kazimov 2011; van der Ploeg 2011).

Strong public institutions help limit the procyclicality of fiscal expenditures (Ossowski et al. 2008; Sugawara 2014). The observed decline in fiscal procyclicality in EMDEs over the post-global-financial-crisis period has been mainly associated with the improved

¹⁹ On the role of institutions, refer to Filc and Scartascini (2010) and Schiavo-Campo (2009). On the role of fiscal rules, refer to Hansen (2020) and von Hagen (2010). For evidence on the impact of MTEFs on spending volatility and efficiency, refer to Vlaicu et al. (2014) and World Bank (2013). ElBerry and Goeminne (2021) provide evidence on how lack of fiscal transparency affects fiscal outcomes.

quality of institutions, as measured by indicators for law and order, bureaucracy quality, and corruption (Frankel, Végh, and Vuletin 2013). In LICs, the quality of budget institutions—measured by the quality of the various stages of the budget process and the checks and balances in place—tends to be positively associated with the ability of these countries to conduct countercyclical policies (Dabla-Norris et al. 2010).

The experiences of Norway, Chile, and Botswana show that the quality of their institutions—which is higher than that of their peers—helped these countries to limit the negative impact of commodity price volatility (Bova, Medas, and Poghosyan 2016; Frankel 2011a; World Bank 2024). These cases also demonstrate that fiscal rules or SWFs work best when they are well-designed, closely linked to broader policy objectives, and supported by strong institutions and political commitment; they are discussed in greater detail in chapter 3. In the absence of strong institutions and political commitment, fiscal rules and SWFs tend not to be followed closely, which reduces their effectiveness (World Bank 2026).

Conclusions

Many EMDEs depend heavily on commodities for fiscal and export revenues as well as economic activity. The enduring challenges posed by this commodity dependence have again been apparent in recent years amid the gyrations of commodity prices resulting from various overlapping shocks. These challenges may be exacerbated in coming years as commodity prices are likely to be more volatile during the transition from fossil fuels to more climate-friendly sources of energy. If not adequately managed, the response of fiscal policy to increased commodity price volatility is likely to impede growth.

This chapter focuses on the procyclicality of fiscal policy in commodity-exporting EMDEs. It finds that fiscal expenditures in commodity-exporting EMDEs exhibit stronger procyclical patterns than in other EMDEs. This tendency persists even as some institutional improvements have taken root over time, suggesting that procyclical fiscal policy responses are embedded in the constraints and incentives facing governments in commodity exporters. Furthermore, this procyclical nature of fiscal policy amplifies the effect of commodity price shocks on the business cycle in commodity exporters, with overall detrimental effects on economic growth.

The chapter offers insights for policy makers in commodity-exporting EMDEs about the appropriate design of fiscal policies and institutional frameworks. Both institutional and policy factors play important roles in explaining cross-country variation in fiscal policy cyclicity. Better governance—especially control of corruption, stronger rule of law, and improved bureaucracy quality—is linked with less procyclical behavior. Greater access to international financial markets is associated with reduced procyclicality, as it eases financing constraints and enables smoother adjustment to shocks. Finally, the presence of well-designed fiscal rules and SWFs is correlated with lower fiscal policy procyclicality.

In addition to implementing policy frameworks to mitigate the macroeconomic consequences of commodity reliance, commodity exporters can reduce that reliance itself. The role that commodity revenues play in the budgets of commodity-exporting EMDEs, and their impact on fiscal policy procyclicality, suggest potential benefits from diversification away from commodity production. Export diversification can help stabilize export earnings and support long-run growth.²⁰ However, a range of factors have impeded diversification in commodity exporters (for example, refer to Harding and Venables 2016). In the case of oil exporters, for instance, diversification has been constrained by the effects of oil revenues on institutions and governance, along with a tendency for oil revenues to lead to overvalued exchange rates, thereby damaging the competitiveness of the domestic non-oil sector (Callen et al. 2014).

²⁰ For a detailed discussion, refer to Bleaney and Greenaway (2001); Ghosh and Ostry (1994); Gill et al. (2014); Hesse (2008); Joya (2015); and World Bank (2022).

TABLE 2.1 Economies in the sample

Commodity exporters	
Agriculture	Argentina; Belize; Benin; Brazil; Burundi; Cabo Verde; Chad; Comoros; Costa Rica; Côte d'Ivoire; Ethiopia; Fiji; Gambia, The; Guatemala; Guinea-Bissau; Honduras; Iceland; Kenya; Lao PDR; Madagascar; Malawi; Mali; New Zealand; Nicaragua; Paraguay; Rwanda; São Tomé and Príncipe; Senegal; Seychelles; Solomon Islands; Sudan; Tajikistan; Tanzania; Togo; Uganda; Ukraine; Uruguay; Uzbekistan; Zimbabwe
Metals	Armenia; Australia; Bhutan; Botswana; Burkina Faso; Central African Republic; Chile; Congo, Dem. Rep.; Eritrea; Guinea; Kyrgyz Republic; Liberia; Mauritania; Mongolia; Mozambique; Namibia; Niger; Papua New Guinea; Peru; Sierra Leone; South Africa; Sudan; Suriname; Tajikistan; Zambia
Energy	Algeria; Angola; Azerbaijan; Bahrain; Bhutan; Bolivia; Brunei Darussalam; Cameroon; Canada; Chad; Colombia; Congo, Rep.; Ecuador; Equatorial Guinea; Gabon; Ghana; Guyana; Indonesia; Iran, Islamic Rep.; Iraq; Kazakhstan; Kuwait; Libya; Myanmar; Nigeria; Norway; Oman; Qatar; Russian Federation; Saudi Arabia; South Sudan; Timor-Leste; Trinidad and Tobago; Turkmenistan; United Arab Emirates; Yemen, Rep.
Commodity importers	
Afghanistan; Albania; Antigua and Barbuda; Austria; Bahamas, The; Bangladesh; Barbados; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Cambodia; China; Croatia; Cyprus; Czechia; Denmark; Djibouti; Dominica; Dominican Republic; Egypt, Arab Rep.; El Salvador; Estonia; Eswatini; Finland; France; Georgia; Germany; Greece; Grenada; Haiti; Hong Kong SAR, China; Hungary; India; Ireland; Israel; Italy; Jamaica; Japan; Jordan; Kiribati; Korea, Rep.; Latvia; Lebanon; Lesotho; Lithuania; Luxembourg; Malaysia; Maldives; Malta; Marshall Islands; Mauritius; Mexico; Micronesia, Fed. Sts.; Moldova; Montenegro; Morocco; Nauru; Nepal; Netherlands; North Macedonia; Pakistan; Palau; Panama; Philippines; Poland; Portugal; Romania; Samoa; San Marino; Serbia; Singapore; Slovak Republic; Slovenia; Somalia; Spain; Sri Lanka; St. Kitts and Nevis; St. Lucia; St. Vincent and the Grenadines; Sweden; Switzerland; Syrian Arab Republic; Taiwan, China; Thailand; Tonga; Tunisia; Türkiye; Tuvalu; United Kingdom; United States; Vanuatu; Viet Nam	

Source: World Bank.

Note: Commodity export patterns can change over time, which may require re-categorization.

TABLE 2.2 Variables for analysis of fiscal procyclicality

Variable	Description	Source
Government spending	Real government expenditure	IMF World Economic Outlook (database)
Political risk	Index based on 12 components with varying weights: government stability, socioeconomic conditions, investment profile, internal conflict, external conflict, corruption, military in politics, religious tensions, law and order, ethnic tensions, democratic accountability, and bureaucracy quality	PRS Group (database)
Bureaucracy quality	Institutional strength and quality of the bureaucracy are shock absorbers that tend to minimize policy revisions when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure. Index ranges from 0–6	PRS Group (database)
Control of corruption	A measure of corruption within the political system that poses a threat to foreign investment by distorting the economic and financial environment, reducing the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introducing inherent instability into the political process. Index ranges from 0–6	PRS Group (database)
Government stability	A measure of both the government's ability to carry out its declared programs and to stay in office. The risk rating assigned is the sum of three subcomponents: government unity, legislative strength, and popular support	PRS Group (database)
Law and order	"Law" assesses the strength and impartiality of the legal system, while the "order" element assesses popular observance of the law	PRS Group (database)
Capital account openness	The Chinn-Ito index (KAOPEN), measuring a country's degree of capital account openness; available from 1970–2019 for 182 countries	Chinn and Ito (2006)
Exchange rate regime	A dummy indicator, where "1" indicates a floating exchange rate regime and "0" indicates a fixed regime. Classification codes 1–3 in the database are classified as "0" and codes 4–6 as "1"	Ilzetzi, Reinhart, and Rogoff (2022)
Openness	Sum of exports and imports (percent of GDP)	World Integrated Trade Solution (World Bank)
Fiscal rules	Covers four types of rules: budget balance rules, debt rules, expenditure rules, and revenue rules, applying to the central or general government or the public sector	Davoodi et al. (2022)
SWF (sovereign wealth fund)	Dummy variable: "0" if a country does not have a SWF and "1" if it has a SWF	Sovereign Wealth Fund Institute

Source: World Bank.

TABLE 2.3 Drivers of fiscal procyclicality

Dependent variable: Correlation between real government spending and real GDP					
	(1)	(2)	(3)	(4)	(5)
Financial openness	-0.24**				-0.22*
Control of corruption		-0.14***			-0.08*
Political constraint index			-0.24		-0.07
GDP volatility				2.2***	2.75**
F-test					**
Observations	92	73	93	96	71
R-squared	0.05	0.18	0.02	0.09	0.28

Source: World Bank.

Note: Cross-sectional OLS regressions for commodity exporters. For regression (5), the F-test evaluates the joint significance of financial openness, control of corruption, and GDP volatility. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

TABLE 2.4 Institutional drivers of fiscal procyclicality

Dependent variable: Correlation between real government spending and real GDP							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Government stability	-0.10***					-0.01	-0.06
Law and order		-0.15***				-0.14***	0.04
Fiscal rules			-0.58***		-2.05***	-0.24	-1.4**
Sovereign wealth funds				-0.31***		-0.24***	-0.14
F-test						***	***
Observations	137	137	84	188	84	84	84
R-squared	0.07	0.31	0.16	0.09	n/r	0.47	-0.04

Source: World Bank.

Note: Cross-sectional regressions for the full sample. The estimates in columns (1)–(4) and (6) are based on OLS regressions. The estimates shown in columns (5) and (7) are based on instrumental variables (two-stage least squares) regressions. “n/r” means not reported by Stata. For regressions (6) and (7), the F-test evaluates the joint significance of the three institutional variables. The last row in column (7) shows the centered R-squared. Overidentification tests do not apply to regressions (5) and (7) since equations are perfectly identified. In these regressions, the first-stage F-test of excluded instruments implies rejection of the null hypothesis of weak identification (p-value = 0.00) in both cases. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively.

TABLE 2.5 Output growth and commodity prices

Dependent variable: GDP growth						
	(1)	(2)	(3)	(4)	(5)	(6)
	EMDEs			Full sample		
Commodity export price index	0.085***	0.063***	0.080***	0.024	0.018	0.026
Terms of trade		0.029			0.026	
GDP growth (t-1)			0.367***			0.366***
Commodity export price index x EMDE				0.062**	0.046*	0.054**
F-test				***	***	***
Observations	381	364	370	533	436	518
Countries	11	11	11	15	15	15

Source: World Bank.

Note: Panel least squares with country fixed effects. All variables are in log differences. The estimates in columns (1)–(3) are based on the sample of emerging market and developing economies (EMDEs) only, while those in columns (4)–(6) are based on the full sample, which includes advanced-economy commodity exporters. The F-test in columns (4)–(6) evaluates the joint significance of the commodity export price index and the interaction of the index with the dummy variables for EMDEs. *, **, and *** denote significance at the 10, 5, and 1 percent levels, respectively. GDP = gross domestic product.

TABLE 2.6 Government spending and commodity prices

Dependent variable: Real government spending						
	(1)	(2)	(3)	(4)	(5)	(6)
	EMDEs			Full sample		
Commodity export price index	0.061*	0.08*	0.061*	-0.123***	-0.072	-0.121***
Terms of trade		-0.060			-0.072	
GDP growth (t-1)			0.688***			0.625***
Commodity export price index x EMDE				0.184***	0.158***	0.183***
F-test				***	**	***
Observations	276	269	276	415	341	413
Countries	11	11	11	15	15	15

Source: World Bank.

Note: Panel least squares with country fixed effects. All variables are in log differences. The estimates in columns (1)–(3) are based on the sample of emerging market and developing economies (EMDEs) only, while those in columns (4)–(6) are based on the full sample that includes advanced-economy commodity exporters. The F-test in columns (4)–(6) evaluates the joint significance of the commodity export price index and the interaction of the index with the dummy variables for EMDEs. *, **, and *** indicate statistical significance at 0.10, 0.05, and 0.01 percent, respectively.

References

- Agenor, P.-R. 2016. "Optimal Fiscal Management of Commodity Price Shocks." *Journal of Development Economics* 122 (September): 183–96.
- Alesina, A., F. Campante, and G. Tabellini. 2008. "Why is Fiscal Policy Often Procyclical?" *Journal of the European Economic Association* 6 (5): 1006–36.
- Allen, R., T. Chaponda, L. Fisher, and R. Ray. 2017. "Medium-Term Budget Frameworks in Sub-Saharan African Countries." IMF Working Paper 17/203, International Monetary Fund, Washington, DC.
- Alonso, V., C. Arroyo, O. Aydin, V. Balasundharam, H. R. Davoodi, G. Hegab, A. M. Nguyen, N. Salazar Ferro, G. Sher, A. Solovyeva, and N. Tchelishvili. 2025. "Fiscal Rules and Fiscal Councils: Recent Trends and Revisions since the Pandemic." IMF Working Paper 25/198, International Monetary Fund, Washington, DC.
- Alvarez, R., and J. De Gregorio. 2014. "Understanding Differences in Growth Performance in Latin America and Developing Countries between the Asian and the Global Financial Crises." *IMF Economic Review* 62 (4): 494–525.
- Apeti, A. E., O. Basdevant, and V. Salins. 2023. "Do Fiscal Rules Foster Fiscal Discipline in Resource-Rich Countries?" IMF Working Paper 23/088, International Monetary Fund, Washington, DC.
- Ardanaz, M., E. A. Cavallo, and A. Izquierdo. 2023. "Fiscal Rules: Challenges and Reform Opportunities for Emerging Markets." IDB Working Paper 1443, Inter-American Development Bank, Washington, DC.
- Arezki, R., and M. Bruckner. 2010. "Commodity Windfalls, Polarization, and Net Foreign Assets: Panel Data Evidence on the Voracity Effect." IMF Working Paper 10/209, International Monetary Fund, Washington, DC.
- Arezki, R., K. Hamilton, and K. Kazimov. 2011. "Resource Windfalls, Macroeconomic Stability and Economic Growth." IMF Working Paper 11/142, International Monetary Fund, Washington, DC.
- Arroyo Marioli, F., and C. A. Végh. 2023. "Fiscal Procyclicality in Commodity Exporting Countries: How Much Does it Pour and Why?" NBER Working Paper 3143, National Bureau of Economic Research, Cambridge, MA.
- Auerbach, A. J., and Y. Gorodnichenko. 2012. "Measuring the Output Responses to Fiscal Policy." *American Economic Journal: Economic Policy* 4 (2): 1–27.
- Auerbach, A. J., and Y. Gorodnichenko. 2013. "Fiscal Multipliers in Recession and Expansion." In *Fiscal Policy after the Financial Crisis*, edited by A. Alesina and F. Giavazzi, 63–102. Chicago: University of Chicago Press.
- Badinger, H., and W. H. Reuter. 2017. "The Case for Fiscal Rules." *Economic Modelling* 60 (January): 334–43.

- Bagattini, G. 2011. "The Political Economy of Stabilization Funds: Measuring Their Success in Resource Dependent Countries." IDS Working Paper 356, Institute of Development Studies, University of Sussex, Brighton, U.K.
- Balatti, M. Forthcoming. "Cracking Commodity Cycles: Uncovering the Hidden Clock and Decoding the Drivers."
- Bergman, U. M., and M. Hutchison. 2015. "Economic Stabilization in The Post-crisis World: Are Fiscal Rules the Answer?" *Journal of International Money and Finance* 52 (April): 82–101.
- Bergman, U. M., M. Hutchison, and E. H. Jensen. 2016. "Promoting Sustainable Public Finances in the European Union: The Role of Fiscal Rules and Government Efficiency." *European Journal of Political Economy* 44 (September): 1–19.
- Blanchard, O., and R. Perotti. 2002. "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output." *The Quarterly Journal of Economics* 117 (4): 1329–68.
- Bleaney, M., and D. Greenaway. 2001. "The Impact of Terms of Trade and Real Exchange Volatility on Investment and Growth in Sub-Saharan Africa." *Journal of Development Economics* 65 (2): 491–500.
- Bova, E., N. Carcenac, and M. Guerguil. 2014. "Fiscal Rules and the Procyclicality of Fiscal Policy in the Developing World." IMF Working Paper 14/122, International Monetary Fund, Washington, DC.
- Bova, M. E., M. P. A. Medas, and M. T. Poghosyan. 2016. "Macroeconomic Stability in Resource-Rich Countries: The Role of Fiscal Policy." IMF Working Paper 16/36, International Monetary Fund, Washington, DC.
- Calderón, C., R. Duncan, and K. Schmidt-Hebbel. 2016. "Do Good Institutions Promote Countercyclical Macroeconomic Policies?" *Oxford Bulletin of Economics and Statistics* 78 (5): 650–70.
- Calderón, C., and K. Schmidt-Hebbel. 2008. "Business Cycles and Fiscal Policies: The Role of Institutions and Financial Markets." Working Paper 481, Central Bank of Chile.
- Callen, T., R. Cherif, F. Hasanov, A. Hegazy, and P. Khandelwal. 2014. "Economic Diversification in the GCC: Past, Present, and Future." Staff Discussion Note 14/12, International Monetary Fund, Washington, DC.
- Carneiro, F., and L. Garrido. 2016. "Revisiting the Evidence on the Cyclicity of Fiscal Policy Across the World." MFM Discussion Paper 16, World Bank, Washington, DC.
- Caselli, F., and J. Reynaud. 2020. "Do Fiscal Rules Cause Better Fiscal Balances? A New Instrumental Variable Strategy." *European Journal of Political Economy* 63 (June): 101873.

- Céspedes, L. F., and A. Velasco. 2014. "Was this Time Different? Fiscal Policy in Commodity Republics." *Journal of Development Economics* 106 (C): 92–106.
- Chinn, M. D., and H. Ito. 2006. "What Matters for Financial Development? Capital Controls, Institutions, and Interactions." *Journal of Development Economics* 81 (1): 163–92.
- Collier, P., and A. Hoeffler. 2005. "Resource Rents, Governance, and Conflict." *Journal of Conflict Resolution* 49 (August): 625–33.
- Coutinho, L., D. Georgiou, M. Heracleous, A. Michaelides, and S. Tsani. 2022. "Limiting Fiscal Procyclicality: Evidence from Resource-Dependent Countries." *Economic Modelling* 106 (January): 105700.
- Cuddington, J. 1989. "Commodity Export Booms in Developing Countries." *World Bank Research Observer* 4 (2): 143–65.
- Dabla-Norris, E., R. Allen, L. Zanna, T. Prakash, E. Kvintradze, V. Lledo, I. Yackovlev, and S. Gollwitzer. 2010. "Budget Institutions and Fiscal Performance in Low-Income Countries." IMF Working Paper 10/80, International Monetary Fund, Washington, DC.
- Dahan, M., and M. Strawczynski. 2013. "Fiscal Rules and the Composition of Government Expenditures in OECD Countries." *Journal of Policy Analysis and Management* 32 (3): 484–504.
- Davoodi, H., P. Elger, A. Fotiou, D. Garcia-Macia, A. Lagerborg, R. Lam, and S. Pillai. 2022. "Fiscal Rules Dataset: 1985–2021." International Monetary Fund, Washington, DC.
- Debrun, X., and M. Kumar. 2008. "Fiscal Rules, Fiscal Councils and All That: Commitment Devices, Signaling Tools or Smokescreens?" Workshop proceedings, Banca d'Italia, "Public Finance," Rome.
- Debrun, X., L. Moulin, A. Turrini, J. Ayuso-i-Casals, and M. S. Kumar. 2008. "Tied to the Mast? National Fiscal Rules in the European Union." *Economic Policy* 23 (54): 298–362.
- ElBerry, N. A., and S. Goeminne. 2021. "Fiscal Transparency, Fiscal Forecasting and Budget Credibility in Developing Countries." *Journal of Forecasting* 40 (1): 144–61.
- Fabrizio, S., and A. Mody. 2006. "Can Budget Institutions Counteract Political Indiscipline?" *Economic Policy* 21 (48): 689–739.
- Fernández, A., D. Guzman, R. E. Lama, and C. A. Végh. 2021. "Procyclical Fiscal Policy and Asset Market Incompleteness." NBER Working Paper 29149, National Bureau of Economic Research, Cambridge, MA.
- Filc, G., and C. Scartascini. 2010. "Is Latin America on the Right Track? An Analysis of Medium-Term Frameworks and the Budget Process." IDB Working Paper 160, Inter-American Development Bank, Washington, DC.

- Frankel, J. A. 2011a. "A Solution to Fiscal Procyclicality: The Structural Budget Institutions Pioneered by Chile." NBER Working Paper 16945, National Bureau of Economic Research, Cambridge, MA.
- Frankel, J. A. 2011b. "How can Commodity Exporters Make Fiscal and Monetary Policy Less Procyclical." In *Beyond the Curse: Policies to Harness the Power of Natural Resources*, edited by R. Arezki, T. Gylfason, and A. Sy, 167–89. Washington, DC: International Monetary Fund.
- Frankel, J., C. A. Végh, and G. Vuletin. 2013. "On Graduation from Fiscal Procyclicality." *Journal of Development Economics* 100 (1): 32–47.
- Froemel, M. and W. Paczos. 2024. "Imperfect Financial Markets and the Cyclicity of Social Spending." *European Economic Review* 167 (August): 104786.
- Ghosh, A. R., and J. D. Ostry. 1994. "Export Instability and the External Balance in Developing Countries." *IMF Staff Papers* 41 (2): 214–35.
- Gill, I. S., I. Izvorski, W. van Eeghen, and D. De Rosa. 2014. *Diversified Development: Making the Most of Natural Resources in Eurasia*. Washington, DC: World Bank.
- Hansen, D. 2020. "The Effectiveness of Fiscal Institutions: International Financial Flogging or Domestic Constraint?" *European Journal of Political Economy* 63 (June): 101879.
- Harding, T., and A. J. Venables. 2016. "The Implications of Natural Resource Exports for Nonresource Trade." *IMF Economic Review* 64 (2): 268–302.
- Hesse, H. 2008. "Export Diversification and Economic Growth." Commission on Growth and Development Working Paper 21, World Bank, Washington, DC.
- Ilzetzi, E. 2011. "Rent-Seeking Distortions and Fiscal Procyclicality." *Journal of Development Economics* 96 (1): 30–46.
- Ilzetzi, E., E. Mendoza, and C. A. Végh. 2013. "How Big (Small?) are Fiscal Multipliers?" *Journal of Monetary Economics* 60 (2): 239–54.
- Ilzetzi, E., C. M. Reinhart, and K. Rogoff. 2022. "Rethinking Exchange Rate Regimes." In *Handbook of International Economics* 6, edited by G. Gopinath, E. Helpman, and K. Rogoff, 91–145. Amsterdam: Elsevier.
- IMF (International Monetary Fund). 2015. *Fiscal Monitor: The Commodities Roller Coaster. A Fiscal Framework for Uncertain Times*. Chapter 1. October. Washington, DC: International Monetary Fund.
- International Country Risk Guide (database). PRS Group. Accessed on 18 December, 2025.
- Jalles, J. T., Y. Kiendrebeogo, W. R. Lam, and R. Piazza. 2023. "Revisiting the Countercyclicality of Fiscal Policy." IMF Working Paper 23/89, International Monetary Fund, Washington, DC.

- Joya, O. 2015. "Growth and Volatility in Resource-Rich Countries: Does Diversification Help?" *Structural Change and Economic Dynamics* 35 (December): 38–55.
- Kaminsky, G. L., C. M. Reinhart, and C. A. Végh. 2004. "When it Rains, It Pours: Procyclical Capital Flows and Macroeconomic Policies." *NBER Macroeconomics Annual* 19: 11–53.
- Koh, W. C. 2017. "Fiscal Policy in Oil-Exporting Countries: The Roles of Oil Funds and Institutional Quality." *Review of Development Economics* 21 (3): 567–90.
- Kose, M. A., E. Prasad, K. Rogoff, and S. J. Wei. 2010. "Financial Globalization and Economic Policies." In *Handbook of Development Economics*, edited by D. Rodrik and M. Rosenzweig, 4283–359, Amsterdam: Elsevier.
- Lane, P. R. 2003. "The Cyclical Behaviour of Fiscal Policy: Evidence from the OECD." *Journal of Public Economics* (87): 2661–75.
- Le Borgne, E., and P. A. Medas. 2007. "Sovereign Wealth Funds in The Pacific Island Countries: Macro-Fiscal Linkages." IMF Working Paper 07/297, International Monetary Fund, Washington, DC.
- Lim, K. Y., and S. Zhang. 2021. "Optimal Fiscal Management in an Economy with Resource Revenue-Financed Government-Linked Companies." *International Journal of Finance and Economics* 28 (2): 1175–2225.
- Martorano, B. 2018. "Cyclicality of Fiscal Policy in Latin America Over the Period 1990–2015." *Review of Development Economics* 22 (1): 67–90.
- Michaud, A., and J. Rothert. 2018. "Redistributive Fiscal Policies and Business Cycles in Emerging Economies." *Journal of International Economics* 112 (C): 123–33.
- Mohaddes, K., and M. Raissi. 2017. "Do Sovereign Wealth Funds Dampen the Negative Effects of Commodity Price Volatility?" *Journal of Commodity Markets* 8 (December): 18–27.
- Ossowski, R., M. Villafuerte, P. A. Medas, and T. Thomas. 2008. "Managing the Oil Revenue Boom: The Role of Fiscal Institutions." IMF Occasional Paper 260, International Monetary Fund, Washington, DC.
- Raudla, R., J. W. Douglas, and M. MacCarthaigh. 2022. "Medium-Term Expenditure Frameworks: Credible Instrument or Mirage?" *Public Budgeting & Finance* 42 (3): 71–92.
- Richaud, C., A. G. M. Galego, F. Ayivodji, S. Matta, and S. Essl. 2019. "Fiscal Vulnerabilities in Commodity Exporting Countries and the Role of Fiscal Policy." MTI Discussion Paper 15, World Bank, Washington DC.
- Schiavo-Campo, S. 2009. "Potemkin Villages: The Medium-Term Expenditure Framework in Developing Countries." *Public Budgeting & Finance* 29 (2): 1–26.

- Shabsigh, G., and N. Ilahi. 2007. "Looking Beyond the Fiscal: Do Oil Funds Bring Macroeconomic Stability?" IMF Working Paper 07/96, International Monetary Fund, Washington, DC.
- Sugawara, N. 2014. "From Volatility to Stability in Expenditure: Stabilization Funds in Resource-Rich Countries." IMF Working Paper 14/43, International Monetary Fund, Washington, DC.
- Talvi, E., and C. A. Végh. 2005. "Tax Base Variability and Procyclical Fiscal Policy in Developing Countries." *Journal of Development Economics* 78 (1): 156–90.
- Tapsoba, R. 2012. "Do National Numerical Fiscal Rules Really Shape Fiscal Behaviours in Developing Countries? A Treatment Effect Evaluation." *Economic Modelling* 29 (4): 1356–69.
- Tornell, A., and P. R. Lane. 1999. "The Voracity Effect." *American Economic Review* 89 (1): 22–46.
- Tornell, A., and A. Velasco. 2000. "Fixed Versus Flexible Exchange Rates: Which Provides More Fiscal Discipline?" *Journal of Monetary Economics* 45 (2): 399–436.
- UN Comtrade (database). United Nations. Accessed May 20, 2026. <https://comtradeplus.un.org>.
- UNCTAD (United Nations Conference on Trade and Development). 2021. "Global Investment Trend Monitor 39." World Investment Forum Factsheet Edition. October. https://unctad.org/system/files/official-document/diaeiainf2021d2_en.pdf.
- van der Ploeg, F. 2011. "Natural Resources: Curse or Blessing?" *Journal of Economic Literature* 49 (2): 366–420.
- Végh, C. A., and G. Vuletin. 2014. "The Road to Redemption: Policy Response to Crises in Latin America." *IMF Economic Review* 62 (4): 526–68.
- Vlaicu, R., M. Verhoeven, F. Grigoli, and Z. Mills. 2014. "Multiyear Budgets and Fiscal Performance: Panel Data Evidence." *Journal of Public Economics* 111 (March): 79–95.
- von Hagen, J. 2010. "Sticking to Fiscal Plans: The Role of Institutions." *Public Choice* 144: 487–503.
- World Bank. 1998. *Public Expenditure Management Handbook*. Washington, DC: World Bank.
- World Bank. 2013. *Beyond the Annual Budget: Global Experience with Medium-Term Expenditure Frameworks*. Washington, DC: World Bank.
- World Bank. 2022. "Commodity Price Cycles: Drivers and Policies." In *Global Economic Prospects*, 111–54. January. Washington, DC: World Bank.
- World Bank. 2023. *Global Economic Prospects*. June. Washington, DC: World Bank.

World Bank. 2024. “Fiscal Policy in Commodity Exporters: An Enduring Challenge.” In *Global Economic Prospects*, 149–92. January. Washington, DC: World Bank.

World Bank. 2025a. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Bank. 2025b. *Commodity Markets Outlook*. April. Washington, DC: World Bank.

World Bank. 2026. *Global Economic Prospects*. June. Washington, DC: World Bank.

World Integrated Trade Solution (WITS) (database). World Bank. Accessed May 20, 2026. <https://wits.worldbank.org>.

*Commodity exporters with fiscal buffers should use them to
smooth the adjustment to lower commodity prices.*

José Viñals (2016)

Chair of Council and Governance Committee
Independent Member,
The London School of Economics and Political Science

CHAPTER 3

Fiscal Policy Volatility: Drivers and Implications for Growth

Fiscal policy has been about 40 percent more volatile in commodity-exporting emerging market and developing economies (EMDEs) than in other EMDEs. The degree of commodity dependence, institutional quality, and policy frameworks are key drivers of fiscal policy volatility. Such volatility—which is closely intertwined with fiscal procyclicality—amplifies business cycles and is detrimental to economic growth. By adopting average advanced-economy policies regarding exchange rate regimes, restrictions on cross-border financial flows, and the use of fiscal rules, commodity-exporting EMDEs can increase their GDP per capita growth by about 0.2 percentage point every year through a reduction in fiscal policy volatility. Such policies should be supported by sustainable, well-designed, and stability-oriented fiscal institutions that can help build buffers during commodity price booms to prepare for any subsequent slump in prices. A steadfast commitment to fiscal discipline is a critical enabling factor for these institutions to achieve their objectives.

Introduction

The link between fiscal policy volatility—defined as changes in fiscal spending that are unrelated to economic conditions—and growth prospects has been well-documented. From a theoretical standpoint, lower government spending volatility may have both positive and negative effects on long-run growth. On the one hand, fiscal policy can boost investment and long-run growth because governments can smooth business-cycle fluctuations by using discretionary changes in fiscal policy—that is, tax cuts and increased spending during recessions and the opposite during expansions—as well as automatic stabilizers. On the other hand, fiscal policy itself might be a source of business-cycle fluctuations, thereby exacerbating macroeconomic volatility (Furceri 2007).¹ Empirical evidence indicates that fiscal policy volatility is detrimental to growth due largely to its impact on output volatility (Afonso and Furceri 2008; Fatás and Mihov 2003, 2007, and 2013).² Fiscal policy variability can also depress growth through its impact on uncertainty (Aizenman and Marion 1999; Lensink, Bo, and Sterken 1999).

While prudent fiscal management is crucial for boosting macroeconomic performance in all countries, it is especially important in commodity-exporting emerging market and

Note: This chapter was prepared by Francisco Arroyo Marioli and Garima Vasishtha.

¹ In addition to discretionary changes, transitory (and cyclical) changes in fiscal policy might increase output volatility and thereby reduce output growth. For instance, temporary changes in fiscal policy have a substantial impact on interest rate volatility, reducing long-run growth (Aiyagari, Christiano, and Eichenbaum 1992).

² For evidence on the links between output volatility and growth, refer to Hnatkovska and Loayza (2003) and Ramey and Ramey (1995), among others.

developing economies (EMDEs), where conditions for managing public finances are more challenging. In these economies, fiscal policy volatility can act as a transmission mechanism for the “resource curse”—how commodity abundance, if not managed properly, can damage overall growth (Bleaney and Halland 2009). Commodity prices are an important driver of the trajectory of fiscal policy and the business cycle in commodity exporters. This is due to three main reasons.

First, many commodity exporters rely heavily on commodity revenues to finance their budgets (chapter 1). Swings in commodity prices often result in highly volatile commodity-related fiscal revenues in these economies, leading to more volatile business cycles.³ As a result, these economies face significant challenges in terms of their capacity to smooth fiscal policy and fluctuations in economic activity. Indeed, over the past three decades, output volatility in commodity-exporting EMDEs has been more than double that of commodity-importing ones.

Second, declines in commodity prices can trigger procyclical cuts in public expenditures because of reduced revenues from commodity production and exports. Conversely, rising commodity prices can lead to procyclical increases in public spending. Fiscal policy, therefore, often amplifies the impact of commodity price cycles on economic growth and reinforces the business cycle (chapter 2; Céspedes and Velasco 2014; Talvi and Végh 2005).

Third, revenues derived from the commodity sector are also prone to influence by policies associated with rent-seeking behavior. Access to natural resource rents often distorts fiscal policy, potentially leading to overexpanded government consumption and inefficient spending (Bleaney and Halland 2009). Moreover, point-source natural resources (mostly minerals and energy commodities) tend to be more susceptible to rent-seeking behavior than diffuse resources (mostly agricultural commodities). This erodes the effectiveness of mechanisms for monitoring how much the government receives and how much it spends.⁴

In this context, commodity-exporting EMDEs face a persistent challenge in managing the impact of volatile resource revenues on macroeconomic stability and in designing fiscal policies that support economic activity. This chapter presents a comprehensive study of fiscal policy volatility and its implications for growth. Specifically, it addresses the following three questions:

- Is fiscal policy more volatile in commodity-exporting EMDEs than in other EMDEs?

³ Refer to, for example, IMF (2015); Jacks, O’Rourke, and Williamson (2011); Richaud et al. (2019); and World Bank (2009, 2020, and 2022).

⁴ Point-source natural resources are defined as resources extracted from a narrow geographic or economic base, such as oil, minerals, and plantation crops (for instance, sugar and bananas). Diffuse resources refer primarily to agricultural produce grown on small family farms (for example, rice and wheat). Export concentration in point-source natural resources has been found to be associated with weak public institutions, which are, in turn, associated with slower growth (Isham et al. 2005).

- What are the main drivers of fiscal policy volatility?
- What is the relationship between fiscal policy volatility and economic growth?

Contributions to the literature

This chapter makes three main contributions to the literature. *First*, it provides comprehensive evidence on the determinants of fiscal policy volatility for a large sample of commodity exporters (agricultural, metal, and energy exporters) and commodity importers. Previous studies have covered either a limited set of countries or mainly oil exporters. *Second*, the chapter deepens the understanding of the implications of fiscal policy volatility by quantifying its impact on economic growth. It also examines the links between fiscal procyclicality (the focus of chapter 2) and fiscal policy volatility.

Third, it presents a comprehensive analysis of policies to reduce fiscal policy volatility by examining the roles of various macroeconomic and structural factors in driving such volatility. In addition, it illustrates the use of sovereign wealth funds (SWFs) and fiscal rules in coping with fiscal procyclicality and volatility by examining the experiences of a set of commodity-exporting countries (box 3.1). Insights from these cases complement the findings of the broader quantitative analysis and help identify best practices in the implementation of these fiscal frameworks and institutions.

Main findings

This chapter offers five main findings.

Over the 1990–2024 period, fiscal policy has been more volatile in EMDEs than in advanced economies, and more so in EMDE commodity exporters than in commodity importers. Fiscal policy volatility, measured by the volatility of real primary government expenditure, is about 40 percent higher in EMDE commodity exporters than in other EMDEs. Fiscal policy volatility is also higher in commodity exporters when measured using alternative fiscal policy indicators—fiscal revenue, government consumption, and primary balance-to-GDP. Moreover, among EMDEs, the larger the commodity sector, the more volatile fiscal policy has tended to be, even when accounting for income levels.

Fiscal policy volatility has declined somewhat in EMDEs in recent decades. The volatilities of government expenditure, government consumption, revenue, and the primary balance were all lower, on average, during 2007–24 than in 1990–2006. The reduction in fiscal volatility mirrors the observed increase in countries' ability to pursue countercyclical fiscal policies following the 2007–09 global financial crisis, supported by efforts to strengthen institutional frameworks, including the adoption of fiscal rules.

Fiscal procyclicality and volatility are intertwined. Procyclicality and volatility have been strongly interlinked in EMDEs, especially among commodity exporters, and have been driven by similar factors. EMDEs with more procyclical fiscal policies have also tended to display more volatile fiscal policies.

Fiscal policy volatility amplifies business cycle fluctuations and is detrimental to economic growth. Results from a counterfactual exercise show that if the average commodity-exporting EMDE were to adopt the policies of an average advanced economy in three areas—exchange rates, capital flow restrictions, and the use of fiscal rules—it could have added about 0.2 percentage point in per capita growth per year by reducing fiscal policy volatility.

Structural policies can help reduce fiscal policy volatility. Institutional and policy variables account for a large share of the cross-country variation in fiscal policy volatility, with more political constraints and better institutions associated with less volatile fiscal policy. Experiences of selected commodity exporters indicate that fiscal rules and SWFs have been most effective when accompanied by robust institutional frameworks and a strong commitment to fiscal discipline.

Fiscal policy volatility

Conceptual definitions and data

The analysis proceeds by first isolating a measure of fiscal policy stance that captures the portion of discretionary fiscal policy unrelated to the business cycle. This is done by estimating a GDP-dependent fiscal policy reaction function for each country, following the approach in Arroyo Marioli, Fatás, and Vasishtha (2024). Next, country-specific measures of fiscal policy volatility are constructed as the standard deviation of the residuals from these reaction functions (annex 3A provides details). That is, the measure of fiscal policy volatility is the variance of exogenous changes in fiscal policy stance. Four alternative measures of fiscal policy are considered: real primary expenditures (which exclude net interest payments), real revenues, real government consumption, and the primary budget balance (which excludes net interest payments). The first three variables are measured as log differences, while the primary budget balance is expressed as the annual change in its ratio to GDP.

Annual data are used for the 1990–2024 period for 184 countries, including 148 EMDEs and 36 advanced economies (table 3.1). The choice of the sample period is based on data availability. Countries are classified as commodity exporters by applying the classification criteria used in World Bank (2025).⁵ Accordingly, 94 countries are classified as commodity exporters and the remainder as commodity importers. The group of commodity exporters includes only five advanced economies. Among commodity importers, 31 are advanced economies and 59 are EMDEs.

Basic features of fiscal policy volatility

The four measures of fiscal policy volatility—based on primary expenditures, revenues, government consumption, and the primary budget balance—provide similar perspec-

⁵ An economy is defined as a commodity exporter when, on average in 2017–19, either (1) total commodity exports accounted for 30 percent or more of total exports or (2) exports of any single commodity accounted for 20 percent or more of total exports. Economies for which these thresholds were met as a result of re-exports were excluded. When data were not available, judgment was used.

tives on fiscal policy (table 3.2). The measures are highly correlated, with government consumption and the primary balance being the least correlated (table 3.3). The following key observations emerge from a comparison of the measures of fiscal policy volatility across countries over 1990 to 2024.

First, fiscal policy is notably more volatile in EMDEs than in advanced economies. Over the past three decades, the volatilities of primary expenditures, government consumption, and revenues were all substantially higher in EMDEs than in advanced economies (figure 3.1.A). The difference between the average volatility for these two groups of countries is statistically significant. Moreover, the difference in the volatility of government consumption between EMDEs and advanced economies is larger than that of primary expenditures, highlighting the role of government consumption in fiscal policy volatility in EMDEs. The estimated volatility of the primary balance (as a percent of GDP) is relatively smaller and more similar between the two country groups than the other three fiscal policy indicators.⁶

Second, commodity-exporting EMDEs exhibit more volatility in fiscal policy than commodity importers, based on all four fiscal indicators (figure 3.1.B). The volatility of real primary government expenditure is about 40 percent higher in commodity exporters than in other EMDEs. The difference in the average volatility for the two country groups is statistically significant. Third, fiscal policy tends to be more volatile in LICs than in other EMDEs. Over 1990–2024, government expenditure, consumption, and revenue were roughly twice as volatile in LICs as in other EMDEs (figure 3.1.C). Fourth, the volatility of real primary government expenditure in commodity exporters in all EMDE regions has been higher than in advanced economies. However, the degree of fiscal volatility varies across regions, with volatility in Sub-Saharan Africa (SSA), the Middle East and North Africa (MNA), and East Asia and Pacific (EAP) being higher than in other emerging-market regions (figure 3.1.D).

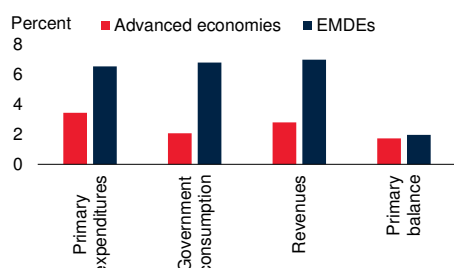
Fifth, fiscal policy volatility declined somewhat in EMDEs over the past three decades, as evidenced by the evolution of volatility over two subperiods: 1990–2006 and 2007–24. The two subperiods are chosen to reflect the observed increase in the willingness and ability of countries to pursue countercyclical fiscal policies following the 2007–09 global financial crisis (chapter 2; Alvarez and De Gregorio 2014; Végh and Vuletin 2014). The volatilities of government expenditure, consumption, revenue, and the primary balance were all lower, on average, during 2007–24 than in 1990–2006 (figure 3.2.A). The reduction in fiscal volatility in EMDEs in the latter part of the sample mirrors the increasing use of fiscal rules in these countries (Arroyo Marioli, Fatás, and Vasishtha 2024). In contrast, the evolution of fiscal volatility in advanced economies over the same period has varied across different fiscal indicators. While average revenue and expendi-

⁶ However, when comparing the volatility of the primary balance with that of the other fiscal variables, the average size of the government (measured as the share of general government total expenditure in GDP) in EMDEs needs to be considered. For instance, a 1 percent increase in government spending will have a different impact on GDP in a country with a smaller government than in one with a larger government. Given that the average government size in EMDEs is about 30 percent, a 1 percent exogenous change in government expenditures only leads to a change in the primary balance of approximately 0.3 percent of GDP in the average EMDE.

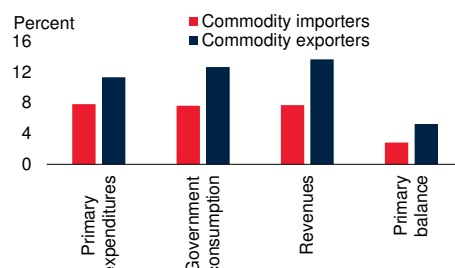
FIGURE 3.1 Fiscal policy volatility

Since 1990, primary expenditure, government consumption, and revenues in EMDEs have been more volatile than those in advanced economies, on average. Within EMDEs, fiscal policy in commodity exporters has been more volatile than that in commodity importers, on average, and more volatile in LICs than in non-LICs. On average, expenditure volatility has been highest among commodity exporters in Sub-Saharan Africa, the Middle East and North Africa, and East Asia and Pacific.

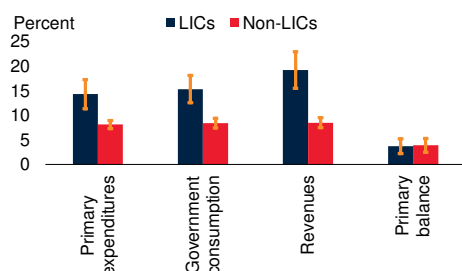
A. Fiscal volatility: Advanced economies versus EMDEs



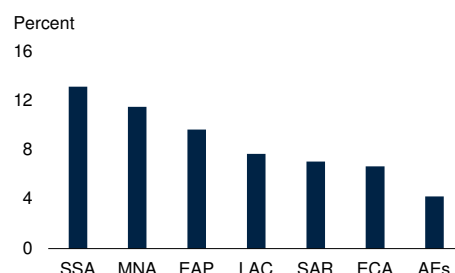
B. Fiscal volatility in EMDEs, by commodity exporter status



C. Fiscal volatility: LICs versus non-LICs



D. Expenditure volatility in commodity-exporters, by region



Sources: Arroyo Marioli, Fatás, and Vasishtha (2024); World Bank; World Economic Outlook (database).

Note: AEs = advanced economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean; LIC = low-income country; MNA = Middle East and North Africa; PPP = purchasing power parity; SAR = South Asia; SSA = Sub-Saharan Africa.

A.B. Panels show weighted averages (panel A) and simple averages (panel B), by country group, of the standard deviations of the residuals obtained from regressing four dependent variables—log differences of real primary expenditures, real government consumption, real revenues, and the change in primary balance (percent of GDP)—on real GDP growth. Weights used are the PPP GDP shares in the respective group's total GDP. Annual data for 146 EMDEs and 37 advanced economies over 1990–2024.

C. Panel shows the weighted averages of the standard deviations of the residuals obtained from regressing four variables—log differences of real primary expenditures, real government consumption, real revenues, and the change in primary balance (percent of GDP)—on real GDP growth. Weights used are the PPP GDP shares in the respective group's total GDP. Annual data for 22 LICs and 156 non-LICs.

D. Panel shows the unweighted average volatility in commodity exporters in each country group.

ture volatility declined from 1990–2006 to 2007–24, primary balance volatility increased somewhat (figure 3.2.B).

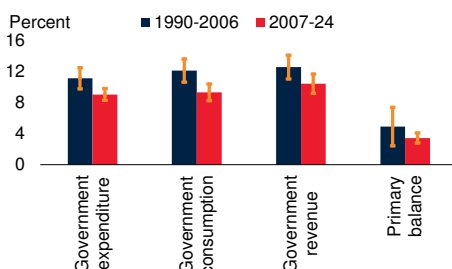
Determinants of fiscal policy volatility

The preceding analysis establishes that fiscal policy volatility—on average—is higher in EMDEs than in advanced economies, and in commodity exporters than in commodity importers. However, these average results mask substantial heterogeneity across

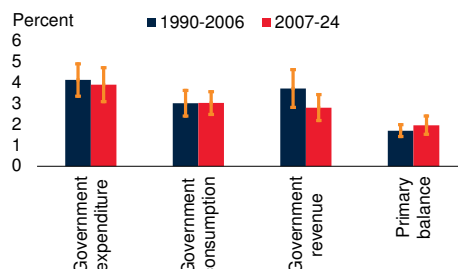
FIGURE 3.2 Evolution of fiscal policy volatility

Fiscal policy volatility declined somewhat in EMDEs over the past three decades, while the evolution of fiscal volatility in advanced economies has varied across fiscal indicators.

A. Evolution of fiscal volatility in EMDEs



B. Evolution of fiscal volatility in advanced economies



Sources: Arroyo Marioli, Fatás, and Vasishtha (2024); World Bank; World Economic Outlook (database).

Note: EMDEs = emerging market and developing economies.

A.B. Figures show the weighted averages of the standard deviations of the residuals obtained from regressing four variables—log differences of real primary expenditures, real government consumption, real revenues, and the change in primary balance (percent of GDP)—on real GDP growth. Weights used are the PPP GDP shares in the respective group's total GDP. Annual data for up to 36 advanced economies and up to 144 EMDEs.

countries. To account for this heterogeneity, cross-sectional regressions are used to investigate the role of country-specific factors—such as institutions, policy variables, the extent and nature of commodity dependence, and GDP per capita—in driving fiscal policy volatility (annex 3A). Similar to the analysis of fiscal policy procyclicality in chapter 2, the exercise focuses on the spending side of the budget. While each of the four fiscal policy indicators used earlier contains information about fiscal policy, the variation in primary expenditures provides a more accurate perspective on fiscal policy volatility. Since the automatic stabilizer component of expenditures tends to be small, changes in primary expenditures tend to be driven by discretionary measures and changes in nondiscretionary spending that are unrelated to the business cycle. It is these changes in primary expenditures, net of cyclical components (such as unemployment benefits), that are captured in the volatility measure used in the analysis. This approach is consistent with the related literature which has typically used government expenditures (or government consumption) to measure fiscal policy volatility (for instance, Fatás and Mihov 2013).

Role of commodity dependence

Results indicate that commodity dependence can be a source of fiscal policy volatility in its own right. The dummy variables for EMDEs and commodity exporters explain up to 23 percent of the variation in fiscal policy volatility across countries (table 3.4).⁷ The

⁷ For brevity, table 3.4 only shows the regression results when primary expenditure volatility is used as the dependent variable. The regression results with government consumption volatility as the dependent variable are very similar.

observation that commodity exporters exhibit higher fiscal policy volatility, even after their EMDE status is considered, suggests that reliance on commodities may be associated with fiscal policy volatility.

EMDEs, including commodity exporters, are a heterogeneous group of countries that display substantial variation in their level of development and the degree of commodity dependence. To account for these differences across countries, two additional variables are introduced into the analysis. First, GDP per capita is included to represent the level of development in each country. Second, a variable measuring resource rents—specifically, income from natural resources as a percentage of GDP—is introduced to capture the degree of commodity dependence.⁸ The results indicate that lower GDP per capita in EMDEs, relative to advanced economies, does not by itself explain the differences in fiscal policy volatility across countries. The presence of larger commodity sectors also contributes to greater volatility in fiscal policy. Overall, these findings suggest that both the level of development and the degree of commodity dependence play an important role in driving fiscal volatility.

The sample of commodity exporters comprises a diverse group of agricultural, metal, and energy exporters. To examine differences in fiscal policy volatility across these different groups, dummy variables are introduced to represent agricultural, metal, and energy exporters. Results show that energy exporters display higher fiscal policy volatility than exporters of metal and agricultural commodities. However, when resource rents are accounted for, evidence suggests that commodity dependence is a more important determinant of fiscal volatility than the type of commodity exported (table 3.5).

Role of institutions

The literature provides evidence that political processes and the institutional environment can amplify or dampen the incentives to use discretionary fiscal policy (Fatás and Mihov 2003, 2013). A stable institutional environment and the use of sound fiscal rules can reduce fiscal policy volatility. The role of institutional factors in driving fiscal policy volatility is analyzed by including two additional variables often used in the literature: political constraints and control of corruption. The political constraints variable, based on the indicator constructed by Henisz (2017), captures the constraints faced by governments during policy implementation. The coefficient estimates for both variables conform with prior beliefs and are statistically significant, indicating that countries with more political constraints and better control of corruption experience less fiscal volatility. These two variables together help explain up to 42 percent of cross-country variation in fiscal policy volatility (table 3.4; column 3).⁹

⁸ Resource rents are used instead of resource revenues due to data availability issues. The two variables are highly correlated.

⁹ Institutional variables show limited variation over time and have often been used in the literature as causal explanations of different macroeconomic phenomena. However, the potential for reverse causality cannot be ruled out. This might be particularly relevant for countries with natural resources since their existence could be a source of corruption (De Rosa and Iortty 2012; Vicente 2010).

Role of policy frameworks

Macroeconomic policy frameworks can also play an important role in driving fiscal policy volatility. Following the literature, the roles of three specific policy variables are examined: the presence of fiscal rules, the exchange rate regime (floating versus fixed), and capital account openness. Fiscal rules have been shown to be effective in delivering better fiscal outcomes. Such frameworks signal governments' underlying preferences for sensible fiscal policy (Debrun and Kumar 2008). Constraints imposed by fiscal rules lead to lower fiscal policy volatility, lower output volatility, and hence higher growth (Badinger and Reuter 2017; Fatás and Mihov 2003, 2007). Moreover, the role of well-established rules in governing spending in EMDEs and commodity exporters—especially when rising commodity prices boost government revenues—has been emphasized in several studies (for example, Bova, Carcenac, and Guerguil 2014; Frankel 2011).

Restrictions on cross-border transactions may induce volatility in fiscal policy. Countries that are less integrated into international financial markets may resort more often to discretionary changes in fiscal policy. For instance, lack of access to international capital markets in economic downturns can induce a procyclical bias in fiscal policy, as the need to finance a primary deficit will lead to expenditure cuts or higher taxes in these periods (Arroyo Marioli and Végh 2026). This suggests that fiscal policy volatility should be negatively correlated with capital account openness.

With regard to the link between the type of exchange rate regime and fiscal discipline, two contrasting perspectives are at play. On the one hand, traditionally fixed exchange rate regimes were considered conducive to stronger fiscal discipline. On the other hand, more recent literature and mixed empirical evidence have set the stage for an alternative policy view, according to which flexible exchange rate regimes can also support fiscal restraint. This is because the immediacy of the repercussions of fiscal profligacy under such regimes prompts closer public scrutiny of policymakers (Jalles, Mulas-Granados, and Tavares 2016; Tornell and Velasco 2000).

The results indicate that the presence of fiscal rules, a more open capital account, and more flexible exchange rates are all associated with lower fiscal policy volatility. Together, commodity dependence, as well as the policy and institutional factors considered, explain up to 71 percent of the cross-country variation in fiscal policy volatility (table 3.4; column 7). The estimates suggest that moving from a fixed exchange rate regime to a flexible one can lower expenditure volatility by approximately 3 percentage points.

Although a flexible exchange rate regime is not feasible or appropriate for all EMDEs, countries with those regimes may have more room for the exchange rate adjustment needed to counteract the destabilizing effects of commodity prices on output. A more flexible exchange rate regime, in principle, facilitates a smoother cyclical adjustment to a terms-of-trade shock. For example, during the 2014–16 fall in commodity prices (mainly crude oil and natural gas), commodity-exporting countries such as Chile and

Peru—two countries with flexible exchange rate regimes—were able to increase spending through countercyclical fiscal policy as they were equipped with sufficient fiscal space and the necessary medium-term fiscal frameworks to safeguard fiscal sustainability (Al-Sadiq, Bejar, and Otker 2021).¹⁰

In contrast, countries with pegged regimes experienced a larger deterioration in their fiscal balance, on average, relative to those with flexible exchange rate regimes. Nevertheless, pegged exchange rates remain the dominant exchange rate regime among EMDEs (figure 3.3.A). While greater exchange rate flexibility can help build resilience to commodity price shocks, its macroeconomic implications need to be taken into account, particularly in cases where prices of a few key exports are globally determined, and exchange rate fluctuations may have adverse impacts on the balance sheets of public and private institutions.

The results also suggest that if the average degree of capital account openness in EMDEs were to be the same as in the average advanced economy, expenditure volatility in EMDEs would be reduced by 1.8 percentage points. In principle, economies with greater access to international capital markets should be better able to smooth the impact of commodity price fluctuations on output volatility. However, for some countries, markets may respond in a procyclical manner, with capital flows increasing during commodity price booms and declining during slumps (IMF 2012a). Capital account openness in commodity exporters has increased over the past few decades, but it remains lower than in commodity importers (figure 3.3.B). Measures to increase capital account openness must always be considered with caution, together with the prudential and other measures that may be needed to avoid instability in the domestic financial system.

Further, establishing a fiscal rule can reduce expenditure volatility in EMDEs by 0.6 percentage point (from 10 to 9.4 percent). The significance of these three variables—exchange rate regime, capital account openness, and fiscal rules—in driving fiscal policy volatility remains even after accounting for the level of development and the extent of commodity dependence. Although the presence of an SWF is also associated with lower fiscal volatility, the coefficient estimate is not statistically significant.¹¹

Links between fiscal procyclicality and volatility

Fiscal procyclicality and volatility are intimately related concepts and often driven by similar factors, as highlighted by the preceding analysis and the insights from chapter 2. Intuitively, a more procyclical fiscal policy would be expected to result in a more volatile

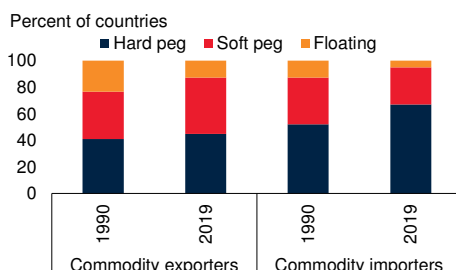
¹⁰ Although a countercyclical fiscal policy response to a temporary commodity price shock is desirable under both fixed and flexible exchange rate regimes, it is more effective under a flexible exchange rate regime combined with inflation targeting, when monetary policy complements fiscal policy by reducing inflation volatility (IMF 2012a).

¹¹ It is possible that the effect of establishing a SWF is captured by the other policy variables included in the analysis. For example, the decision to establish one may be correlated with fiscal volatility itself.

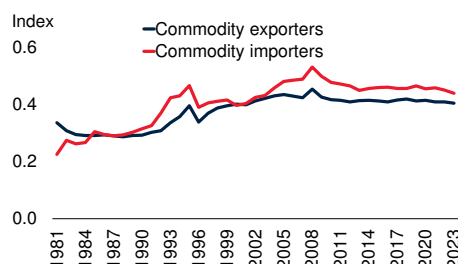
FIGURE 3.3 Exchange rate regimes and capital account openness

Fixed exchange rates remain the dominant regime in EMDEs. Although capital account openness has increased in commodity exporters over the past few decades, it remains lower than that in commodity importers, and the gap has widened.

A. Exchange rate regimes in EMDEs



B. Capital account openness in EMDEs



Sources: Chinn and Ito (2006); Ilzetzi, Reinhart, and Rogoff (2022); World Bank.

Note: EMDEs = emerging market and developing economies.

A. Panel shows the share of EMDEs with hard pegs, soft pegs, and floating exchange rate regimes, based on the classification in Ilzetzi, Reinhart, and Rogoff (2022).

B. Based on the Chinn-Ito index of financial openness. The lines represent the average of the index in each year. Sample includes up to 53 commodity importers and 86 commodity exporters.

fiscal policy to the extent that it amplifies the business cycle, thus exacerbating the effect of the initial source of volatility. It is also possible that when fiscal policy is procyclical relative to the commodity cycle, it becomes the main transmission channel of the commodity cycle. In countries where the commodity export sector is weakly linked to the rest of the economy, government expenditure could be the main link between the business cycle and commodity prices. However, in the analysis used here (which follows the empirical literature), fiscal volatility is defined as the volatility of changes in public expenditure that are not related to the business cycle (Fatás and Mihov 2013). Under this definition, the relation between the two is less obvious.

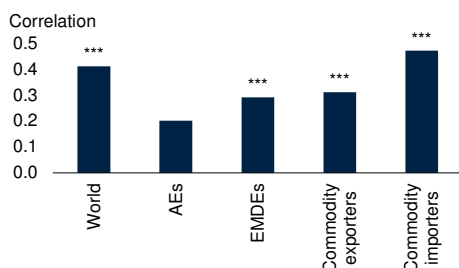
The measures of volatility and procyclicality—analyzed in chapter 2—are positively correlated, a finding in line with some previous studies (figure 3.4.A; IMF 2004). However, the correlation is significant only for EMDEs—both commodity exporters and commodity importers. This suggests that fiscal procyclicality is associated with more fiscal policy volatility only in EMDEs, which also tend to be procyclical. In advanced economies, because fiscal policy is countercyclical or acyclical on average, the volatility of fiscal policy is likely due to other factors.

The correlation between fiscal procyclicality and volatility declined for advanced economies from the 1980–2006 period to the post-2007 period, while it has increased slightly for EMDEs and commodity exporters (figure 3.4.B). Further, the correlation between fiscal procyclicality and volatility is statistically significant for all country-income groups and regions, although there is substantial variation in the degree of correlation across groups (figures 3.4.C and 3.4.D).

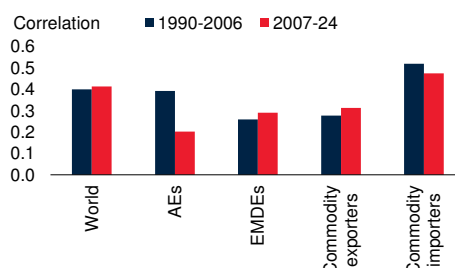
FIGURE 3.4 Fiscal policy volatility and procyclicality

Among EMDEs and commodity exporters, the correlation between fiscal volatility and procyclicality largely reflects procyclical fiscal behavior. While the correlation between fiscal procyclicality and volatility in advanced economies declined between 1980–2006 and 2007–20, it increased slightly in EMDEs and commodity exporters. The correlation between fiscal procyclicality and volatility is statistically significant for all country income groups and regions, although there is substantial variation in the degree of correlation across groups.

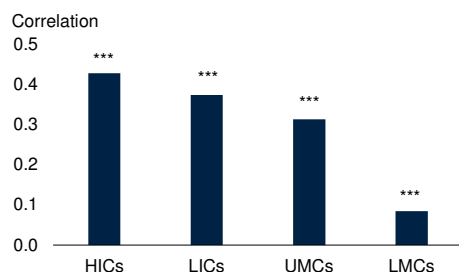
A. Correlation between fiscal volatility and procyclicality



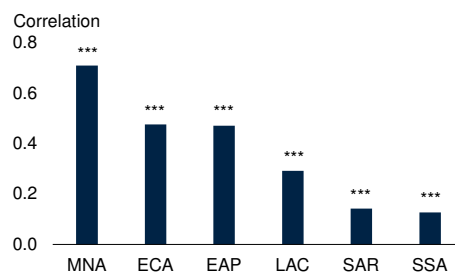
B. Correlation between fiscal volatility and procyclicality over time



C. Correlation between fiscal volatility and procyclicality, by income group



D. Correlation between fiscal volatility and procyclicality, by region



Sources: International Monetary Fund; World Bank.

Note: AEs = advanced economies; EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; HICs = high-income countries; LAC = Latin America and the Caribbean; LICs = low-income countries; LMCs = lower-middle-income countries; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; UMCs = upper middle-income countries. Bars represent the correlation between fiscal procyclicality and the measure of volatility that does not exclude the effect of the business cycle on fiscal policy changes.

A.C.D. Asterisks represent statistical significance.

Implications of fiscal policy volatility for growth

The above analysis focused on the role of economic and institutional factors in driving fiscal policy volatility in EMDEs, including commodity exporters. This section analyzes the macroeconomic consequences of this additional volatility by measuring its effects on the growth of GDP per capita. The link between fiscal policy volatility and economic growth is identified by using the approach of Fatás and Mihov (2013) which involves estimating variants of a standard growth regression introduced by Barro (1991) and using controls based on the growth regressions of Sala-i-Martin, Doppelhofer, and Miller (2004) (annex 3A).

The dependent variable is the country-specific average growth rate of GDP per capita and the key regressor is the measure of fiscal policy volatility used above—that is, the volatility of the exogenous shock to real primary government expenditure. The period over which the average growth rate is calculated corresponds to the period over which the measure of fiscal policy volatility is constructed. The framework also includes variables that have been identified as having significant explanatory power for the cross-country variation in GDP growth: initial GDP per capita, initial investment price level, and government size.¹² Additional controls include a dummy variable for commodity exporters and the index of capital account openness to control for the effect of financial openness on economic growth.

It is possible that omitted variables may affect both growth and policy volatility or that countries with low growth rates may resort more often to aggressive fiscal policy to boost aggregate demand. Recognizing this, instrumental variables are used to capture the causal effects of policy volatility. Instrumental variables also help address the standard measurement error issues that might arise from the use of the constructed measure of fiscal policy volatility. Guided by the link between institutions and fiscal policy volatility (table 3.5), political constraints and control of corruption are used as instruments. These variables are often used in the literature as instruments for government policies since they are deemed exogenous to economic conditions and mostly affect the economy through their effects on the state and government behavior (Fatás and Mihov 2013).

While the estimated effects of fiscal policy volatility is not significant in the univariate regression, they become statistically significant once controls are introduced. The results indicate that expenditure volatility reduces per capita output growth significantly (table 3.6). The estimated impact of fiscal volatility on per capita growth is in line with other estimates in the literature (for example, Fatás and Mihov 2013).¹³ The results are also consistent with earlier evidence on a negative association between macroeconomic volatility and economic growth (Kose, Prasad, and Terrones 2005; Ramey and Ramey 1995). Fiscal policy volatility reduces output growth by exacerbating macroeconomic volatility (Arroyo Marioli, Fatás, and Vasishtha 2024). Additionally, higher spending volatility implies either an attendant increase in tax rate volatility or potentially raises uncertainty about future tax rates, in turn dampening investment and growth.

The results yield important policy implications. Applying the above estimates in a counterfactual scenario, if the average commodity-exporting EMDE were to adopt the policies of an average advanced economy in three areas—capital account openness, exchange rate flexibility, and use of fiscal rules—fiscal volatility would be reduced by roughly 2.6 percentage points—from 11.4 percent to 8.8 percent. That would result in

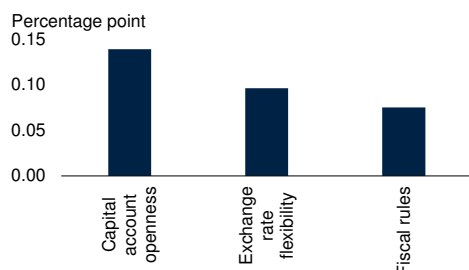
¹² Barro and Sala-i-Martin (2003) provide a detailed discussion of the relevant theories justifying the inclusion of these variables. A battery of specifications including a variety of controls was also estimated. For example, the existence of a sovereign wealth fund was included as one of the controls, but the results were not statistically significant.

¹³ The empirical specification used here differs from that of Fatás and Mihov (2013) in that the policy volatility variable is not log-transformed. If instead the log of the policy volatility variable is used, the coefficient is about 1, which is consistent with the results in Fatás and Mihov (2013).

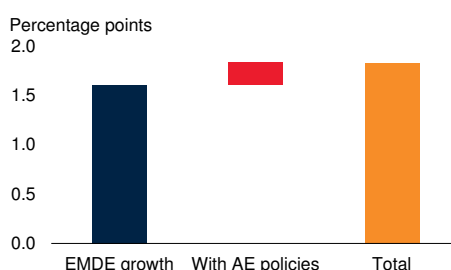
FIGURE 3.5 Fiscal volatility and growth

The dampening effect of fiscal volatility on growth can be reduced by avoiding restrictions on international capital movements, establishing a fiscal framework to discipline government spending, and adopting flexible exchange rate regimes. If the average commodity-exporting EMDE were to adopt the policies of an average advanced economy regarding exchange rates, capital account openness, and use of fiscal rules, it could have added about 0.2 percentage point in per capita growth every year by reducing fiscal policy volatility.

A. Impact of volatility-reducing policies on per capita growth



B. Annual per capita growth in EMDE commodity exporters: Counterfactual scenario



Sources: Chinn and Ito (2006); Davoodi et al. (2022); Ilzetzi, Reinhart, and Rogoff (2022); International Monetary Fund; World Bank.

Note: AE = advanced economy; EMDE = emerging market and developing economy.

A. Figure shows the impact on per capita growth from a 1 standard deviation change in each of the three policy variables, based on estimates reported in tables 3.4 and 3.6.

B. The middle column in the panel illustrates how applying the average advanced-economy policies along three dimensions (exchange rate flexibility, capital account openness, and fiscal rules) impacts per capita GDP growth in the average commodity-exporting EMDE. The last column shows per capita GDP growth for the average commodity-exporting EMDE growth with these advanced-economy policies.

an increase of 0.2 percentage point—from about 1.6 to 1.8 percent—in the average per capita GDP growth for commodity-exporting EMDEs per year (figures 3.5.A and 3.5.B). Over the 34-year sample period of the analysis, an overall 6.9 percentage points would have been added to average growth in GDP per capita in commodity-exporting EMDEs.

Conclusions

Managing fiscal policy in commodity-exporting EMDEs presents a unique set of challenges that, if left unaddressed, can hinder long-term prosperity. This chapter examines the drivers and implications of fiscal policy volatility—that is, the aggressiveness with which policy makers use discretionary fiscal policy—over the 1990–2024 period for a large sample of economies. It finds that fiscal policy tends to be markedly more volatile in EMDEs than in advanced economies, and in commodity exporters relative to commodity importers. This pattern holds for all four fiscal policy indicators considered—primary expenditure, revenue, government consumption, and primary balance-to-GDP. That said, fiscal policy volatility has declined somewhat in EMDEs since 1990 alongside the adoption of fiscal rules and other measures to strengthen institutional frameworks.

Fiscal policy volatility reflects deep-seated structural characteristics: in particular, the higher the degree of commodity dependence, the higher fiscal policy volatility is, with energy exporters typically experiencing higher volatility than agricultural or metal exporters. This pattern persists even after accounting for differences in income levels across countries. Institutional and policy variables are also important. Countries with robust political constraints and effective control of corruption tend to exhibit lower fiscal volatility. The adoption of well-designed fiscal rules provides a signal of commitment to discipline and serves as a stabilizer during price booms. Capital account openness and flexible exchange rate regimes are also associated with lower fiscal volatility. Greater integration into international financial markets allows for better consumption smoothing while flexible exchange rate regimes can act as a shock absorber, facilitating smoother adjustment to terms-of-trade shocks. Jointly, these factors account for more than half of the cross-country variation in fiscal policy volatility, underscoring the critical role of governance and policy design.

Fiscal policy volatility amplifies business cycle fluctuations and exerts a drag on growth. The drag on growth can be reduced by putting in place fiscal frameworks to discipline government spending, adopting greater exchange rate flexibility, and managing restrictions on international movements of capital, among other measures. The potential benefits of these reforms are substantial. Estimates from a counterfactual exercise suggest that if commodity-exporting EMDEs were to adopt the average policies of advanced economies in areas such as exchange rate flexibility, capital account openness, and fiscal rules, they could boost GDP per capita growth by about 0.2 percentage point per year.

The empirical findings and country cases analyzed point to a suite of policy actions that can help mitigate fiscal policy volatility and its consequences for growth. In particular, lessons from the country cases underscore the importance of a comprehensive strategy focused on institutional strengthening and policy reform (box 3.1). A sustainable, properly designed, and stability-oriented fiscal framework can help build buffers during commodity price booms to prepare for a subsequent slump in prices. Fiscal rules can help in this regard by dampening the procyclicality and volatility of government spending and improving macroeconomic performance. Stabilization funds can be used to invest windfalls in commodity revenues, thereby saving resource revenues for future generations. Chapter 5 provides a detailed discussion of the menu of priorities for policy makers in commodity-exporting EMDEs.

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies

Commodity price swings often make fiscal policy more procyclical and volatile in commodity-exporting emerging market and developing economies (EMDEs), fueling boom-bust cycles and weakening growth. Many countries have adopted fiscal rules and sovereign wealth funds (SWFs) to mitigate these risks, but their design, implementation, and effectiveness vary widely. Evidence suggests that these frameworks work best when well designed and backed by strong institutions. Chile and Norway offer useful lessons, having managed commodity exposure relatively successfully through rigorous fiscal frameworks and strong institutions.

Introduction

Commodity dependence presents substantial challenges for many emerging market and developing economies (EMDEs). Commodity price volatility generally results in unpredictable swings in commodity-related export and fiscal revenues, leading to volatile and procyclical public spending—that is, spending that reinforces rather than moderates the business cycle. To manage the impact of commodity price volatility on fiscal policy, countries have adopted a variety of policy frameworks, such as fiscal rules and sovereign wealth funds (SWFs). Additionally, some countries have set up publicly funded independent fiscal institutions, such as fiscal councils, tasked with independent monitoring of fiscal policy and highlighting fiscal risks. However, these policy frameworks and institutions are far from homogeneous and often take different forms in different countries.

In this context, this box assesses the effectiveness of fiscal rules and SWFs in managing commodity price shocks in selected commodity-exporting countries. It addresses the following questions:

- How have fiscal rules and SWFs helped in reducing fiscal procyclicality and volatility?
- What lessons do country cases offer for the successful implementation of fiscal rules and SWFs?

Country case studies

This box examines the use of SWFs and fiscal rules in seven diverse commodity-exporting countries from different geographic regions: Argentina, Australia, Botswana, Chile, Indonesia, Norway, and Timor-Leste. The exercise aims to include a diverse set of commodity exporters both in terms of the types of commodity exports (agriculture, energy, and minerals). It also considers the concentration of commodity exports—that is, single-commodity exporters as well as countries with a more diverse export portfolio. To draw lessons for resource-

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (*continued*)

rich countries considering fiscal rules and SWFs to mitigate fiscal procyclicality and volatility, the box compares countries with well-functioning fiscal rules and SWFs, countries with mixed experiences, and those without such frameworks.

Australia, Chile, and Norway

These countries have designed their SWFs to help manage the fiscal effects of fluctuations in commodity export prices and revenues. Australia and Norway have designed their funds for long-term purposes, while Chile has designed its fund for short-term purposes. These countries have also established fiscal rules and a strong institutional framework that allow them to reduce or avoid fiscal procyclicality (Arezki et al. 2012; Bauer 2014; Frankel 2011). The combination of good institutions, SWFs, and fiscal rules has enabled these countries to manage their commodity-based revenues and create sustainable frameworks. Australia combines well-developed fiscal frameworks with broad principles (for example, on debt sustainability) with more flexible numerical rules or guidelines. Chile and Norway also rely on more flexible guidelines and rules, supported by strong institutions and transparency on fiscal plans, and are often regarded as countries with the most successful fiscal frameworks and institutions to manage natural resource wealth (Lam et al. 2023).

Australia

Australia's main commodity exports comprise iron ore, coal, gold, liquefied natural gas, and meat. The country's fiscal framework is based on the Charter of Budget Honesty Act 1998 (Commonwealth of Australia 2014), which provides for "constrained discretion." This framework advocates a principles-based approach rather than a numerically oriented, rules-based approach. It adds transparency and discipline to the budget formulation and execution process (Bhattacharyya and Williamson 2011; Chohan 2017). The Charter defines the principles of sound fiscal management as comprising several components, including an expectation that fiscal policy contributes to adequate national saving and to moderating cyclical fluctuations in economic activity, as appropriate (Chohan 2017). The country's SWF, the Future Fund, was established in 2006 and accumulates revenue from budget surpluses for long-term purposes, such as pensions (figure B3.1.1.A).^a The Minister of Finance may make certain discretionary transfers from time to time.

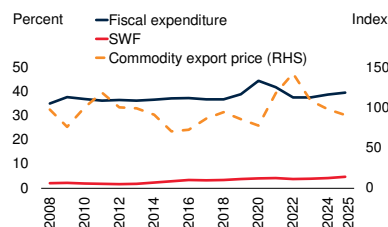
a. The Future Fund also received contributions from the proceeds of the sale of the government's stake in Telstra in late 2006 and the approximately 2 billion shares in Telstra that remained after this sale process. Additionally, it received contributions from a combination of budget surpluses, proceeds from the sale of the government's holding of Telstra, and the transfer of remaining Telstra shares (Al-Hassan et al. 2018).

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

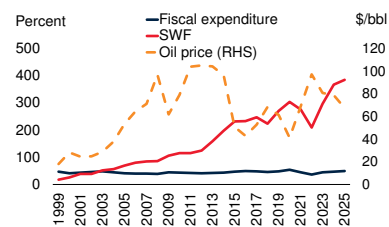
FIGURE B3.1.1 Fiscal expenditure and SWFs in Australia and Norway

Sovereign wealth funds in Australia and Norway have consistently accumulated resources in line with their long-term objectives.

A. Australia



B. Norway



Sources: Future Fund (website); International Monetary Fund; Norges Bank (website); World Bank.

Note: bbl = billion barrels; SWF = sovereign wealth fund.

A.B. Fiscal expenditure and assets under management of SWFs are expressed as percentages of GDP.

Norway

Norway's commodity exports are concentrated in crude oil and natural gas. The country has a SWF comprising two separate investment funds.

- The Government Pension Fund Global (GPFG), formerly the Petroleum Fund, was established in 1990 to collect revenue from oil-related income sources to support government saving and to promote an intergenerational transfer of resources (Velculescu 2008). In this way, the government's revenue from petroleum production does not enter the central government budget directly. Norway's GPFG is the largest natural resource-based SWF in the world, with its annual holdings equivalent to about 385 percent of GDP in 2025 (figure B3.1.1.B).
- The Government Pension Fund Norway (GPFN) saves surpluses of the national insurance scheme and held assets of \$38.1 billion, or 8 percent of 2024 GDP (Annual White Paper on the Government Pension Fund 2025).

Political will to turn nonrenewable resources into wealth for future generations paved the way for Norway's fund. The GPFG is fully integrated with the state budget and builds on existing institutions to strengthen the budget process. It finances the non-oil budget without constraints from any inflow or outflow rules between the fund and the budget. Norway has consistently sustained budget surpluses over the past two decades (except for 2020), with net inflows to the

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (*continued*)

GPFG accumulating over time. The central government in Norway has the so-called “bird-in-hand rule” or “spending rule” (established in 2001), which stipulates that the non-oil structural deficit, and thus withdrawals from the fund over time, should correspond to the estimated annual real return of the fund, which has been 3 percent since 2017.

Norway’s spending rule implies that the non-oil budget, and hence the economy, is isolated from both the large variations in oil revenues that result from oil price fluctuations and the volatility in the value of the fund due to variations in stock prices. This, in turn, helps to dampen the cyclical swings in the economy. The linking of the structural, and not the actual, non-oil fiscal deficit to the expected real return on the assets of the wealth fund allows automatic stabilizers to work. Norway (unlike its Nordic peers) does not have a publicly funded independent body to monitor fiscal or other economic policy.

Chile

Chile is the world’s biggest copper exporter—the metal accounts for about half of the country’s total exports. Chile’s fiscal policy management has been anchored on the successful implementation of SWFs and fiscal rules, and the establishment of the Autonomous Fiscal Council in 2019. Chile’s SWFs comprise two types of funds.

- The Economic and Social Stabilization Fund (ESSF) was established under the Fiscal Responsibility Law of 2006. The ESSF has been designed for short-term purposes, with the main objective of stabilizing fiscal spending and insulating the budget from economic downturns and volatile copper prices, thus reducing the need to issue debt. Provisions for contributions to and withdrawals from the ESSF are well established in law and closely tied to the fiscal rules. The ESSF has followed its mandate successfully and helped Chile finance countercyclical fiscal policy when needed. During the pandemic, the government used the stabilization fund to provide fiscal support.
- The Pension Reserve Fund (PRF) aims to accumulate resources on a longer-term horizon. The PRF was created to support the state guarantee of pension and disability benefits. The funds’ governance and asset management strategy matches international best practices (Lam et al. 2023).

Chile’s fiscal rule, in place since 2001, limits the growth of budgeted central government spending to an estimate of structural revenue growth. The rule’s operation is supported by two expert panels that estimate long-term copper prices and the output gap. According to the rule, the authorities can run a deficit larger than the target if: (1) in a recession, output falls short of its long-run trend, or (2) the price of copper is below its medium-term (10-year) equilibrium (Frankel

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

2011). The ESSF is closely linked to the structural budget balance rule and has followed international best practices by adopting a flexible inflow and outflow mechanism, a feature similar to the arrangement in Norway (Lam et al. 2023). In addition to the fiscal rule, the Autonomous Fiscal Council was created in 2019 to replace the Advisory Fiscal Council established in 2013. The new fiscal council also continues to have legal independence, its own resources, and a broader mandate.

The presence of credible fiscal rules and strong governance structures has enabled Chile to develop some of the best fiscal management institutions among commodity-exporting EMDEs (Izquierdo et al. 2008). In addition, the recent creation of competent, independent, and adequately resourced fiscal councils has reinforced this progress. For example, in the aftermath of the 2009 global recession, Chile implemented countercyclical fiscal policies and maintained a low risk of debt distress. Government expenditures grew from about 23 percent of GDP in 2012–14 to about 25 percent of GDP in 2015–17 (figure B3.1.2.A). This helped mitigate output volatility, with GDP growth declining by 2 percentage points between 2012–14 and 2015–17, compared with an average decline of 2.6 percentage points among other metal exporters (Richaud et al. 2019). Chile's fiscal sustainability was maintained thanks to its fiscal rule, which allowed the country to save a substantial proportion of commodity revenues into its SWF during the commodity supercycle (World Bank 2017). Some of these savings were drawn down to boost the economy in the wake of the global financial crisis. More recently, the SWF was crucial in financing a large fiscal stimulus package during the COVID-19 pandemic.

Botswana and Timor-Leste

Botswana

Diamond mining is the dominant economic sector in Botswana. The government established a sovereign wealth fund—the Pula Fund—in 1994 to serve both as a savings fund and as a short-term stabilization fund. The main objective of the fund is to set aside part of the income from diamond exports to benefit future generations. Another objective is to provide a stabilization mechanism for the government budget and foreign reserves during an economic downturn or a slump in mineral prices. For example, the Pula Fund helped stabilize revenue and output during the 2007–09 global financial crisis. During 2008–10, Botswana's fiscal deficit averaged about 9.4 percent of GDP, as mining revenues declined, and expenditures surged because of increased infrastructure spending to offset the adverse effects of the global economic downturn and to boost long-term productivity (figure B3.1.2.B). The government financed this deficit by drawing on savings from the Pula Fund and issuing new debt (World Bank 2016).

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (*continued*)

To prevent excessive spending and bolster fiscal sustainability, the government has established a set of fiscal rules, which have been mostly set in terms of nonbinding political commitments. Botswana has four main rules, which target public spending, the fiscal balance, and debt:

- An indicative expenditure rule, the Sustainable Budgeting Index (SBI), was established in 1994 to ensure that mineral revenue is directed toward investments and savings, rather than consumption (Apeti, Basdevant, and Salins 2023; Kojo 2010). The SBI calculates the ratio of recurrent spending (excluding development spending) to non-diamond revenue, with the objective of keeping the ratio below one. Adhering to this rule sets aside diamond revenue to finance the accumulation of financial assets and development spending.
- There is an indicative target on the composition of spending, which specifies that development spending should be at least 30 percent of total spending.
- An indicative target of a nonnegative fiscal balance was established in 2003.
- Foreign and domestic debt are each prohibited from exceeding 20 percent of GDP.

Surplus fiscal savings are deposited into the Pula Fund, which invests in long-term instruments overseas, and dividends from these investments are paid to the Treasury.

However, Botswana's fiscal framework has limitations. The sustainable budgeting principle does not directly incorporate a sustainability concept, and the Pula Fund has been reducing its overall size with withdrawals that are far larger than its inflows (Basdevant 2008; Jefferis 2016). The Pula Fund is not governed by clearly defined withdrawal or deposit rules, with deposits determined by the size of the budget surplus and withdrawals determined by the size of deficits (Markowitz 2020). On balance, however, Botswana has run a fairly prudent fiscal policy, avoiding many pitfalls experienced by other commodity-dependent countries. The strength and stability of Botswana's institutions have been key to achieving this success (Kojo 2010; Richaud et al. 2019).

Timor-Leste

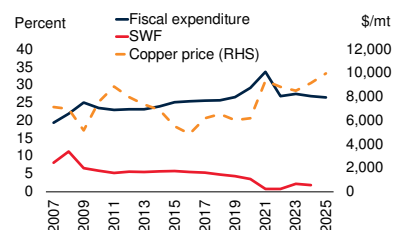
Offshore oil and gas reserves are the main sources of Timor-Leste's resource revenues. The Petroleum Fund (PF) was established in 2005 to collect oil revenues and is managed by the central bank. The PF primarily invests in offshore assets, such as U.S. Treasury bonds. The PF's only expenditures are transfers to the budget, payments of operational management fees, and refunds of overpaid taxes. The government has adopted two fiscal rules to guide the use of oil revenue, although these rules are not binding.

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

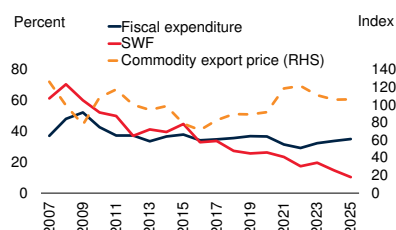
FIGURE B3.1.2 Fiscal policy and institutional quality

Chile used its stabilization fund as needed during its 2019 social crisis and the pandemic. Botswana and Timor-Leste have demonstrated more procyclical fiscal policy, although fiscal rules have enabled the accumulation of sizable financial assets. In Indonesia, fiscal rules have supported a prudent fiscal balance path amid increases in export prices while fiscal balances in Argentina have closely tracked commodity export prices. Overall, SWFs and fiscal rules—supported by strong institutions—have helped countries accumulate assets and reduce or avoid fiscal procyclicality.

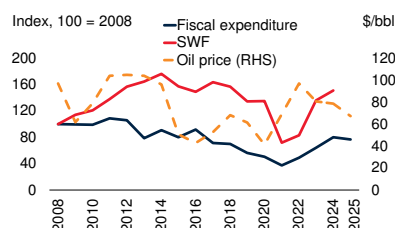
A. Chile



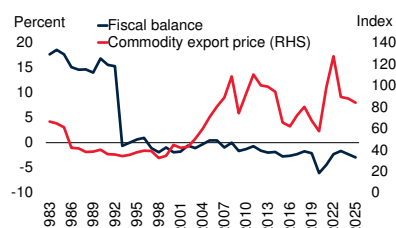
B. Botswana



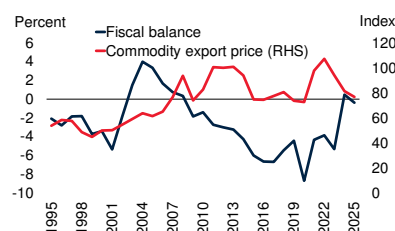
C. Timor-Leste



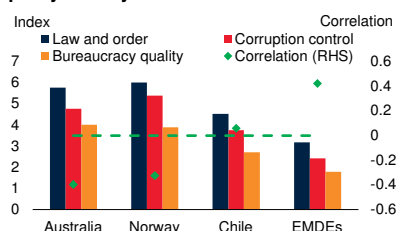
D. Indonesia



E. Argentina



F. Institutional quality and fiscal procyclicality



Sources: Bank of Botswana; Fondo de Estabilización Económica y Social; International Monetary Fund; PRS Group; International Country Risk Guide (ICRG) (database); Timor-Leste Petroleum Fund; World Bank.

Note: bbl = billion barrels; EMDEs = emerging market and developing economies; mt = metric ton; SWF = sovereign wealth fund. Fiscal expenditures, fiscal balance, and assets under management of SWFs are expressed as percentages of GDP.

C. Panel shows a constructed index (with 2008 = 100) for fiscal expenditures and SWF assets under management.

F. Institutional quality indexes give higher scores to countries with better metrics. "EMDEs" shows the simple average of 68 commodity-exporting countries for the three indicators from 1990–2024. "Correlation" refers to the correlation between the cyclical components of real GDP and real government expenditure, using the Hodrick-Prescott filter to remove the trend component of the time series (refer to chapter 2 for details).

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (*continued*)

- The Estimated Sustainable Income (ESI), established in 2005, is a mechanism for integrating the Petroleum Fund and the budget. The ESI is calculated as 3 percent of total wealth plus the present value of projected future oil receipts. This combined amount is what the government is authorized to spend each year. The value of future oil receipts is determined using the U.S. Energy Information Administration's forecasts for West Texas Intermediate crude oil. Transfers exceeding the ESI are allowed only if the government provides a justification that is approved by the National Parliament. The requirement is designed to constrain the government's ability to spend public resources without considering long-term fiscal sustainability (Apeti, Basdevant, and Salins 2023).
- The second rule is a political commitment to maintain a ceiling on the cost of external debt at 3 percent per year. It requires the government to benchmark the costs of external borrowing against the average rate of investment returns of the PF.

Channeling all oil revenues into the PF and requiring that the ESI rule be consistent with the sustainable use of funds should, in principle, mitigate the impact of oil price cycles on fiscal expenditures. However, the escape clauses have hindered the effectiveness of Timor-Leste's fiscal frameworks. Until 2008, government spending of oil revenue was conservative, and transfers to the budget to finance the non-oil budget deficit were lower than the ESI. As a result, the net assets of the Petroleum Fund grew rapidly from \$371 million in 2005 to \$4.2 billion in 2008, the equivalent of 647 percent of non-oil GDP.

However, beginning in 2009, the country started to withdraw funds from the PF in excess of the ESI to finance large infrastructure projects (IMF 2012b). This led to a significant slowdown in the accumulation of assets, but the PF still reached a level of about \$17 billion in 2021. Since the global financial crisis, expenditures have followed oil prices closely (figure B3.1.2.C). Additionally, systematic excess withdrawals have been authorized in recent years, even prior to the pandemic. Given the short expected remaining lifetime of the country's oil fields, the PF is at serious risk of being depleted within the next decade (World Bank 2021). In sum, escape clauses and weak institutions have diminished the effectiveness of fiscal rules in both Botswana and Timor-Leste, even when the rules were well-designed for long-run sustainability.

Indonesia and Argentina

Indonesia

The main commodity exports of Indonesia are crude oil, gas, coal, palm oil, and rubber. Indonesia established a fiscal rule in 2003, which stipulates a fiscal deficit

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

ceiling of 3 percent of GDP and a debt ceiling of 60 percent of GDP. At that time, the government deficit was 1.7 percent of GDP, debt was at 57 percent of GDP, and the economy was well on its path to recovery after the Asian financial crisis. The aim of the fiscal rule was to solidify these gains and to promote future fiscal discipline by enacting these fiscal responsibility criteria into law (Blöndal, Hawkesworth, and Choi 2009). The rules have been respected and only temporarily lifted during the pandemic, within legally pre-established norms.

Although Indonesia's fiscal rule has provided a solid nominal anchor and has safeguarded debt sustainability, fiscal spending has not been disconnected from the commodity price cycle (figure B3.1.2.D). For example, over 1993–2008, fiscal policy in Indonesia was not countercyclical (IMF 2009). The factors underlying limited fiscal responses to output fluctuations originated from structural weaknesses in public finance management and a lack of budget flexibility. These weaknesses included a high dependence on revenue from natural resources, narrow and volatile tax bases, low discretionary spending, and problems with budget execution.

Additionally, like many EMDEs, Indonesia relies on external financing, which tends to be procyclical. Liquidity constraints, particularly during downturns, weaken the government's ability to run an expansionary fiscal policy to offset the effects of an economic slowdown. For example, during the 2007–09 global financial crisis, Indonesia's external borrowing spreads increased sharply, by nearly 1,200 basis points, much higher than its regional peers—Malaysia, the Philippines, and Thailand (IMF 2009). Another factor contributing to fiscal procyclicality is the high subsidy component of the budget, particularly energy subsidies, which leave little room to respond to the economic cycle. Despite ongoing efforts to reform fuel subsidies, including the notable 2015 reform and the fuel price hikes in 2022, spending on such subsidies has been substantial (World Bank 2024).

Argentina

The country's commodity export basket is based on agricultural goods. Unlike the other countries analyzed here, Argentina has neither a sovereign wealth fund nor a set of fiscal rules. Fiscal policy in Argentina has been highly procyclical, with expenditures growing closely in line with commodity export prices during the commodity price cycle of the 2000s (Kaminsky 2010). The lack of strong institutions and fiscal rules contributed to a deterioration in fiscal outcomes once the commodity price boom ended (figure B3.1.2.E). As a result, the country faced persistent fiscal challenges in the 2010s (IMF 2020).

BOX 3.1 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (*continued*)

Conclusions

This box analyzes the experiences of selected commodity-exporting countries, all but one of which adopted fiscal rules and SWFs, in managing commodity price shocks. Insights from these case studies lead to the following conclusions.

First, SWFs and fiscal rules differ among countries in objectives and design. SWFs can have a long-term purpose (such as the accumulation of pension funds) or a short-term one (such as mitigating the impact of temporary economic shocks). Some rules are designed to make SWFs sustainable, others to make them accessible when needed (Bauer 2014; Richaud et al. 2019). This aspect plays an important role in fiscal procyclicality because the criteria governing accessibility determine the extent to which a government can access funds (and spend them). The sustainability conditions might also impose limits on the amount that can be used, even in times of need.

Second, when supported by well-designed fiscal rules and institutions, SWFs can help reduce procyclicality. International experience suggests that a strong political commitment to fiscal discipline, as well as strong institutions of governance, are needed for SWFs to be successful in meeting their objectives. Countries with good corruption control and law and order have been able to construct effective SWFs that reduce procyclicality by serving as a buffer against revenue volatility or as a source of financing during downturns (figures B3.1.2.F). In the cases of Norway (oil) and Chile (copper), commodity revenues are channeled directly into their SWFs, severing links between resource revenue and government spending. These funds are then available for specific purposes under certain conditions, thereby avoiding or limiting fiscal procyclicality. In other cases, despite the presence of well-designed rules, the existence of escape clauses and weak institutions can render SWFs less useful (Perry 2007). These observations are in line with the findings in chapter 2, which show that weak institutions limit the ability of governments to follow countercyclical fiscal policy despite having fiscal tools at their disposal.

Finally, commodity-exporters without SWFs or robust fiscal rules are more prone not only to procyclical fiscal behavior but also to debt-sustainability issues. In both Indonesia and Argentina, the two countries without an SWF in the sample, fiscal policies have been procyclical.^b While Indonesia has benefited from a set of rules aimed at debt sustainability, the absence of rules in Argentina has allowed more discretionary spending policies that have contributed to successive crises.

b. Indonesia established a SWF in 2021 that leverages state assets as well as public and private investment for infrastructure spending. It is not designed for fiscal stabilization.

ANNEX 3A Link between fiscal policy volatility and economic growth

Estimating fiscal policy volatility

The framework used to estimate fiscal policy volatility is based on the approach in Arroyo Marioli, Fatás, and Vasishtha (2024) and Fatás and Mihov (2013). It involves estimating a fiscal policy reaction function of the following form:

$$\text{Fiscal policy}_t = \alpha + \beta \text{Economic Activity}_t + \gamma \text{Controls}_t + \epsilon_t, \quad (3A.1)$$

where “Fiscal Policy” is a variable that captures the stance of fiscal policy. Four alternative measures of fiscal policy are used: primary expenditures, revenues, the primary budget balance, and government consumption. Primary expenditures, revenues, and government consumption are all expressed in real terms and measured as log differences. The primary budget balance is expressed as the annual change in its ratio to GDP. “Economic Activity” denotes the cyclical stance of the economy and is represented by annual GDP growth. Alternative measures, such as the output gap and the unemployment rate, are more difficult to construct or measure accurately across diverse economies.¹⁴

β summarizes the cyclical behavior of fiscal policy and indicates whether fiscal policy is countercyclical or procyclical. It consists of both automatic stabilizers and the discretionary response of governments to economic fluctuations.¹⁵ The residual, ϵ , captures changes in fiscal policy that are unrelated to the business cycle or any of the control variables. These changes can be the result of political decisions (such as changes in tax rates or spending associated with the political cycle) or errors in policy (such as mismeasurement of the output gap). The uncertainty associated with the residual can be seen as generating excessive volatility in GDP and, possibly, reduced long-term growth. Following Arroyo Marioli, Fatás, and Vasishtha (2024) and Fatás and Mihov (2013), the volatility of fiscal policy is measured as the standard deviation of the residual in the fiscal policy reaction function (σ_i^ϵ).

“Controls” capture other variables that can influence fiscal policy. For example, the level of indebtedness (a proxy for available fiscal space) or external shocks might affect fiscal policy regardless of the state of the business cycle. If the objective was to fully explain the behavior of fiscal policy, a number of variables would need to be included as controls. However, the objective here is to understand changes in fiscal policy that are orthogonal to the countercyclical policies captured by β . Therefore, the analysis proceeds with a

¹⁴ HP-filtered GDP levels are also used as a measure of economic activity to check the robustness of the results. The results using this alternative measure are consistent with the baseline results.

¹⁵ The specification has potential endogeneity issues since fiscal policy could affect economic activity contemporaneously. While the literature has acknowledged these issues, it has made use of OLS in many instances because of the lack of an obvious instrument (for example, Aghion, Hemous, and Kharroubi 2014; Alesina, Campante, and Tabellini 2008; and Lane 2003). Studies that have explored a set of instruments to test the robustness of the results presented in these earlier papers find similar results (for example, Fatás and Mihov 2013). Given this, and for the sake of simplicity, the analysis in this chapter uses OLS.

baseline regression where no controls are introduced. The logic is as follows. Consider an external event that causes a certain change in fiscal policy. Any change in fiscal policy that is purely driven by the effects that this external event has on GDP will already be captured by the first term (“*Economic Activity*”). Any other changes will be additional fiscal policy volatility that will be captured in the residual. Nevertheless, given the focus on fiscal policy in commodity exporters, a variation of equation (3A.1) including commodity prices as a control is also estimated.

The data come from multiple sources. For commodity exporters, data on natural resource rents (as a percent of GDP) come from the World Bank’s World Development Indicators. Fiscal rules are based on the IMF’s Fiscal Rules Dataset (Davoodi et al. 2022). Country-specific commodity terms of trade indexes are obtained from the IMF. Institutional and political variables are sourced from the PRS Group’s International Country Risk Group (ICRG) database and the Polity IV database. Capital account openness is based on the Chinn-Ito index. Details of the country coverage, variables included in the analysis, and data sources are provided in tables 3.1 and 3.2.

Implications of fiscal policy volatility for growth

The impact of fiscal policy volatility on per capita GDP growth is analyzed by estimating variants of a standard growth regression following Barro (1991). The benchmark specification is:

$$\overline{\Delta y_i} = \alpha' + \rho' \log(\sigma_i^e) + \gamma' Z_i + u_i, \quad (3A.2)$$

where Δy_i is the average per capita GDP growth for country i . The variable σ_i^e measures fiscal policy volatility and is the key regressor of interest. The vector Z_i includes control variables that have been shown to explain cross-country variation in economic growth. Fiscal policy volatility is measured using real primary expenditures. The vector of controls, Z_i , included in the regression is taken from the specification of Fatás and Mihov (2013), which is based on the growth regressions of Sala-i-Martin, Doppelhofer and Miller (2004).¹⁶ The variables included are government size, initial GDP per capita, capital account openness, and the initial price of investment.

Equation (3A.2) is estimated using both OLS and instrumental variables to address endogeneity concerns. The instruments used are political constraints, based on the indicator developed by Henisz (2017), and control of corruption from the PRS Group database, International Country Risk Guide.

¹⁶ For robustness, different specifications were estimated with a variety of controls, including the existence of a sovereign wealth fund. The results are not statistically significant. Note that this variable is already included as an instrument for fiscal policy volatility.

TABLE 3.1 Economies in the sample

Commodity exporters	
Agriculture	Argentina; Belize; Benin; Brazil; Burundi; Cabo Verde; Chad; Comoros; Costa Rica; Côte d'Ivoire; Ethiopia; Fiji; Gambia, The; Guatemala; Guinea-Bissau; Honduras; Iceland; Kenya; Lao PDR; Madagascar; Malawi; Mali; New Zealand; Nicaragua; Paraguay; Rwanda; Senegal; Seychelles; Solomon Islands; Sudan; São Tomé and Príncipe; Tajikistan; Tanzania; Togo; Uganda; Ukraine; Uruguay; Uzbekistan
Metals	Armenia; Australia; Bhutan; Botswana; Burkina Faso; Central African Republic; Chile; Congo, Dem. Rep.; Eritrea; Guinea; Kyrgyz Republic; Liberia; Mauritania; Mongolia; Mozambique; Namibia; Niger; Papua New Guinea; Peru; Sierra Leone; South Africa; Sudan; Suriname; Tajikistan; Zambia
Energy	Algeria; Angola; Azerbaijan; Bahrain; Bhutan; Bolivia; Brunei Darussalam; Cameroon; Canada; Chad; Colombia; Congo, Rep.; Ecuador; Equatorial Guinea; Gabon; Ghana; Guyana; Indonesia; Iran, Islamic Rep.; Iraq; Kazakhstan; Kuwait; Libya; Myanmar; Nigeria; Norway; Oman; Qatar; Russian Federation; Saudi Arabia; Timor-Leste; Trinidad and Tobago; Turkmenistan; United Arab Emirates; Venezuela, RB; Yemen, Rep.
Commodity importers	
Albania; Antigua and Barbuda; Austria; Bahamas, The; Bangladesh; Barbados; Belarus; Belgium; Bosnia and Herzegovina; Bulgaria; Cambodia; China; Croatia; Cyprus; Czechia; Denmark; Djibouti; Dominica; Dominican Republic; Egypt, Arab Rep.; El Salvador; Estonia; Eswatini; Finland; France; Georgia; Germany; Greece; Grenada; Haiti; Hong Kong SAR, China; Hungary; India; Ireland; Israel; Jamaica; Japan; Jordan; Kiribati; Korea, Rep.; Latvia; Lebanon; Lesotho; Lithuania; Luxembourg; Malaysia; Maldives; Malta; Marshall Islands; Mauritius; Mexico; Micronesia, Fed. Sts.; Moldova; Morocco; Nepal; Netherlands; North Macedonia; Pakistan; Palau; Panama; Philippines; Poland; Portugal; Romania; Samoa; Serbia; Singapore; Slovak Republic; Slovenia; Spain; Sri Lanka; St. Kitts and Nevis; St. Vincent and the Grenadines; Sweden; Switzerland; Syrian Arab Republic; Taiwan, China; Thailand; Tonga; Tunisia; Türkiye; Tuvalu; United Kingdom; United States; Vanuatu; Viet Nam	

Source: World Bank.

TABLE 3.2 Variables for analysis of fiscal policy volatility

Variable	Description	Source
General government revenue	Includes taxes, social contributions, grants receivable, and other revenue	IMF World Economic Outlook (database)
Primary balance	Primary net lending/borrowing is net lending (+)/borrowing (-) plus net interest payable/paid (interest expense minus interest revenue; percent of GDP).	IMF World Economic Outlook (database)
Primary expenditure	Obtained by subtracting interest payments from general government total expenditures. Interest payments are calculated as the difference between the overall fiscal balance and the primary balance (all in percent of GDP)	IMF World Economic Outlook (database) and authors' calculations
Government consumption	General government final consumption expenditure includes all government current expenditures for purchases of goods and services (including compensation of employees) and most expenditures on national defense and security; it excludes government military expenditures that are part of government capital formation	World Development Indicators (World Bank)
Real GDP and real GDP per capita		IMF World Economic Outlook (database)
Political constraints	The Political Constraints Index (POLCON) measures the extent to which policy changes are constrained by institutional and political factors.	POLCON dataset (Henisz 2017)
Control of corruption	A measure of corruption within the political system that poses a threat to foreign investment by distorting the economic and financial environment, reducing the efficiency of government and business by enabling people to assume positions of power through patronage rather than ability, and introducing inherent instability into the political process. Index ranges from 0–6	PRS Group, International Country Risk Guide (ICRG) (database)
Government size	General government total expenditure (percent of GDP)	IMF World Economic Outlook (database)
Investment price	Price level of investment	Penn World Table (database)
Capital account openness	The Chinn-Ito index (KAOPEN) measures a country's degree of capital account openness; available 182 countries from 1970 to 2019.	Chinn and Ito (2006)
Openness	Sum of exports and imports (percent of GDP)	World Integrated Trade Solution (World Bank)
Resource rents	Sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents. The estimates of natural resource rents are calculated as the difference between the price of a commodity and the average cost of producing it	World Development Indicators (World Bank)
Fiscal rules	Covers four types of rules—budget balance, debt, expenditure, and revenue—applying to the central or general government or the public sector	Davoodi et al. (2022)
SWF (sovereign wealth fund)	Dummy variable: "0" if a country does not have a SWF and "1" otherwise	Sovereign Wealth Fund Institute

Source: World Bank.

TABLE 3.3 Correlations between measures of fiscal policy volatility

	Primary expenditures	Revenues	Primary balance	Government consumption
Primary expenditures	1.00			
Revenues	0.74	1.00		
Primary balance	0.64	0.36	1.00	
Government consumption	0.73	0.63	0.34	1.00

Source: World Bank.

Note: Correlations between the standard deviations of residuals obtained from regressing the log-difference of real primary expenditures, log-difference of real revenues, the change in primary balance (percent of GDP), and the log-difference of real consumption on real GDP growth, as specified in equation (3A.1).

TABLE 3.4 Determinants of fiscal policy volatility: Cross-sectional regressions

Dependent variable: Primary expenditure volatility							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EMDE	4.301*** (0.585)	1.156 (0.741)		-2.884** (1.165)	-0.512 (1.111)	0.0491 (1.014)	-1.269 (0.819)
Commodity exporters	3.148*** (0.764)	-0.752 (0.773)		0.619 (0.789)	2.763*** (1.000)	-0.423 (0.834)	0.740 (0.698)
Resource rents		0.307*** (0.073)		0.201*** (0.053)		0.487*** (0.162)	0.370*** (0.063)
GDP per capita		-1.406*** (0.329)		-0.961** (0.388)		0.586 (0.935)	-0.286 (0.618)
Sovereign wealth fund						-0.340 (0.719)	-0.143 (0.603)
Political constraints			-10.50*** (2.121)	-5.480* (2.825)			4.380 (4.356)
Control of corruption			-1.842*** (0.361)	-1.648*** (0.574)			-0.297 (0.322)
Fiscal policy rules					-0.901*** (0.304)	-0.935*** (0.354)	-0.618** (0.270)
Capital account openness					-6.894*** (2.258)	-3.974** (1.532)	-3.874** (1.512)
Exchange rate regime					-4.156*** (0.949)	-3.645*** (1.080)	-2.566*** (0.778)
Constant	3.761*** (0.393)	19.23*** (3.547)	16.49*** (1.254)	23.84*** (4.295)	13.23*** (2.468)	4.469 (9.026)	11.60** (5.414)
Observations	177	175	133	132	93	93	77
R-squared	0.229	0.436	0.422	0.565	0.379	0.643	0.710

Source: World Bank.

Note: EMDE = emerging market and developing economy. Robust standard errors in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively. "EMDE" is a dummy variable that takes the value 1 if a country is classified as an EMDE, and 0 otherwise. "Commodity exporters" is a dummy variable representing whether a country is a commodity exporter or not. "SWF" is a dummy equal to 1 if a country has a sovereign wealth fund, and 0 otherwise.

TABLE 3.5 Determinants of fiscal policy volatility, by type of commodity

Dependent variable: Primary expenditure volatility		
	(1)	(2)
EMDE	1.959** (0.845)	1.158 (0.745)
Agricultural exporters	0.696 (0.977)	-0.0494 (1.020)
Metal exporters	1.635 (1.287)	0.0840 (1.342)
Energy exporters	5.206*** (1.318)	-0.391 (1.184)
GDP per capita	-1.451*** (0.400)	-1.278*** (0.365)
Resources rents		0.298*** (0.082)
Constant	19.47*** (4.345)	17.77*** (3.956)
Observations	175	175
R-squared	0.308	0.434

Source: World Bank.

Note: EMDE = emerging market and developing economy. Robust standard errors in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively. "Agricultural exporters," "metal exporters," and "energy exporters" are dummy variables that take the value 1 if a country is a net exporter of the respective commodity group, and 0 otherwise.

TABLE 3.6 Effects of fiscal policy volatility on GDP per capita growth

Dependent variable: GDP per capita growth				
	(1)	(2)	(3)	(4)
Fiscal policy volatility	-0.0324 (0.050)	-0.122*** (0.022)	-0.124*** (0.038)	-0.0858* (0.045)
Government size		-0.000917 (0.011)	0.00405 (0.012)	0.000317 (0.011)
Initial GDP per capita		-0.603*** (0.123)	-0.701*** (0.125)	-0.687*** (0.118)
Capital account openness		1.138*** (0.282)	1.150*** (0.286)	0.873** (0.347)
Investment price		-1.322*** (0.367)	-1.410*** (0.408)	-1.422*** (0.407)
Commodity exporter				-0.680** (0.315)
Constant	2.191*** (0.413)	8.499*** (1.020)	9.288*** (1.224)	9.512*** (1.142)
Observations	175	161	128	128
R-squared	0.013	0.355	0.400	0.431

Source: World Bank.

Note: Robust standard errors in parentheses. ***, **, and * denote statistical significance at the 1, 5, and 10 percent levels, respectively. Fiscal policy volatility in all specifications is measured using primary expenditures. The estimates in columns (1) and (2) are based on ordinary least squares (OLS) regressions while those in columns (3) and (4) are based on instrumental variables (IV) estimation, using "political constraints" and "control of corruption" as instruments.

References

- Afonso, A., and D. Furceri. 2008. "Government Size, Composition, Volatility and Economic Growth." Working Paper Series 849, European Central Bank, Frankfurt.
- Aghion, P., D. Hemous, and E. Kharroubi. 2014. "Cyclical Fiscal Policy, Credit Constraints, and Industry Growth." *Journal of Monetary Economics* 62 (March): 41–58.
- Aizenman, J., and N. Marion. 1999. "Volatility and Investment: Interpreting Evidence from Developing Countries." *Economica* 66 (262): 157–79.
- Aiyagari, S. R., L. Christiano, and M. Eichenbaum. 1992. "The Output, Employment, and Interest Rate Effects of Government Consumption." *Journal of Monetary Economics* 30 (1): 73–86.
- Alesina, A., F. Campante, and G. Tabellini. 2008. "Why Is Fiscal Policy Often Procyclical?" *Journal of the European Economic Association* 6 (5): 1006–36.
- Al-Hassan, A., S. Brake, M. G. Papaioannou, and M. Skancke. 2018. "Commodity-based Sovereign Wealth Funds: Managing Financial Flows in the Context of the Sovereign Balance Sheet." IMF Working Paper 18/26, International Monetary Fund, Washington, DC.
- Al-Sadiq, A., P. Bejar, and I. Otker. 2021. "Commodity Shocks and Exchange Rate Regimes: Implications for the Caribbean Commodity Exporters." IMF Working Paper 21/104, International Monetary Fund, Washington, DC.
- Alvarez, R., and J. De Gregorio. 2014. "Understanding Differences in Growth Performance in Latin America and Developing Countries between the Asian and the Global Financial Crises." *IMF Economic Review* 62 (4): 494–525.
- "Annual White Paper on the Government Pension Fund," October 2025. Government of Norway. Available at: <https://www.regjeringen.no/en/whats-new/meldingen-om-statens-pensjonsfond-2025/id3097032/>.
- Apeti, A. E., O. Basdevant, and V. Salins. 2023. "Do Fiscal Rules Foster Fiscal Discipline in Resource-Rich Countries?" IMF Working Paper 23/088, International Monetary Fund, Washington, DC.
- Arezki, R., C. A. Pattillo, M. G. Quintyn, and M. Zhu. 2012. *Commodity Price Volatility and Inclusive Growth in Low-Income Countries*. Washington, DC: International Monetary Fund.
- Arroyo Marioli, F., A. Fatás, and G. Vasishtha. 2024. "Fiscal Policy Volatility and Growth in Emerging Markets and Developing Economies." *International Review of Economics and Finance* 92 (April): 758–77.
- Arroyo Marioli, F., and C. A. Végh. 2026. "Fiscal Procyclicality in Commodity Exporting Countries: How Much Does it Pour and Why?" *American Economic Journal: Economic Policy* 18 (May): 309–45.

Badinger, H., and W. H. Reuter. 2017. "The Case for Fiscal Rules." *Economic Modelling* 60 (January): 334–43.

Bank of Botswana (website). Accessed on July 24, 2026. <https://www.bankofbotswana.bw/>.

Barro, R. 1991. "Economic Growth in a Cross Section of Countries." *The Quarterly Journal of Economics* 106 (2): 407–43.

Barro, R., and X. Sala-i-Martin. 2003. *Economic Growth*. Cambridge, MA: MIT Press.

Basdevant, O. 2008. "Are Diamonds Forever? Using the Permanent Income Hypothesis to Analyze Botswana's Reliance on Diamond Revenue." IMF Working Paper 08/80, International Monetary Fund, Washington, DC.

Bauer, A. 2014. "Fiscal Rules for Natural Resource Funds: How to Develop and Operationalize an Appropriate Rule." Policy Brief, Revenue Watch Institute, Vale Columbia Center on Sustainable International Investment, New York.

Bhattacharyya, S., and J. G. Williamson. 2011. "Commodity Price Shocks and the Australian Economy since Federation." *Australian Economic History Review* 51 (2): 150–77.

Bleaney, M., and H. Halland. 2009. "The Resource Curse and Fiscal Policy Volatility." Discussion Paper 09/09, Centre for Research in Economic Development and International Trade, University of Nottingham, Nottingham, U.K.

Blöndal, J. R., I. Hawkesworth, and H.-D. Choi. 2009. "Budgeting in Indonesia." *OECD Journal on Budgeting* 9 (2): 49–79.

Bova, E., N. Carcenac, and M. Guerguil. 2014. "Fiscal Rules and the Procyclicality of Fiscal Policy in the Developing World." IMF Working Paper 14/122, International Monetary Fund, Washington, DC.

Céspedes, L. F., and A. Velasco. 2014. "Was this Time Different? Fiscal Policy in Commodity Republics." *Journal of Development Economics* 106 (C): 92–106.

Chinn, M. D., and H. Ito. 2006. "What Matters for Financial Development? Capital Controls, Institutions, and Interactions." *Journal of Development Economics* 81 (1): 163–92.

Chohan, U. W. 2017. "What Is a Charter of Budget Honesty? The Case of Australia." *Canadian Parliamentary Review* 40 (1): 11–5.

Commonwealth of Australia. 2014. "Charter of Budget Honesty Act 1998." Office of Parliamentary Counsel, Canberra.

Davoodi, H., P. Elger, A. Fotiou, D. Garcia-Macia, A. Lagerborg, R. Lam, and S. Pillai. 2022. "Fiscal Rules Dataset: 1985–2021." International Monetary Fund, Washington, DC.

Debrun, X., and M. Kumar. 2008. "Fiscal Rules, Fiscal Councils and All That: Commitment Devices, Signaling Tools or Smokescreens?" Proceedings of the 9th Banca d'Italia Workshop on Public Finance, Banca d'Italia, Rome.

De Rosa, D., and M. Iooty. 2012. "Are Natural Resources Cursed? An Investigation of the Dynamic Effects of Resource Dependence on Institutional Quality." Policy Research Working Paper 6151, World Bank, Washington, DC.

Fatás, A., and I. Mihov. 2003. "The Case for Restricting Fiscal Policy Discretion." *Quarterly Journal of Economics* 118 (4): 1419–47.

Fatás, A., and I. Mihov. 2007. "Fiscal Discipline, Volatility and Growth." In *Fiscal Policy, Stabilization, and Growth: Prudence or Abstinence?* edited by L. Serven, G. Perry, and R. Suescun, 43–74. Washington, DC: World Bank.

Fatás, A., and I. Mihov. 2013. "Policy Volatility, Institutions, and Economic Growth." *The Review of Economics and Statistics* 95 (2): 362–76.

Fondo de Estabilización Económica y Social (website). Ministerio de Hacienda, Santiago, Chile. Accessed on July 24, 2026. <https://www.hacienda.cl/areas-de-trabajo/finanzas-internacionales/fondos-soberanos/fondo-de-estabilizacion-economica-y-social>.

Frankel, J. A. 2011. "A Solution to Fiscal Procyclicality: The Structural Budget Institutions Pioneered by Chile." NBER Working Paper 16945, National Bureau of Economic Research, Cambridge, MA.

Furceri, D. 2007. "Is Government Expenditure Volatility Harmful for Growth? A Cross-Country Analysis." *Fiscal Studies* 28 (1): 103–20.

Future Fund (website). Australia's Sovereign Wealth Fund, Future Fund Management Agency, Melbourne, Australia. Accessed on July 24, 2026. <https://futurefund.gov.au>.

Henisz, W. J. 2017. *The Political Constraint Index (POLCON) Dataset 2017 Release*. The Wharton School, University of Pennsylvania.

Hnatkovska, V., and N. Loayza. 2003. "Volatility and Growth." Policy Research Working Paper 3184, World Bank, Washington, DC.

Ilzetzki, E., C. M. Reinhart, and K. Rogoff. 2022. "Rethinking Exchange Rate Regimes." In *Handbook of International Economics* 6, edited by G. Gopinath, E. Helpman, and K. Rogoff, 91–145. Amsterdam: Elsevier.

IMF (International Monetary Fund). 2004. *World Economic Outlook*. October. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2009. "Indonesia: Selected Issues." IMF Country Report 09/231, International Monetary Fund, Washington, DC.

- IMF (International Monetary Fund). 2012a. *World Economic Outlook: Commodity Price Swings and Commodity Exporters*. April. Washington, DC: International Monetary Fund.
- IMF (International Monetary Fund). 2012b. “Macroeconomic Policy Frameworks for Resource-Rich Developing Countries.” IMF Background Paper, International Monetary Fund, Washington, DC.
- IMF (International Monetary Fund). 2015. *World Economic Outlook: Adjusting to Lower Commodity Prices*. October. Washington, DC: International Monetary Fund.
- IMF (International Monetary Fund). 2020. “Argentina: Technical Assistance Report—Staff Technical Note on Public Debt Sustainability.” IMF Country Report 20/83, International Monetary Fund, Washington, DC.
- International Country Risk Guide (database). PRS Group. Accessed December 1, 2025. <https://www.prsgroup.com/explore-our-products/international-country-risk-guide/>.
- Isham, J., M. Woolcock, L. Pritchett, and G. Busby. 2005. “The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth.” *World Bank Economic Review* 19 (2): 141–74.
- Izquierdo, A., E. Talvi, L. Catão, E. Cavallo, and A. Powell. 2008. “All That Glitters May Not be Gold: Assessing Latin America’s Recent Macroeconomic Performance.” Research Department, Inter-American Development Bank, Washington, DC.
- Jacks, D. S., K. H. O’Rourke, and J. G. Williamson. 2011. “Commodity Price Volatility and World Market Integration since 1700.” *Review of Economics and Statistics* 93 (3): 800–13.
- Jalles, J. T., C. Mulas-Granados, and J. Tavares. 2016. “Fiscal Discipline and Exchange Rates: Does Politics Matter?” IMF Working Paper 16/230, International Monetary Fund, Washington, DC.
- Jefferis, K. 2016. “Public Finance and Mineral Revenues in Botswana” Technical Report. Waves Partnership Botswana Program.
- Kaminsky, G. L. 2010. “Terms of Trade Shocks and Fiscal Cycles.” NBER Working Paper 15780, National Bureau of Economic Research, Cambridge, MA.
- Kojo, N. C. 2010. “Diamonds are Not Forever: Botswana Medium-Term Fiscal Sustainability.” Policy Research Working Paper 5480, World Bank, Washington, DC.
- Kose, M. A., E. S. Prasad, and M. E. Terrones. 2005. “Growth and Volatility in an Era of Globalization.” *IMF Staff Papers* 52 (Suppl 1): 31–63.
- Lam, R. W., Y. Cao, A. Lagerborg, and A. Scipioni. 2023. “Chile Technical Assistance Report—Fiscal Considerations in Managing Stabilization Funds.” IMF Country Report 23/249, International Monetary Fund, Washington, DC.

- Lane, P. R. 2003. "The Cyclical Behaviour of Fiscal Policy: Evidence from the OECD." *Journal of Public Economics* 87): 2661–75.
- Lensink, R., H. Bo, and E. Sterken. 1999. "Does Uncertainty Affect Economic Growth? An Empirical Analysis." *Review of World Economics* 135 (3): 379–96.
- Markowitz, C. 2020. "Sovereign Wealth Funds in Africa: Taking Stock and Looking Forward." *Occasional Paper 304*, South African Institute of International Affairs, Johannesburg.
- Norges Bank (website). Norges Bank Investment Management, Oslo, Norway. Accessed on July 23, 2026. <https://www.nbim.no/en/>.
- Penn World Table (database). University of Groningen. Accessed September 25, 2025. <https://www.rug.nl/ggdc/productivity/pwt/>.
- Perry, G. E., ed. 2007. *Fiscal Policy, Stabilization, and Growth: Prudence or Abstinence?* Washington, DC: World Bank.
- Ramey, G., and V. A. Ramey. 1995. "Cross-Country Evidence on the Link between Volatility and Growth." *American Economic Review* 85 (5): 1138–51.
- Richaud, C., A. G. M. Galego, F. Ayivodji, S. Matta, and S. Essl. 2019. "Fiscal Vulnerabilities in Commodity Exporting Countries and the Role of Fiscal Policy." MTI Discussion Paper 15, World Bank, Washington DC.
- Sala-i-Martin, X., G. Doppelhofer, and R. Miller. 2004. "Determinants of Long-Term Growth: A Bayesian Averaging of Classical Estimates (BACE) Approach." *American Economic Review* 94 (4): 813–35.
- Talvi, E., and C. A. Végh. 2005. "Tax Base Variability and Procyclical Fiscal Policy in Developing Countries." *Journal of Development Economics* 78 (1): 156–90.
- Timor-Leste Petroleum Fund (website). The Timor-Leste Institute for Development Monitoring and Analysis, Dili, Timor-Leste. Accessed on July 24, 2026. <https://laohamutuk.org/Oil/PetFund/05PFIndex.htm>.
- Tornell, A., and A. Velasco. 2000. "Fixed versus Flexible Exchange Rates: Which Provides More Fiscal Discipline?" *Journal of Monetary Economics* 45 (2): 399–436.
- Végh, C. A., and G. Vuletin. 2014. "The Road to Redemption: Policy Response to Crises in Latin America." *IMF Economic Review* 62 (4): 526–68.
- Velculescu, D. 2008. "Norway's Oil Fund Shows the Way for Wealth Funds." *IMF Survey Magazine* 9: 600–3.
- Vicente, P. C. 2010. "Does Oil Corrupt? Evidence from a Natural Experiment in West Africa." *Journal of Development Economics* 92 (1): 28–38.
- Viñals, J. 2016. "Reaching the 'Great Normalization'—Overcoming Financial Stability Challenges in Advanced and Emerging Economies." Speech at the Reserve Bank of India, Mumbai, India, March 10, 2016.

World Bank. 2009. *Global Economic Prospects: Commodities at the Crossroads*. Washington, DC: World Bank.

World Bank. 2016. *Public Finance and Mineral Revenues in Botswana Technical Report*. Washington, DC: World Bank. Available at <https://www.worldbank.org/en/programs/global-program-on-sustainability>.

World Bank. 2017. “The Republic of Chile: Systematic Country Diagnostic.” World Bank Publications. Washington, DC: World Bank.

World Bank. 2020. *Commodity Markets Outlook: Persistence of Commodity Shocks*. October. Washington, DC: World Bank.

World Bank. 2021. *Timor-Leste Public Expenditure Review: Changing Course Towards Better and More Sustainable Spending*. Washington, DC: World Bank.

World Bank. 2022. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Bank. 2024. “Indonesia’s Fuel Subsidies Reforms.” Equitable Growth, Finance, and Institutions Insight-Finance. Washington, DC: World Bank.

World Bank. 2025. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Development Indicators (database). World Bank. Accessed September 22, 2025. <https://databank.worldbank.org/source/world-development-indicators>.

World Economic Outlook (database). International Monetary Fund. Accessed September 22, 2025. <https://data.imf.org/en/datasets/IMF.RES:WEO>.

World Integrated Trade Solution (WITS) (database). World Bank. Accessed September 22, 2025. <https://wits.worldbank.org>.

Now for developing countries with large reserves, critical minerals represent obviously a critical opportunity. An opportunity to create jobs, to diversify their economies, and to boost revenues.

António Guterres (2024)
Secretary-General, United Nations

CHAPTER 4

The Energy Transition: Fiscal Implications for Commodity Exporters

The energy transition has the potential to fundamentally reshape global commodity markets, shifting demand from fossil fuels toward metals and minerals required for renewable technologies. This chapter examines the fiscal implications of the transition for metal- and oil-exporting emerging market and developing economies (EMDEs). While metal exporters stand to generally benefit from increased metal demand and hence higher export and fiscal revenues, they are likely to face heightened short-run metal price volatility. Meanwhile, fiscal spending in these countries will be shaped in part by fiscal frameworks and institutional quality. For oil-exporting EMDEs, illustrative scenarios reveal potentially diverging revenue paths over the long run, with high-income oil exporters likely to fare better than other EMDEs. Strengthening fiscal policy frameworks and promoting economic diversification will be crucial for navigating the energy transition.

Introduction

The transition away from fossil fuels to low-carbon technologies will cause far-reaching shifts in the patterns of commodity demand and supply. While the trajectory and speed of the transition are uncertain, demand for metals and minerals used in renewable technologies is expected to increase substantially—even in the short run—while the demand for fossil fuels will fall over the medium to long run (World Bank 2017, 2023b). These shifts could have significant fiscal and macroeconomic consequences for emerging market and developing economies (EMDEs), as fossil fuels are a critical source of government revenue for many of these economies. In commodity-exporting EMDEs, rents (that is, excess market value on top of all types of production costs in the resource sector) from oil, natural gas, and coal in 2021 averaged about 8 percent, 3 percent, and 1 percent of GDP, respectively.¹ Besides taxes on profits of oil companies and dividends, consumer fuel taxes are also prevalent, comprising a significant source of government revenue in some countries (Laan and Maino 2022). As the transition to a low-carbon energy future proceeds, resource revenue over the medium to long term in fossil-fuel-producing countries will fall due to lower demand and output, and possibly lower prices (Carbon Tracker Initiative 2021; IEA 2023).

In contrast, the transition to a low-carbon economy will require large quantities of metals and minerals, presenting opportunities for countries producing these commodi-

Note: This chapter was prepared by Mathilde Lebrand and Garima Vasishtha, with contributions from Francisco Arroyo Marioli and Paola D'Orazio.

¹ An economy is classified as a commodity exporter if, on average in 2017–19, either its combined exports of all commodities accounted for 30 percent or more of its total exports or its exports of any single commodity accounted for 20 percent or more of its total exports (World Bank 2025). Economies are excluded if they reached either threshold only because of re-exports.

ties (World Bank 2017, 2023b). This demand for minerals is tied to the higher mineral intensity of renewable energy technologies compared with fossil fuel-based energy generation and transport. For example, electric vehicles require about six times more minerals than traditional internal combustion vehicles (IEA 2021). The mineral intensity of clean energy generation is even greater—for every megawatt of electricity produced, offshore wind requires nine times more minerals than natural gas and eight times more than coal.

Between 2015 and 2025, clean-energy investment, including in renewable power and electric vehicles, increased by nearly 80 percent, from \$1,210 billion to an estimated \$2,155 billion (figure 4.1.A). A continuation of this trend will further increase the demand for critical metals and minerals (World Bank 2023a). For instance, in a scenario meeting net-zero greenhouse gas emissions by 2050, the total demand for critical metals and minerals used in zero-carbon technologies could increase by seven times between 2021 and 2040 (Miller et al. 2023). As an indicator, between 2000 and 2024, the global consumption of metals as a share of total commodity consumption increased considerably, especially for copper, nickel, and lead, while the corresponding shares of oil and natural gas consumption declined (figure 4.1.B). For some metals, notably cobalt, lithium, and nickel, clean energy generation has been one of the main drivers of the increase in demand in recent years (figure 4.1.C).

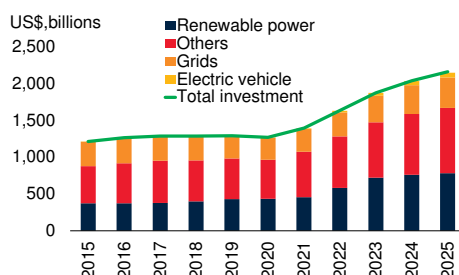
Significant investments have been made in the critical metals and minerals sector in recent years, leading to an expansion in global production (World Bank 2023b). Nevertheless, supply bottlenecks for these minerals in the short to medium term, especially due to the long lead times required to operationalize new mining projects, could put substantial upward pressure on their prices. For instance, the timeframe from discovery to the commencement of production of critical metals (such as copper, lithium, and nickel) ranges from 4 to 20 years, depending on the commodity type, regulatory frameworks, deposit characteristics, and the mining and processing methods employed (figure 4.1.D). In addition, many critical minerals are thinly traded, with low pricing transparency and liquidity, often resulting in substantial price fluctuations. Heightened geopolitical tensions could also exacerbate price volatility given that mining and processing capacity for critical metals and minerals is much more concentrated geographically than that for fossil fuels. Therefore, while the potential surge in demand for critical metals used in green technologies creates substantial revenue opportunities for EMDEs exporting these resources, it concurrently exposes these countries to fiscal risks arising from the inherent volatility of metal prices.

Many commodity-exporting EMDEs are already facing significant fiscal challenges, with fiscal positions weaker than before the prolonged commodity price slump of 2014–16. For instance, debt-to-GDP ratios in 2025 were higher than a decade ago in about 83 percent of metal exporters and 91 percent of energy exporters, compared to about 64 percent of commodity importers (figure 4.2.A). Likewise, fiscal balances (as a percent of GDP) in 2025 were weaker than a decade ago in about 62 percent of metal exporters and 69 percent of energy exporters, compared with about 48 percent of commodity

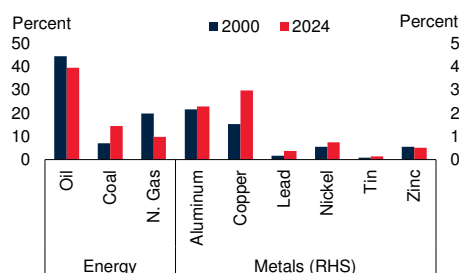
FIGURE 4.1 Clean energy investment and commodity consumption and production

Clean energy investment has risen significantly in recent years, mostly in sectors that are metal-intensive. While the share of oil and natural gas in total commodity consumption has decreased since the turn of the century, the shares of metals such as copper, lead, and nickel have increased. Clean energy has been one of the main drivers of the increase in demand for some minerals. Mineral supply might take time to increase due to large production lead times.

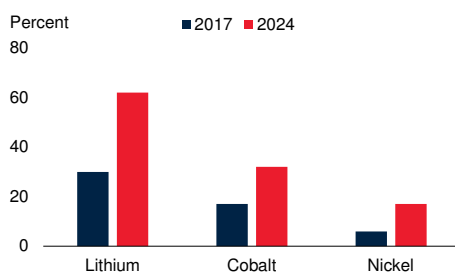
A. Global clean energy investment



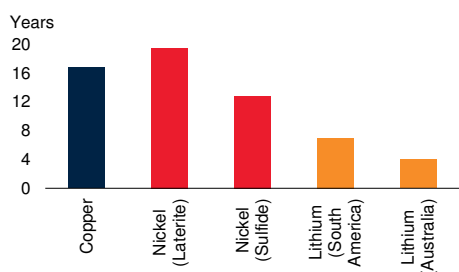
B. Share of global commodity consumption



C. Share of clean energy in demand for selected minerals



D. Discovery-to-production lead times for selected minerals



Sources: International Energy Agency (IEA); Refinitiv (database); The Energy Institute; World Bank (2021, 2023a).

A. Investment for 2025 is based on estimated values. "Others" includes clean fuels; direct air capture; nuclear; fossil fuels with carbon capture, utilization, and storage (CCUS); other clean power; and end-use. Data are based on IEA (2025a).

B. Value of commodity consumption calculated as the product of the volume of energy and metal consumption and their respective prices. Prices are from the World Bank's Pink Sheet. "Metals" refers to the value of refined metals only.

C. Bars indicate the share of clean energy in total mineral demand.

D. Bars show the global average duration from discovery to production for selected minerals. Data are from 2010 to 2019.

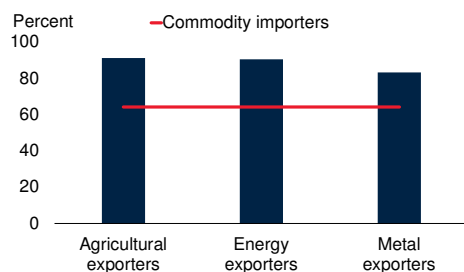
importers (figure 4.2.B). In this context, metal exporters will need to manage the short-term fiscal risks from price swings alongside adopting prudent policies to invest the increased revenues to promote sustainable growth.

Against this backdrop, this chapter analyzes the short- and long-run fiscal implications of the energy transition for commodity-exporting EMDEs. The most immediate effects are likely to fall on metal exporters, as the early stages of the transition create a potentially significant surge in demand for the metals and minerals needed for low-carbon technologies—from electric vehicle batteries to renewable energy grids. Over time,

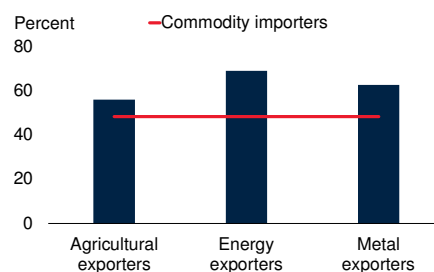
FIGURE 4.2 Debt and fiscal balances in commodity exporters

Over four-fifths of commodity-exporting EMDEs have higher debt levels than before the 2014–16 commodity price slump, compared with 64 percent of commodity importers. Most agriculture, energy, and metal exporters have weaker fiscal balances than in 2013.

A. Share of EMDE commodity exporters with higher debt-to-GDP ratio than in 2013



B. Share of EMDE commodity exporters with weaker fiscal balance than in 2013



Sources: Kose et al. (2017; updated in Spring 2026); World Bank.

Note: Panels show the share of EMDEs in each country group in 2025 with higher government debt-to-GDP ratios (panel A) and weaker fiscal balances as percent of GDP (panel B) compared to 2013.

however, this initial surge is likely to give way to a more moderate and stable demand. Nonetheless, these alternative energy sources are not anticipated to fully replace fossil fuels in the short run. Demand for oil is projected to continue growing in the near term, peaking only toward the end of the current decade, before entering a sustained structural decline (IEA 2025b). This asymmetry in timing—with metal exporters facing more immediate revenue opportunities and fiscal risks, and fossil fuel exporters confronting a longer but likely ultimately more disruptive transition—shapes the analytical framework of this chapter.

This chapter addresses the following questions:

- How do metal price shocks affect fiscal revenue and expenditure in metal-exporting EMDEs over the short run?
- How do these effects depend on country characteristics, including fiscal policy regimes and frameworks?
- How is the energy transition likely to impact government revenues in oil-exporting EMDEs over the longer run?

Contribution to the literature

The chapter makes three main contributions to the literature. *First*, the chapter offers a novel analysis of the impacts of metal price shocks on fiscal revenue and expenditure for metal exporters, using a newly constructed country-specific metal price index. While a significant body of research has examined the impact of oil price shocks on the global

economy, as well as on oil exporters and oil importers separately, cross-country studies on the impact of metal price shocks remain relatively scarce.² Understanding how metal price shocks affect fiscal positions is both timely and policy-relevant as the energy transition drives a substantial increase in demand for critical metals and minerals, raising concerns about supply reliability and price volatility. The chapter also examines how the effects of metal price shocks depend on country characteristics, including policy frameworks.

Second, the chapter complements the short-run analysis of metal price shocks—the horizon over which cyclical price fluctuations primarily manifest—with an assessment of the potential longer-run fiscal impacts of the energy transition on oil exporters. As noted above, a longer horizon is particularly relevant for oil exporters given that the energy transition represents a structural, permanent shift in fossil fuel demand. The chapter presents some illustrative pathways for fiscal revenues in major oil-exporting EMDEs related to the phasing out of fossil fuels, based on scenarios developed by the International Energy Agency (IEA 2025b).

Finally, it presents a detailed review of the literature on fiscal risks in fossil fuel exporters from the energy transition. A synthesis of the recent literature offers a broader perspective on fiscal risks beyond the direct impact on fiscal revenues and helps identify policy priorities for fossil fuel-exporting EMDEs.

Main findings

This chapter offers the following main findings.

A positive country-specific metal price shock leads to an increase in median real fiscal revenues in metal exporters, while median real fiscal expenditures remain little changed. A 1 percent increase in the metal price index is accompanied by a 0.58 percent cumulative increase in fiscal revenues after 10 quarters, the horizon at which the cumulative response peaks. In contrast, the median impact on fiscal expenditures is negligible. The median responses, however, mask substantial variation across countries. Moreover, expenditure responses display wider dispersion across countries compared with revenue responses.

The varying expenditure responses to metal price shocks across metal exporters partly reflect the presence and design of fiscal rules. For example, the conduct of fiscal policy in periods of similar commodity price increases differs between Peru and Chile—both major copper

² Exceptions include World Bank (2022a), which identifies the drivers of metal price swings and estimates how output in metal exporters and importers responds to metal price shocks. Previous studies on the responses of fiscal policy have focused on oil price shocks in certain countries or regions or on shocks to commodity price indexes (as opposed to commodity-specific price shocks). For country-specific analysis on the impact of oil price shocks on fiscal policy, refer to Al Jabri, Raghavan, and Vespignani (2022); Hoang and Nguyen (2018); Khadan (2017); and Sohag et al. (2022). Medina (2016) studies the impact of commodity price fluctuations on fiscal policy in commodity-exporting countries in Latin America, while Kumah and Matovu (2007) do so for four countries of the Commonwealth of Independent States (Kazakhstan, the Kyrgyz Republic, Russia, and Tajikistan).

exporters. While metal price fluctuations have roughly 40 percent stronger effects on fiscal revenue in Chile, their effects on fiscal expenditure are about half as large.

Illustrative scenarios indicate that the impact of the energy transition on oil exporters over the long run is likely to vary substantially across countries. Scenario analysis, comparing projected fiscal revenues with their prepandemic levels, suggests that high-income oil exporters are projected to fare better, on average, than lower-middle-income and low-income oil exporters. High-income countries—with more diversified economies, stronger technological and infrastructural capabilities, and greater financial resilience—are likely to be better equipped to adapt to falling global oil demand. Their capacity to attract investment in various sectors, including renewables, could help partly offset declining fossil fuel revenues.

A comprehensive review of the literature on fiscal risks in fossil fuel exporters from the energy transition supports a multipronged policy agenda. Key elements include embedding transition scenarios in medium-term fiscal frameworks; strengthening fiscal frameworks and building fiscal buffers; managing SOE-related contingent liabilities and decommissioning risks; and developing alternative revenue streams to offset fossil fuel tax base erosion while safeguarding equity and macroeconomic stability.

Metal price changes and fiscal revenues in metal producers

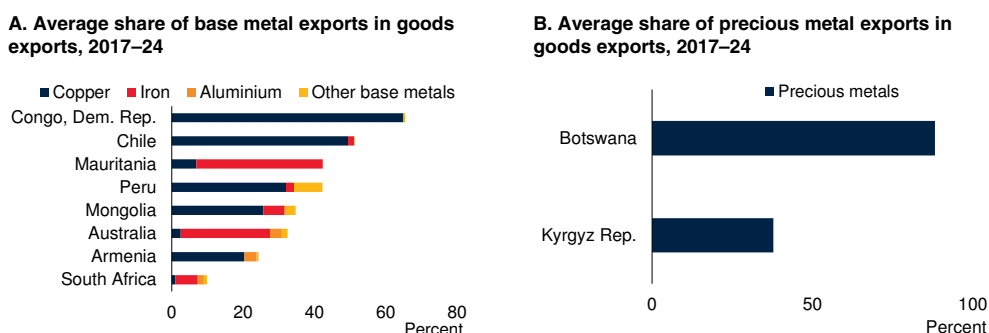
Metal exporters tend to be less reliant on metals than oil exporters are on oil, on average (chapter 1). Over 2017–24, the average share of base metal exports in total goods exports for metal exporters ranged from 35 percent to 65 percent (figure 4.3.A). Among base-metal exporting economies, copper exporters exhibit the highest level of commodity dependence, followed by aluminum exporters (World Bank 2023b). For example, copper is the major base metal export commodity for Armenia, Chile, the Democratic Republic of Congo, Mongolia, and Peru. Aluminum is a significant export for Armenia and South Africa. Other metals, including cobalt and titanium, are main exports for the Democratic Republic of Congo. Botswana and the Kyrgyz Republic rely heavily on precious metals, such as gold, and diamonds (figure 4.3.B).³

The share of resource revenues in fiscal revenues also varies considerably across oil and metal exporters, with metal exporters generally less dependent on resource revenues than oil exporters (chapter 1). On average, resource revenues account for about 53 percent of total fiscal revenues for oil exporters compared with about 14 percent for metal exporters. This is partly because of the lower marginal cost of extracting and processing oil (which translates into higher economic rents) and specific fiscal regimes, such as joint production agreements. Rents from metals and minerals, on the other hand, are

³ While Botswana and the Kyrgyz Republic are currently major exporters of precious metals, they are also prospective producers of some energy-transition metals.

FIGURE 4.3 Export shares of metals in metal-exporting economies

Some metal exporters are highly dependent on metals. The share of metal exports in total goods exports ranges from 10 percent to 88 percent.



Sources: UN Comtrade; World Bank; World Integrated Trade Solution (WITS; database).

A. Panel shows the average share of exports of base metals (aluminum, copper, iron, lead, nickel, tin, and zinc) in goods exports over 2017–24. Base metals include metals from the Standard International Trade Classification (SITC) Rev3 categories 28 and 68.

B. Panel shows the average share of exports of precious metals (gold and diamond) in goods exports over 2017–24.

comparatively smaller on account of higher marginal costs associated with extraction and processing (Baunsgaard 2001).

Fiscal revenues

Mining revenues can be a critical source of government income in some economies, particularly because the sector tends to have limited connections to the broader domestic economy, with few upstream and downstream linkages. Mining involves extracting finite, state-owned mineral resources, requiring substantial upfront capital investment that only generates returns over a long period of time. The mining sector is also subject to uncertainty, including that related to the quality of mineral deposits, extraction costs, and future commodity prices (Born, Heerwig, and Steel 2023). In this context, governments in metal-producing countries typically establish fiscal regimes tailored specifically to the mining sector.

Mining fiscal regimes vary widely across countries in structure, choice of fiscal instruments, and the way fiscal instruments interact with each other (Benninger et al. 2024). At a conceptual level, fluctuations in metal prices affect fiscal revenues through several direct and indirect channels, ranging from immediate royalty collections to long-term corporate tax receipts.

Direct revenue channels

Royalties and taxes. The direct impact on fiscal revenue derives from fluctuations in tax revenue and dividends resulting from changes in commodity exports. Most countries levy ad valorem royalties, which are charged as a percentage of the sales value. These are highly sensitive to price changes—a surge in global metal prices leads to an immediate increase in government receipts.

Fluctuations in metal prices also impact revenues derived from corporate income taxes and resource rent taxes. Because corporate income tax is levied on profits, a drop in metal prices can reduce the tax base considerably, especially since mining projects often have high operating costs and significant debt interest deductions. In capital-intensive sectors like copper or nickel, recovering large upfront investment costs often delays the payment of corporate income tax for years, making revenues in the early phases of a mine's life cycle particularly vulnerable to price troughs.

State participation and dividends. Governments often retain equity stakes in mining operations or receive revenues through state-owned enterprises (SOEs). In such cases, commodity price booms can raise fiscal revenues through higher dividends and profit-based transfers to the budget. However, the fiscal implications of state participation are not unambiguously positive. Country experiences suggest that state ownership in mining does not always translate into sustained fiscal gains. In environments characterized by governance weaknesses, operational inefficiencies, and high commodity price volatility, SOEs can become a source of fiscal pressure rather than revenue. This underscores the importance of strong institutional frameworks and transparent management in realizing the potential benefits of state participation (Maur et al. 2022).

Indirect revenue channels

Tax base effects. Metal price increases can stimulate upstream and downstream economic activity and boost wages in mining regions, expanding the base for personal and corporate income taxes. Moreover, higher incomes from mining boost consumption, expanding indirect tax bases, such as value-added taxes and trade taxes. However, the potential exchange rate appreciation from stronger export earnings may erode the local-currency value of certain tax bases, particularly royalties, export levies, and profit-based taxes on mining revenues denominated in foreign currency. Currency appreciation can also weigh on non-mining tradeable sectors by eroding their competitiveness, compressing the broader corporate and personal income tax bases over time.

Beyond these direct and indirect impacts, commodity revenues can put large fiscal resources at the disposal of governments and fuel an economic boom. This can boost revenues further as resource rents spur growth by financing public investment, encouraging consumption, and creating incentives for private investment.

Fiscal impacts of metal price shocks

This section examines how metal price shocks affect government revenues and expenditures in metal-exporting countries. Country-specific structural vector autoregression (SVAR) models are estimated using metal price indexes tailored to each country's export composition, allowing for a more nuanced examination of changes in metal prices across metal exporters. The linear framework assumes symmetric fiscal responses to price increases and declines, so results should be interpreted as average dynamic effects rather than a distinction between price surges and slumps.

Methodology and data

Methodology. To assess the impact of metal price shocks on fiscal revenues and expenditures, country-specific SVAR models are estimated for a sample of 11 metal-exporting economies spanning different levels of development.⁴ The sample includes 10 EMDEs as well as Australia, which is included as a benchmark advanced economy metal exporter.⁵ Despite its high-income level, Australia is one of the world's largest metal exporters and shares significant commodity exposure with the EMDEs in the sample. To provide a comparison, SVAR models are also estimated for non-metal-exporting economies, including 29 EMDEs and 10 advanced economies. The inclusion of both advanced economies and EMDEs in each group—metal exporters and non-exporters alike—helps limit the extent to which differences in fiscal responses across country groups could be driven by income level or institutional quality rather than dependence on metal exports.

The SVAR model includes the change in the log real metal price index, change in log real GDP, real fiscal revenues, and real fiscal expenditures as endogenous variables (annex 4A provides details). Control variables include real interest rates and an index of global real economic activity. The model is estimated using quarterly data with samples differing across countries depending on data availability (table 4A.1).

Metal price index calculation. The metal prices included in the SVARs are country-specific metal price indexes. For each country, the index is constructed to reflect its mix of different metals in total metal exports.⁶ The index is built by weighing the metal price data from the World Bank Commodities Price Data (the “Pink Sheet”) with the average metal export shares for each metal-exporting country in the sample. Details about the construction of the index as well as the data sources are provided in annex 4A. The country-specific metal price indexes are highly correlated but also differ across countries, especially for those that are dependent on exports of gold and diamonds.

Impact of metal price shocks

Impulse response analysis

Overall, median real fiscal revenues increase after a positive metal price shock, while fiscal expenditures remain little changed. A 1 percent increase in the metal price index is accompanied by a 0.1 percent increase in real fiscal revenues after a quarter and a 0.58 percent increase over 10 quarters for the median metal exporter (figure 4.4.A). The

⁴ Countries are classified as metal exporters based on the criteria used in World Bank (2021). For four of the six base metals, the largest exporter of the metal was not classified as a metal exporter either because its economy was highly diversified or because the value of the exported metal was small compared with its other exports. For example, Indonesia accounted for one-third of global tin exports in 2019, but these made up less than 1 percent of the country's total goods exports that year. Similarly, the Russian Federation accounted for around one-quarter of global nickel exports in 2019, but these accounted for just over 1 percent of Russia's total exports.

⁵ The sample size is restricted by the availability of data at quarterly frequency.

⁶ As a robustness check, the analysis was also done using the mix of base and precious metals to construct the metal index as reported in annex 4A. The results are similar across the two approaches.

impact on fiscal expenditures for the median metal exporter is very small (figure 4.4.B). The impact of the metal price shock on non-metal exporters is also very small. Since GDP growth is included in the SVAR model as an endogenous variable, these results incorporate both the direct and indirect effects of a commodity shock that could increase not only commodity revenues but also income.

The median responses, however, mask substantial variation across metal exporters, with the immediate impact on revenues ranging from 0.41 percent to nearly zero across the sample. Real fiscal revenues tend to increase in almost all countries following a positive metal price shock, with the magnitude of the response correlated with the degree of dependence on metal exports and the structure of the fiscal regime (figure 4.4.C). The estimated revenue responses are the largest for Kosovo and Mauritania—both small, highly commodity-dependent economies where metals account for a dominant share of exports. In Kosovo, a metal price shock can affect government revenues through multiple channels. Kosovo’s tax system relies heavily on income and consumption taxes, particularly value-added tax (VAT), making revenues sensitive to changes in domestic demand (IMF 2023). At the same time, a narrow base of large formal firms implies that adverse shocks to the metals sector can materially reduce corporate income tax receipts. Lower wages and reduced payments to domestic suppliers would further weaken household consumption, feeding back into lower VAT collection. Finally, employment adjustments in a large, formal employer—where jobs tend to be relatively well paid—would reduce personal income tax and social contribution revenues. In Mauritania, iron ore production is dominated by the state-owned company SNIM, which channels mining revenues to the government through a dedicated fiscal regime combining a specific mining tax, corporate income tax, and dividend transfers. As a result, a sharp decline in iron ore prices simultaneously compresses all three revenue streams (IMF 2024).

The impact on revenues is also substantial in Chile, where copper revenues—generated through a combination of royalties, corporate taxes, and profit transfers—are highly sensitive to copper price movements. In contrast, the response is more muted in Armenia, Australia, and South Africa, likely reflecting greater economic diversification and a broader revenue base that limits the pass-through from metal prices to total fiscal revenues.

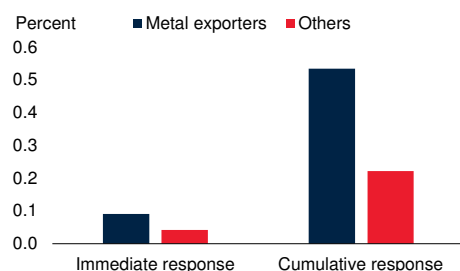
The response of real fiscal expenditures to metal price shocks shows wider dispersion across countries than the revenue response, likely reflecting differences in fiscal frameworks and institutional capacity to manage commodity windfalls (figure 4.4.D). In some countries, including the Kyrgyz Republic, Peru, and South Africa, expenditures rise significantly following a price increase, indicating a tendency for fiscal policy to move with the cycle, as governments expand spending in response to revenue windfalls rather than saving them.⁷ At the other end of the spectrum, expenditures decline or

⁷ In South Africa, the National Treasury adopted a more disciplined fiscal stance in the post-pandemic period, using windfall revenues from the 2022 boom in coal and gold prices, and the 2025 surge in gold prices to reduce the deficit and debt accumulation rather than increase spending.

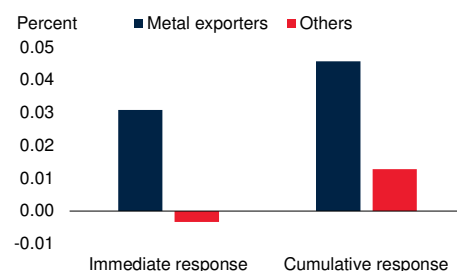
FIGURE 4.4 Impact of metal price shocks on fiscal revenue and expenditure

Overall, median fiscal revenues in metal exporters increase after a positive shock to metal prices, while fiscal spending is little changed. However, the impacts differ substantially across countries. Moreover, expenditure responses display wider dispersion across countries compared with the revenue responses.

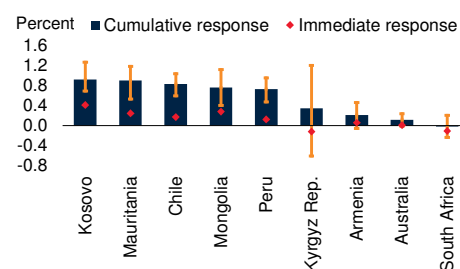
A. Median impacts of a metal price shock on fiscal revenue



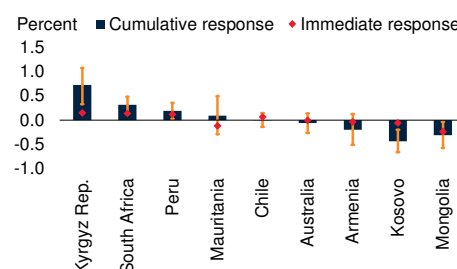
B. Median impacts of a metal price shock on fiscal expenditure



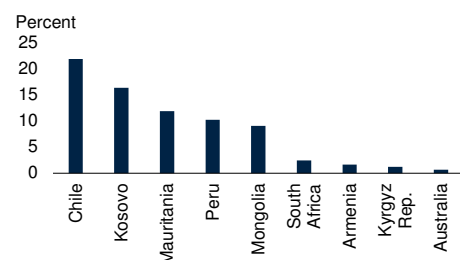
C. Impacts of a metal price shock on fiscal revenue for metal exporters



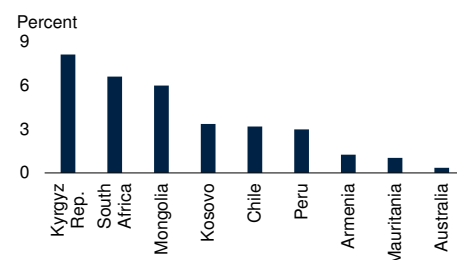
D. Impacts of a metal price shock on fiscal expenditure for metal exporters



E. Impacts of a metal price shock on fiscal revenues: Variance decomposition



F. Impacts of a metal price shock on fiscal expenditures: Variance decomposition



Source: World Bank.

Note: Results for Botswana are not reported.

A.B. Panels show the median impact of a 1 percent increase in the country-specific metal price index based on the SVAR methodology. "Immediate response" refers to the response after one quarter. "Cumulative response" is the impact over 10 quarters.

C.D. Panels show the impact of a 1 percent increase in the country-specific metal price index for each metal exporter. Orange lines represent the 66 percent confidence interval.

E.F. Panels show forecast error variance decomposition attributed to metal price changes over 10 quarters.

remain flat in Armenia, Australia, Chile, Kosovo, Mauritania, and Mongolia. This pattern is consistent with the presence of fiscal rules or stabilization mechanisms that constrain spending during commodity booms. However, the underlying drivers likely differ across this group. Australia and Chile have well-established fiscal frameworks while fiscal space is more constrained in Mauritania.⁸

Overall, the comparison of country-specific results presented here should be interpreted with caution given the variation in fiscal regimes and export structures of countries. For example, coal exports for Mongolia accounted for more than half of government mining revenues over 2011–24 but are not captured in the analysis. The muted expenditure response may therefore reflect partial commodity revenue coverage rather than effective fiscal restraint. Another caveat, which applies more broadly, is that quasi-fiscal spending is not captured in the fiscal aggregates used here. In Mongolia, such spending was particularly elevated over the sample period, and this may hold for other countries as well. Expenditure responses may therefore understate the true fiscal impulse. Overall, the responses of revenues and expenditures are broadly in line with previous studies (for example, Medina 2016).

Forecast error variance decomposition

The variance decomposition of forecast errors quantifies the contribution of metal price shocks to fluctuations in fiscal revenues and expenditures. Results indicate that metal price variability contributes significantly to fluctuations in fiscal revenues, accounting for between 1 and 22 percent of the observed variation across the sample (figure 4.4.E). The role of metal price shocks in shaping fluctuations in fiscal expenditures is relatively smaller, ranging between 1 and 8 percent of the observed variation (figure 4.4.F).⁹ Fiscal revenues in Chile and Kosovo comove most strongly with metal prices, reflecting their high degree of commodity dependence.¹⁰ By comparison, fiscal revenues and expenditures in Australia vary the least with metal price fluctuations, consistent with its more diversified economic and revenue base.

Heterogeneity in fiscal responses

Countries with a larger share of tradable goods in their production and those exporting mostly commodities tend to be more exposed to international price fluctuations (Kohn, Leibovici, and Tretvoll 2021). In commodity exporters, an increase in the relative price of commodities raises the price of exports, reducing the relative price of imported goods.

⁸ Country case studies of Australia and Chile presented in chapter 3 are consistent with these results.

⁹ Results are not reported for the Democratic Republic of Congo. The forecast error variance decomposition attributes 73 percent of the observed variation in fiscal revenue fluctuations and 5 percent of the observed variation in fiscal expenditure fluctuations to metal price shocks. The Democratic Republic of Congo's fiscal revenue fluctuates the most with metal prices. The country is Africa's largest producer of copper and the world's largest producer of cobalt, a strategic metal used in battery manufacture. But the validity of the estimates might suffer from the limited coverage of the data.

¹⁰ Export dependence on metals in the case of Kosovo was historically associated with the ferronickel sector, with the performance of a single company often determining the metals export trend, although there has been some diversification of exports from 2021 onward.

This results in a positive wealth effect that boosts economic activity. In contrast, in countries that export more manufactured goods and have large service sectors, an increase in the relative price of commodities does not generate the same wealth effect, as the increase in the value of domestically produced commodities is largely offset by higher costs of consuming them. This notion is supported by the heterogeneity in responses of fiscal revenues across countries. The cumulative impacts of metal price shocks on revenues are highly correlated with the share of metals in total exports (figure 4.5.A). No such correlation is found for expenditure responses, suggesting that factors beyond commodity dependence, such as fiscal frameworks and institutional capacity, likely play a greater role in shaping spending behavior (figure 4.5.B). This pattern is also reflected in the variance decomposition results, which show that metal price shocks explain a larger share of revenue fluctuations in more metal-dependent exporters, while no systematic relationship is observed for expenditure fluctuations (figures 4.5.C and 4.5.D).

The presence and design of fiscal rules can partly help explain the varying expenditure responses to commodity price shocks across countries. Fiscal rules are effective in achieving better fiscal outcomes, including reducing procyclicality, when they are well designed and accompanied by strong institutions (chapter 2). Government expenditures in countries with fiscal rules respond less to commodity price shocks (for example, Medina 2016). Moreover, studies find that fiscal rules help curb government consumption growth while leaving public investment largely unaffected (Vinturis 2023). By promoting predictability, fiscal rules can also reduce spending volatility (Cordes, Kinda, and Muthooru 2015; Mendoza Bellido et al. 2021). The results of the SVAR analysis for Australia and Chile—two countries often cited as examples of relatively successful fiscal frameworks—are consistent with these insights.

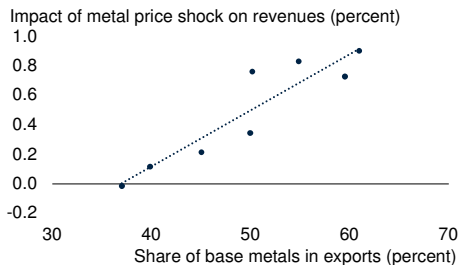
Country examples. The SVAR framework is used to compare the responses of fiscal revenue and expenditure to positive metal price shocks in Chile and Peru, both major copper-exporting economies. The estimation samples differ across the two countries due to data availability: the sample for Chile begins in 2004, whereas the sample for Peru extends to 1996, thereby capturing part of Peru's post-hyperinflation transition rather than a fully comparable macroeconomic environment. This distinction is relevant because Chile had undertaken major structural and fiscal reforms roughly a decade earlier. Despite these differences in samples, the responses of fiscal policy to a positive commodity price shock in Chile and Peru demonstrate notable differences. The response of fiscal revenue in Chile to a 1-percent increase in the country-specific metal price index is about 40 percent higher than that in Peru (figures 4.6.A and 4.6.B). However, the corresponding increase in fiscal expenditure is only about half as large. These differences are consistent with the role of fiscal frameworks and institutional quality in shaping the transmission of commodity price shocks to fiscal outcomes.

Chile is often cited as an example of the critical role strong institutional foundations play in the success of fiscal rules. Chile's structural balance rule, adopted in 2001, is supported by robust public institutions, characterized by a transparent approach as well

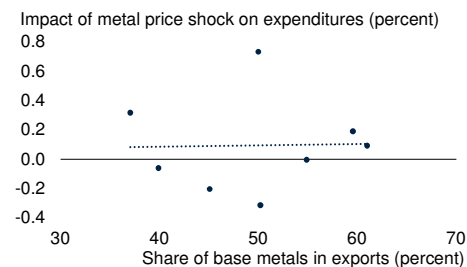
FIGURE 4.5 Commodity dependence in metal exporters and impact on fiscal revenue and expenditure

The share of base metals in total exports varies considerably across metal exporters. A metal price shock tends to have a larger impact on revenues in countries that are more dependent on metal exports. There is, however, no clear relationship between dependence on metal exports and the impact of metal price shocks on fiscal expenditures.

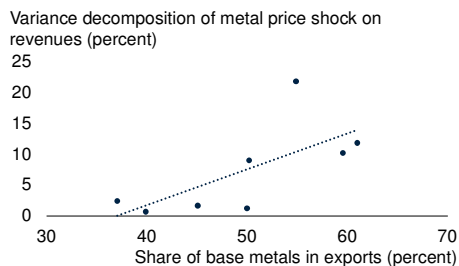
A. Share of base metals in exports and impact of a metal price shock on revenues



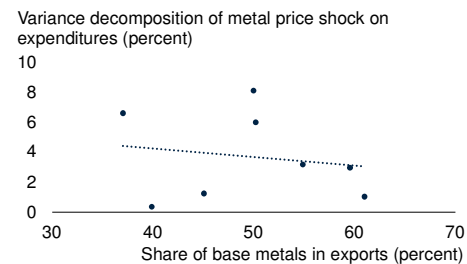
B. Share of base metals in exports and impact of a metal price shock on expenditures



C. Share of base metals in exports and variance decomposition of a metal price shock on revenue



D. Share of base metals in exports and variance decomposition of a metal price shock on expenditures



Source: World Bank.

Note: The x-axis represents the average share of base metals in total exports over 2017–24. The results for Botswana and Kosovo are not reported. Each dot represents one country observation.

A.B. The y-axis shows the cumulative impact of a metal price shock on revenues (panel A) and expenditures (panel B), using the SVAR model.

C.D. The y-axis shows the forecast error variance decomposition of a metal price shock on revenues (panel C) and expenditures (panel D), based on the SVAR model.

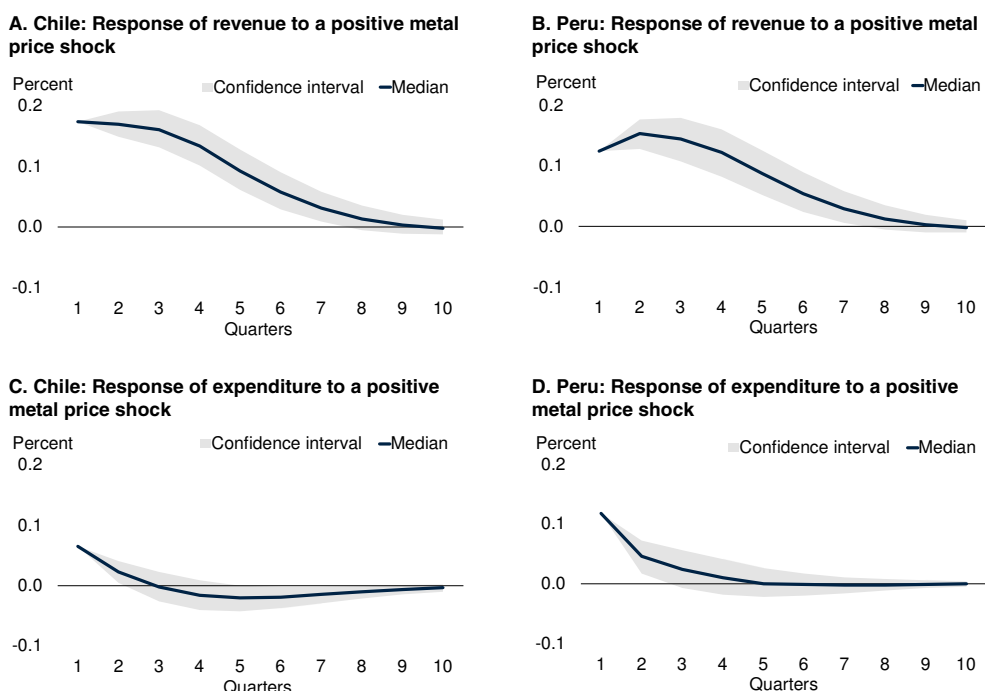
as independent expert committees for estimating potential GDP and long-run copper prices (chapter 3). Peru implemented a fiscal deficit ceiling in 1999 along with a stabilization fund (Vtyurina 2015). It has subsequently adjusted its fiscal rules several times, with a compliance rate of 30 percent for revenue rules and 45 percent for expenditure rules (Mendoza Bellido et al. 2021).

Long-run fiscal implications of the energy transition for oil exporters

The preceding analysis focuses on the impact of metal price shocks on fiscal revenues and expenditures in metal exporters in the short run. Along with the impacts of short-

FIGURE 4.6 Responses of fiscal revenue and expenditure to a metal price shock: Country examples

The conduct of fiscal policy in periods of similar commodity price increases differs between Peru and Chile, both major copper exporters. While metal price fluctuations have roughly 40 percent stronger effects on fiscal revenue in Chile, their effects on fiscal expenditure are about half as large.



Source: World Bank.

Note: The shaded area represents the 66 percent confidence interval.

A.B. Panels show the median response of fiscal revenues to a 1 percent increase in the country-specific metal price index over 10 quarters for Chile (panel A) and Peru (panel B), based on the SVAR model.

C.D. Panels show the median response of fiscal expenditures to a 1 percent increase in the country-specific metal price index over 10 quarters for Chile (panel C) and Peru (panel D), based on the SVAR model.

run fluctuations in metal prices, the energy transition also represents a structural economic shift that could potentially alter growth prospects for metal and oil exporters over the long run. Several studies—with varying focus and scope—estimate future demand for metals and minerals under different transition scenarios. These include reports by the IEA (IEA 2021), the World Bank (World Bank 2020), and the SET-Plan scenarios developed by the European Union (Kuzov et al. 2022; Moss et al. 2013). These studies, however, focus only on specific sectors, such as electrical generation technologies or electric vehicles, or on specific materials (Miller et al. 2023). While some studies include a range of technologies (Blagoeva et al. 2016; Månberger and Stenqvist 2018), only a few conduct a comprehensive assessment with all currently known technologies and subtechnologies relevant for the transition.¹¹ The different approaches

¹¹ Exceptions include World Bank (2020) and IEA (2021).

used in these studies highlight the trade-off between a broader inclusion of technologies and the need for greater assumptions on innovation, development, and substitution (Miller et al. 2023).

Importantly, studies examining the fiscal, or broader macroeconomic, implications of the energy transition for exporters of energy transition metals and minerals are relatively scant. The lack of relevant data and scenarios at the country level poses significant challenges in conducting such an exercise. In light of these issues, this section complements the preceding analysis of metal exporters in the short run by examining the potential consequences for resource revenues in major oil-exporting EMDEs from phasing out fossil fuels in the long run. Oil exporters tend to rely heavily on oil for fiscal and export revenues and so are potentially more vulnerable to future slowdowns in demand.¹² Decline in demand for oil and other carbon-intensive commodities could lead to balance of payments pressures, declining fiscal revenues to finance development needs, and stranded assets (box 4.1 provides a detailed discussion of the various channels).

Impact of the energy transition on resource revenues of oil exporters: Scenario analysis

This section uses IEA scenarios to illustrate trajectories for resource revenues among oil exporters in the context of the ongoing energy transition. It presents potential trends in resource revenues from fossil fuels based on historical revenue data and the Stated Policies Scenario (STEPS) from the IEA. STEPS is not a forecast but an exploratory scenario that reflects the prevailing trajectory for the energy system. It reflects specific energy, climate, and related industrial policies that have been adopted or announced, as well as policy intentions not yet codified into law but supported by markets, infrastructure, and financial conditions (IEA 2025b). It does not include aspirational targets.

The STEPS involves a consistent increase in energy demand driven mainly by economic development, electrification, increased electricity demand for cooling due to higher temperatures, and new electricity-intensive technologies such as data centers and artificial intelligence (AI). Total energy demand increases by about 55 exajoules (EJ) by 2035, an 8 percent increase over current levels, driven mainly by EMDEs. How this increase in energy demand is met primarily depends on governments' policy choices. These policy decisions influence investment strategies adopted by both public and private entities as well as the approaches individuals employ to meet their energy requirements. Furthermore, the global population is set to continue to grow in the scenario, although the average annual increase of 80 million since 2000 is projected to slow to 65 million per year to 2035, and then to 50 million to 2050 (IEA 2025b).

The IEA scenarios include demand and supply projections per type of fuel at the country or regional level, which account for model representations of energy systems, including market dynamics and technological progress. Since the tax burden is assumed

¹² While this is also true for gas-producing countries, the focus of this section is on oil producers.

to remain constant, the factors influencing the revenue projections are future energy production, consumption, and prices. Annex 4B provides further details on the assumptions embedded in the STEPS.

Methodological approach

The analysis covers 32 oil-exporting EMDEs and proceeds in three steps, following the approach of Laan and Maino (2022).¹³ *First*, for each country, the average amount of resource revenues generated per unit of oil production is estimated using 2019 revenue data and the IEA (2025b) energy production data for 2019.¹⁴ Data for 2019 are used as the most recent “typical year,” to abstract from the complex impacts of a series of shocks in recent years, particularly the pandemic and the Russian Federation’s invasion of Ukraine. Countries are assumed to maintain the same average tax burden as in 2019.¹⁵

Second, country-specific oil production projections are obtained from the STEPS. *Finally*, for each country, the average revenue per unit of oil production is multiplied by the projected oil production under the STEPS to obtain projected resource revenues. The resource revenue pathways are intended to be illustrative at best, based on assumptions embedded in the STEPS and subject to data availability constraints.

Findings

The analysis of the STEPS scenario suggests that resource revenues in high-income (HIC) oil exporters are projected to remain above their 2019 levels, on average, through 2050.¹⁶ In contrast, average resource revenues in other oil exporters in the sample are projected to remain between 70 and 90 percent of their 2019 levels during 2035–50 (figure 4.7.A). While high-income oil exporters exhibit an upward trend in projected revenues through 2050, resource revenue in lower-middle-income (LMC) and upper-middle-income (UMC) oil exporters are projected to remain roughly stable relative to 2019 levels.

The contrasting revenue paths for HIC oil exporters versus other oil-exporting EMDEs in this illustrative scenario can be attributed to various factors. HICs often benefit from

¹³ The sample of oil-exporting EMDEs comprises the following countries: Algeria, Angola, Azerbaijan, Bahrain, Bolivia, Brunei Darussalam, Cameroon, Chad, Colombia, the Republic of Congo, Ecuador, Equatorial Guinea, Gabon, Ghana, Guyana, Indonesia, the Islamic Republic of Iran, Iraq, Kazakhstan, Kuwait, Myanmar, Nigeria, Oman, Qatar, Russia, Saudi Arabia, South Sudan, Timor-Leste, Trinidad and Tobago, the United Arab Emirates, República Bolivariana de Venezuela, and the Republic of Yemen.

¹⁴ The oil production data from the IEA refers to the sum of crude oil, natural gas liquids (NGLs), and nonconventional oils. The data on resource revenues are taken from the Natural Resource Governance Institute and refer to total resource revenues. Disaggregated data on revenues from different commodities are not available on a cross-country basis.

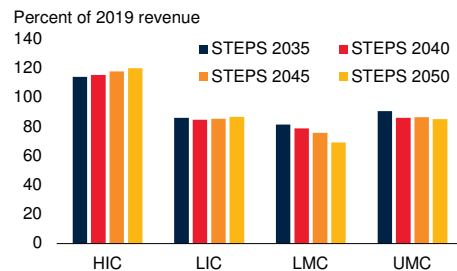
¹⁵ To the best of our knowledge, the assumption of unchanged tax burdens is consistent with IEA modeling assumptions. Indeed, governments can change tax rates, particularly in response to movements in international commodity prices, and introduce new measures, such as carbon taxes, over time. Production subsidies can also vary, impacting revenues through tax expenditures and changes in production. However, such changes are difficult to predict.

¹⁶ Oil exporters are grouped by income levels—into high income, upper-middle income, lower-middle income, and low income—following the standard World Bank classification (World Bank 2025).

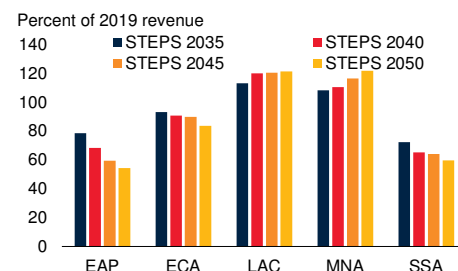
FIGURE 4.7 Resource revenue paths for oil exporters based on energy transition scenarios

Scenario analysis suggests that transition risks to fiscal revenues in oil-exporting EMDEs likely vary substantially across countries. High-income oil exporters are projected to fare better in terms of lost revenues than others. Across regions, oil exporters in LAC and MNA are expected to fare better than in other regions.

A. Resource revenues under IEA STEPS, by country-income group



B. Resource revenues under IEA STEPS, by EMDE region



Sources: IEA (2025b); Natural Resource Governance Institute; World Bank.

Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; HIC = high-income country; LAC = Latin America and the Caribbean; LIC = low-income country; LMC = lower-middle-income country; MNA = Middle East and North Africa; STEPS = Stated policies scenario; SSA = Sub-Saharan Africa; UMC = upper-middle-income country.

A.B. Panels show the average resource revenue path for each country group, derived from the STEPS. Revenues are expressed as a share of 2019 levels. For some countries, data for earlier years are used depending on availability.

more diversified economies, superior technological and infrastructural capabilities, and greater financial resilience. This is likely to bolster their ability to adapt more effectively to the decreasing global demand for oil in the coming decades. These countries can also attract investment in various sectors, including renewables, which would help compensate for the decline in fossil fuel revenues (Carbon Tracker Initiative 2021; Puyo et al. 2024). Many such countries, for instance Gulf Cooperation Council members, are leveraging advanced infrastructure and investment in non-oil sectors (from petrochemicals to renewables) to partially offset the future decline in fossil fuel income. By contrast, LMCs and LICs, especially those in Europe and Central Asia (ECA) and Sub-Saharan Africa (SSA), often lack these advantages, making them more vulnerable to a structural drop in oil demand and prices.

Additionally, stronger institutional frameworks in HICs compared with those in LMCs and LICs should allow for smoother adaptation to policy changes and international market dynamics (Puyo et al. 2024). Meanwhile, LMCs and LICs with weaker institutions and lower levels of human and physical capital are especially vulnerable. Their less diversified economies often lack the capital for technological upgrades, leaving them more vulnerable to fluctuations in oil prices and demand, as reflected in a steeper and more sustained potential decline in oil revenues relative to prepandemic levels in LMCs. These countries also typically lack SWFs and fiscal buffers, making them relatively ill-equipped to absorb the fiscal shocks of declining oil demand.

Resource revenue paths for oil exporters in different EMDE regions also display substantial variation (figure 4.7.B). Resource revenues in the Latin America and the Caribbean (LAC) and Middle East and North Africa (MNA) regions are expected to surpass their 2019 levels under STEPS and continue on an upward trend through 2050. The MNA region holds some of the lowest-cost oil producers in the world which are likely to maintain or even expand their market share over time (IEA 2025a, 2025b). In contrast, resource revenues in East Asia and Pacific (EAP), ECA, and SSA are projected to fall below their prepandemic level and continue on a downward trend through 2050. This likely reflects the relatively lower cost competitiveness of some oil exporters in Sub-Saharan Africa and parts of Asia, which could lead to steeper declines in oil production and related revenues in these economies.

Conclusions and policy implications

The energy transition represents a fundamental structural shift, creating a divergent landscape of opportunities and risks for commodity-exporting EMDEs. While the trajectory of this transition remains subject to technological and policy uncertainty, governments in commodity-exporting countries need to act now to create a conducive policy environment that allows them to derive maximum benefit from their endowments while navigating attendant fiscal risks.

The analysis in this chapter suggests that while metal exporters stand to generally benefit from increased demand for their exports as the energy transition proceeds, the response of fiscal revenue and expenditure to metal price fluctuations could vary substantially across countries. The transition has huge potential to shift both the scale and composition of the demand for minerals and metals, which can be associated with structural price changes as well as substantial volatility in the prices of commodities. While the impact of a positive metal price on real fiscal revenues is positive for all countries in the sample, it can be positive or negative for real fiscal expenditures. The impact on expenditures will ultimately depend on the extent to which fiscal policy is countercyclical or procyclical in metal exporters.

These aggregate findings, however, mask significant heterogeneity across countries. The cumulative impact of metal price shocks on fiscal revenues is correlated with countries' dependence on metal exports, while expenditure responses appear to be shaped more by the quality of fiscal frameworks and institutional capacity than by commodity dependence. Countries with well-designed fiscal rules and stronger institutions tend to exhibit more contained and less procyclical spending responses to commodity windfalls (chapter 2). This underscores that the fiscal dividend of the energy transition will not accrue uniformly and that the design and credibility of fiscal institutions will be a key determinant of how effectively countries translate commodity windfalls into lasting fiscal resilience.

With regard to the long-run impact of the energy transition on oil exporters, scenario analysis suggests that transition risks to fiscal revenues could vary substantially across countries. Illustrative paths for resource revenues based on IEA scenarios indicate that

HICs could fare better than other oil-exporting EMDEs. Greater economic diversification, including through larger service sectors, should help HICs mitigate the impacts of reduced demand for fossil fuels.

To navigate the structural shifts associated with the energy transition, policy makers in commodity-exporting EMDEs need to prioritize two key pillars of reforms. Chapter 5 presents a detailed discussion of these and other policy options.

Strengthening policy frameworks. In metal-exporting countries, countercyclical policies can help to better shield an economy from global commodity price volatility. The recurring nature of commodity price cycles calls for a framework that avoids increasing spending during good times and reducing it when economic conditions deteriorate. Such a framework would ensure that surplus revenues are saved so that resources are available to support activity when prices collapse. Stronger fiscal frameworks, including fiscal rules, and sovereign wealth funds combined with robust institutions can help reduce the procyclicality and volatility of fiscal expenditures (chapters 3 and 5).¹⁷ Additionally, a prudent fiscal framework should channel commodity-related revenues into productive investment. Directing the use of commodity revenues toward long-term investment in critical sectors, such as health, education, and infrastructure, will be essential for sustained growth.

Economic diversification: In fossil fuel exporters, expected long-term trends in global fossil fuel consumption necessitate efforts to gradually reduce their exposure to resource sectors over the medium to long term by undertaking reforms that encourage diversification into other sectors. Reforms include building human capital, promoting competition, strengthening institutions, and reducing distorting subsidies (World Bank 2022b). In addition to diversifying their economies, countries will need to strengthen efforts to curtail government expenditure, boost non-oil fiscal revenue, and prioritize financial saving when economic returns on additional public investment are low (Mirzoev et al. 2020).

The appropriate policy responses, however, need to be tailored to country-specific characteristics, such as fiscal space, commodity reliance, market flexibility, and the quality of domestic institutions. Additionally, for metal exporters, though the energy transition presents a significant opportunity to increase exports, it could also present a risk of overreliance on certain industries or sectors. Policy makers could make good use of increased revenues by fostering growth in other sectors of the economy.

¹⁷ Additionally, strengthened monetary policy frameworks, with flexible exchange rates anchored by credible inflation targets, could help build resilience to commodity price fluctuations and ensure smoother adjustment of real exchange rates (Frankel 2018; Torvik 2018).

BOX 4.1 The impact of the energy transition on fiscal policy in fossil-fuel exporting EMDEs: A literature review

Introduction

The transition to a low-carbon future, together with technological advancements in fossil fuel extraction, is likely to exert long-term downward pressure on fossil fuel demand and prices. For example, a 50 percent chance of meeting the 1.5°C global warming target—with an emphasis on equity—requires all advanced economies to effectively cease coal production by 2030 and developing countries to do so by 2040. Likewise, oil and gas production needs to be completely phased out in the wealthiest group of producers by 2034 and in the poorest group of producers by 2050 (Calverley and Anderson 2022). These expected changes in fossil fuel production, together with the corresponding decline in fossil fuel consumption, would have significant implications for fossil fuel revenues in the coming decades. In addition to fiscal capacity, there is also growing concern that delayed or sudden transitions could lead to macroeconomic shocks and impact financial stability (Allen et al. 2020).

Within commodity-exporting countries, vulnerability to the low-carbon transition will depend on a menu of factors. These include the degree of dependence on commodity revenues, extraction costs and breakevens, economic diversification, human capital, institutional quality, and governance (Peszko et al. 2020). These factors shape a country's capacity to develop other sectors, attract investment, and generate alternate revenue streams (Laan and Maino 2022). While the literature on the energy transition and its implications for fossil fuel demand is expanding rapidly, the challenges that the transition will pose for fiscal policy in commodity exporters has received relatively less attention.

Against this backdrop, this box addresses two questions:

- What are the main channels through which transition risks can impact fiscal policy in fossil fuel exporters?
- What does the literature suggest about the potential magnitude and timing of these effects?

Impact on fiscal policy: Transmission channels

The energy transition can affect fiscal policy through the following channels.

Direct revenue channel. Carbon pricing, regulation, electrification, and technology substitution reduce global demand for fossil fuels, exerting downward pressure on fossil fuel prices over time. This translates into lower royalties, corporate taxes, export duties, dividends from national oil and gas companies, and other related income. These impacts will naturally vary across countries

BOX 4.1 The impact of the energy transition on fiscal policy in fossil-fuel exporting EMDEs: A literature review (continued)

depending, for instance, on shifts in commodity demand, implemented climate policies, heterogeneity in fiscal regimes, and state participation (Black et al. 2024; Elgouacem et al. 2020; Solano-Rodríguez et al. 2021). For oil exporters, the speed of transport electrification and technology diffusion can materially compress the long-run oil price path and attendant resource rents, raising the tail risk of rapid revenue declines under fast-adoption scenarios (Cherif, Hasanov, and Pande 2021).

Macroeconomic and fiscal feedback channel. Lower export earnings and investment can weaken growth, employment, and the non-resource tax base, while potentially increasing macroeconomic volatility. These second-round effects can amplify initial revenue losses and trigger additional expenditure pressures, particularly in countries where dependence on fossil fuels for export and fiscal revenues is relatively high (Espagne et al. 2021; Fernando, Liu, and McKibbin 2021; Titelman et al. 2022).

Expenditure channel. Governments are likely to face higher spending needs for labor reallocation and reskilling, social protection, targeted support to affected communities, and promoting economic diversification. Where reform of energy subsidies is pursued, compensatory measures may be required to manage distributional impacts and preserve social cohesion (Carley and Konisky 2020; Raimi et al. 2022; Roemer and Haggerty 2022).

Balance sheet and contingent liability channel. Transition risks can materialize through state-owned enterprises (SOEs), public banks, subnational entities, and pension funds. Fiscal exposure arises from explicit guarantees, arrears, implicit backstops, and the absorption of stranded or impaired assets. Additional pressures can stem from decommissioning obligations and environmental remediation liabilities, especially where these are not provisioned for adequately (Bridle et al. 2022; Gourdel, Monasterolo, and Gallagher 2025).

Financing and sovereign risk channel. Sovereign financing conditions can change as markets price transition risks, climate policy credibility, and governance quality. These effects can materialize via ESG-related premia, climate-related credit-rating adjustments, refinancing risks when fiscal buffers are limited, and shifts in investor mandates that affect market access (Agarwala et al. 2021; Espagne et al. 2021; Gratcheva et al. 2022).

In addition, trade-policy spillovers are becoming more relevant as large markets deploy carbon-related border measures and other policies, with implications for export competitiveness, domestic value chains, and—indirectly—for fiscal space (de Mello and Ter-Minassian 2023; European Union 2023). Taken together, the different channels at play suggest that transition risk is most appropriately

BOX 4.1 The impact of the energy transition on fiscal policy in fossil-fuel exporting EMDEs: A literature review (*continued*)

characterized as involving interconnected aspects of revenues, expenditures, public sector balance sheets, and financing, rather than being limited to a narrowly-defined revenue shortfall. The literature to date has largely concentrated on the revenue channel, with a growing albeit thinner body of work on contingent liabilities, sovereign risk pricing, and trade-policy spillovers (table B4.1.1).

Low-carbon transition risks for fiscal policy: Review of empirical evidence

The literature on the low-carbon transition risks for fiscal policy in fossil fuel exporters is largely based on scenarios and case studies. Across approaches, evidence consistently points to material downside risks for fiscal revenues and fiscal space, with the scale and timing of the impacts shaped by the fuel mix, production cost structure, fiscal regime features, and the degree of economic diversification (Black et al. 2024; Puyo et al. 2024).

Regional and country case studies

The literature on fossil fuel exporting countries in Africa documents the potential revenue gaps that could arise as global demand shifts away from fossil fuels (Ackah 2021; Agu and Ogbeide-Osaretin 2016; Arndt et al. 2017). These effects are likely to play out through upstream fiscal channels, including changes in royalties, profit-based taxes, production sharing, and dividends from state participation. Furthermore, second-round effects could weaken the non-resource tax base and raise gross financing needs, especially in countries more dependent on hydrocarbon and coal exports. These pressures could be compounded by declining donor support and weak domestic revenue mobilization in some countries, prompting cuts in public expenditure and potentially reducing fiscal space for spending on human development, infrastructure, and essential public services (Nalule, Anaman, and Acheampong 2022; Puyo et al. 2024).

Scenario-based estimates for South Africa illustrate how macro-fiscal risks can accumulate over time. Estimates suggest that the cumulative impact on South Africa of a global low-carbon transition over 2013–35 could exceed \$120 billion in present value terms (Huxham, Anwar, and Nelson 2019). These risks will accumulate slowly at first before accelerating from the mid-2020s, driven mainly by external shifts in coal and oil markets linked to declining global demand. Additionally, the study shows that losses from declining coal exports can outweigh the benefits of lower oil prices. If unmitigated, this could potentially have implications for sovereign creditworthiness and borrowing costs (Gratcheva et al. 2022; Huxham, Anwar, and Nelson 2019).

BOX 4.1 The impact of the energy transition on fiscal policy in fossil-fuel exporting EMDEs: A literature review (continued)

Studies on oil producers in LAC highlight substantial uncertainty around oil production, fiscal revenues from oil, and the size of unexploited oil reserves. Key drivers include global oil demand, which is sensitive to climate policy and technological change; geopolitical uncertainty, affecting production strategies of major suppliers; and the competitiveness of fields in the region, influenced in part by fiscal regime design. While fiscal returns from oil production may be linked in part to fiscal regimes, they are mainly driven by global demand and production strategies of major oil producers, underscoring the need for governments to diversify their fiscal revenues away from dependence on oil production (Solano-Rodríguez et al. 2021). Hydrocarbon producers with less diversified economies face large social and investment spending needs alongside heightened fiscal vulnerabilities. Estimates suggest that carbon taxes for most major producers in the region (Bolivia, Brazil, Colombia, Ecuador, Mexico, and Trinidad and Tobago) are expected to provide little relief from plummeting hydrocarbon revenues under stringent transition pathways, reinforcing the need for credible medium-term adjustment plans and growth strategies (Titelman et al. 2022).

With regard to coal exporters, mine-level evidence from Indonesia suggests that a global low-carbon transition can reduce the set of economically viable mines and translate into significant revenue reductions for government and coal companies under unchanged domestic pricing and policy settings. This reinforces the fiscal relevance of coal phase-out timing and the role of just-transition financing plans (Rishanty, Anugrah, and Rahmawati 2023).

Cross-country evidence

Cross-country studies provide a basis for comparing exposure to transition risks, but results are not directly comparable across studies as they rely on different time horizons, scenarios, and definitions of fiscal revenues. Nevertheless, evidence indicates that countries with high fiscal dependence on oil and natural gas face potentially large downside risks.

Countries that are highly dependent on oil and gas revenue could see a drop of 51 percent in government oil and gas revenues in a shift to a low-carbon world over the next two decades (Carbon Tracker Initiative 2021). Using a broad set of fossil fuel exporters, Jensen (2024) estimates that oil rents could fall by more than half under an ambitious global decarbonization scenario over 2023–40. Evidence based on local projections points to large and persistent adverse fiscal responses in EMDE oil exporters to global decarbonization and oil price shocks. Many of these countries also have elevated public debt which together with dependence on fossil fuel revenues makes them vulnerable to macroeconomic instability, procyclical expenditure cuts, and rising sovereign refinancing costs.

BOX 4.1 The impact of the energy transition on fiscal policy in fossil-fuel exporting EMDEs: A literature review (*continued*)

For major EMDEs, estimates suggest that direct fossil fuel revenues could decline to about 35 percent of 2019 levels for Brazil, China, Indonesia, and Russia by 2050, and to about 65 percent of 2019 levels for India and South Africa (Laan and Maino 2022). Declining fossil fuel revenues will require governments to cut spending and/or develop alternative revenue streams. Economic and fiscal diversification, strengthened domestic revenue mobilization, and credible strategies to replace vulnerable tax bases are critical to support decarbonization and sustainable development.

Low-carbon transition risks for fiscal policy: Review of modeling approaches

Studies based on input-output and multi-regional input-output (MRIO) methods find that countries display different degrees of exposure to low-carbon transition risks across external, fiscal, and socio-economic dimensions, and that measured exposure can increase once indirect impacts through supply chains are considered (Magacho, Espagne, and Godin 2023). India, Ecuador, and Paraguay exhibit high fiscal exposure to the low-carbon transition as direct and indirect tax revenues from “sunset” industries (that is, high emission industries) account for a large share of the tax base. In contrast, while “sunset” industries are economically important in other countries (such as Brunei), fiscal exposure to the energy transition can be lower when these industries are not a major source of tax revenues and when productive structures have greater capacity to shift to greener products. Recent MRIO applications extend this approach to quantify the distribution of cross-border policy shocks, including carbon border measures, and emphasize that effects can be uneven across regions and sectors and can translate into losses in tax revenues, employment, and export receipts for more rigid production structures (Lin and Zhao 2024; Magacho, Espagne, and Godin 2023).

Complementary scenario-based analysis highlights that public revenue paths reflect a combination of rising carbon pricing, erosion of existing fuel tax bases due to electrification and efficiency gains, and the speed at which governments can develop replacement revenue instruments (Black et al. 2024). In a similar vein, macroeconomic models indicate that economies that are more reliant on fossil fuels for energy generation or receive substantial income from exporting fossil fuels or fossil fuel-intensive products face larger downside risks to output and the tax base under stringent transition pathways (Fernando, Liu, and McKibbin 2021).

The energy transition also poses spillover risks from policy actions in large economies to their trading partners. These transition spillovers can be modeled as

BOX 4.1 The impact of the energy transition on fiscal policy in fossil-fuel exporting EMDEs: A literature review (continued)

a demand shock to fossil fuel exports triggered by decarbonization policies in major trading partners, with cascading effects on output, employment, fiscal revenues, and debt dynamics (Gourdel, Monasterolo, and Gallagher 2025). Carbon border adjustment measures have become a focal spillover channel. Recent work quantifies carbon border adjustment mechanism (CBAM)-related burdens and highlights that impacts depend on trade exposure in covered products, embodied emissions intensity, and the extent to which domestic carbon pricing can be credited or substituted (Abdou et al. 2025; He, Zhai, and Ma 2025). Evidence from Colombia suggests that sharp declines in oil and coal production could weigh heavily on fiscal sustainability and regional public finances in the absence of credible offsetting reforms and diversification (Arena et al. 2025).

Conclusion

Analyzing the impact of transition risks on fiscal policy in fossil-fuel exporting EMDEs is a vibrant area of research. Existing studies primarily emphasize the revenue channel, highlighting how the energy transition can disrupt government revenue sources where tax revenue and SOE dividends from fossil fuels are significant (Elgouacem et al. 2020; Laan and Maino 2022; Welsby et al. 2021). More recent contributions emphasize that fiscal exposure extends beyond upstream rents, as electrification can erode the fuel excise tax base, contingent liabilities can materialize through SOEs and decommissioning obligations, and sovereign financing conditions can amplify adjustment pressures (Black et al. 2024; Gratcheva et al. 2022). Furthermore, the scale and timing of fiscal impacts depend on global decarbonization pathways, domestic policy credibility, and progress on economic diversification. Consistent with this, evidence suggests that greater export diversification among oil exporters is associated with more stable state revenue prospects during the energy transition, strengthening the case for front-loading diversification and boosting human capital (Karanfil and Omgba 2023).

The findings from existing studies support a policy agenda that emphasizes the following: embedding transition scenarios in medium-term fiscal frameworks; strengthening fiscal buffers and stabilizers; managing SOE-related contingent liabilities and decommissioning risks; and developing replacement revenue instruments to offset fossil fuel tax base erosion while safeguarding equity and macroeconomic stability.

BOX 4.1 The impact of the energy transition on fiscal policy in fossil-fuel exporting EMDEs: A literature review (*continued*)

TABLE B4.1.1 Literature review on fiscal implications of energy transition risks for fossil fuel exporters

Reference	Approach	Fiscal channels	Geographical coverage/notes
Reviews/Syntheses			
Ackah (2021)	Review	Rev; bal	Algeria, Angola, Ghana, Nigeria
Agarwala et al. (2021)	Review	Rev; fin	UK/OECD
Black et al. (2024)	Fiscal framework	Rev; mac; fin	Global; fiscal scenario design
Dabla-Norris et al. (2021)	Review	Rev; bal	Asia and Pacific
Elgouacem et al. (2020)	Review	Rev; bal	Global
Henderson and Mitrova (2020)	Review	Rev; mac	Russia
IEA (2024)	Outlook	Rev; mac	Global; pathway calibration
IEA (2025b)	Outlook	Rev; mac	Global; updated pathways
Laan and Maino (2022)	Review and scenario	Rev; mac; fin	BRIICS; EMDE focus
Mills (2020)	Review	Rev; mac	MENA
Nalule, Anaman, and Acheampong (2022)	Review	Rev	Africa
Peszko et al. (2020)	Review	Rev; mac; exp; bal Fin	Global; vulnerability drivers
Tagliapietra (2019)	Review	Rev; mac	MENA
TCD-IMF (2022)	Review	Rev	LAC/India/Colombia/Peru
Empirical			
Arena et al. (2025)	Scenario analysis	Rev; mac; fin	Colombia; macro-fiscal sustainability under declining oil and coal production
Bridle et al. (2022)	Empirical	Rev; bal	South Africa; SOE bailouts
Espagne et al. (2021)	Empirical/modeling	Mac; fin	Global; macro-financial
Gratcheva et al. (2022)	Empirical	Fin	Global; sovereign risk
Huxham, Anwar, and Nelson (2019)	Empirical/scenario	Rev	South Africa
Jensen (2024)	Empirical	Rev; mac; fin	Cross-country; fossil-fuel-export-dependent economies; local projections and scenario-based rent paths
Karanfil and Omgba (2023)	Empirical	Mac; Rev	Cross-country; oil-dependent countries; diversification as fiscal-risk mitigation

BOX 4.1 The impact of the energy transition on fiscal policy in fossil-fuel exporting EMDEs: A literature review (*continued*)

TABLE B4.1.1 Literature review on fiscal implications of energy transition risks for fossil fuel exporters (*continued*)

Reference	Approach	Fiscal channels	Geographical coverage/notes
Models, spillovers, and systemic risk			
Fernando, Liu, and McKibbin (2021)	Macro model	Rev; mac	Global
Frankovic and Kolb (2024)	DSGE	Mac; fin	Mechanisms; disclosure
Magacho et al. (2023)	Input-output	Mac; rev	Cross-country; IO/MRIO tax base
Magacho, Espagne, and Godin (2023)	Input-output	Mac; rev	Spillovers; supply chains
Hoffart et al. (2024)	Systemic risk	Mac; fin; bal	Cross-country; systemic risk
NGFS (2024)	Scenarios	Rev; Mac; fin	Phase V; stress testing
NGFS (2025)	Scenarios	Rev; Mac; fin	Guidance; model risk
Scenario analysis and stress testing (fiscal pathways)			
Bhandari and Dwivedi (2022)	Scenario analysis	Rev; mac	India; fuel tax base erosion
Carbon Tracker Initiative (2021)	Scenario analysis	Rev; fin	Africa, MENA; petrostates
Titelman et al. (2022)	Scenario analysis	Rev; mac; fin	LAC6; adjustment implications
Cherif, Hasanov, and Pande (2021)	Scenario analysis	Rev; mac	Oil exporters; long-horizon transition scenarios
Hasanov et al. (2025)	Macro model	Rev; mac; exp	Saudi Arabia; carbon pricing revenue and recycling implications
Rishanty, Anugrah, and Rahmawati (2023)	Scenario analysis	Rev; exp	Indonesia; coal phase-out and government revenue impacts
Trade policy spillovers (CBAM and related measures)			
Abdou et al. (2025)	Quantitative	Mac	Cross-country; sector exposure
de Mello and Ter-Minassian (2023)	Policy	Mac; gin	Cross-country; EMDE relevance
European Union (2023)	Policy	Mac; fin	EU CBAM/industrial policy
Gourdel, Monasterolo, and Gallagher (2025)	Trade/spillovers	Mac; rev; fin	Exporter spillovers; debt
He, Zhai, and Ma (2025)	Quantitative	Macro/fiscal	Cross-country; sector exposure
Lin and Zhao (2024)	Trade/spillovers	Macro model	Distributional spillovers
Wang (2025)	Trade/spillovers	Macro model	Leakage/competitiveness

Source: World Bank.

Note: Fiscal channels are defined as follows: rev (revenue), mac (macro/fiscal feedback), exp (expenditure/just transition), bal (balance sheet/contingent liabilities), and fin (financing/sovereign risk).

ANNEX 4A Analyzing the impact of metal price shocks: Methodology and data

Econometric model

To assess the impact of metal price shocks on fiscal revenues and expenditures, country-specific structural vector autoregression (SVAR) models are estimated following Lebrand, Vasishtha, and Yilmazkuday (2024). The SVAR model is written as

$$A_0 z_t = \alpha + \sum_{k=1}^4 A_k z_{t-k} + \beta C_t + u_t, \quad (4A.1)$$

where z_t is the vector of endogenous variables, C_t the vector of controls, and u_t is the vector of corresponding shocks that represent serially and mutually uncorrelated structural innovations. For estimation purposes, the model in its reduced form is expressed as follows:

$$z_t = b + \sum_{k=1}^4 B_k z_{t-k} + \gamma C_t + e_t, \quad (4A.2)$$

where $b = A_0^{-1} \alpha$, $\gamma = A_0^{-1} \beta$, and $B_k = A_0^{-1} A_k$ for all k . It is postulated that the structural impact multiplier matrix of A_0^{-1} has a recursive structure such that the reduced-form errors of e_t can be decomposed according to $e_t = A_0^{-1} u_t$, where shock sizes are standardized to unity. Hence, the reduced-form errors are made orthogonal using a triangular decomposition.

In the model, z_t consists of following country-specific variables: the year-on-year change in the log real metal price index, the year-on-year change in log real GDP, fiscal revenues, and fiscal expenditures. The recursive structure imposed on A_0^{-1} requires an ordering of the variables used in the estimation. Accordingly, real metal price growth is ordered first because metal prices are mainly determined in the global economy. Fiscal expenditures are ordered second and revenues third because they can be affected by changes in globally determined metal prices but are assumed not to be immediately affected by country-specific real GDP (Blanchard and Perotti 2002). Real GDP growth is ordered last. Control variables include real interest rates and an index of global real economic activity.

All variables can affect other variables after one quarter. The model is estimated for each country in the sample using quarterly data.

Data

The SVAR model is estimated for 12 advanced economies and 39 EMDEs. The sample of 11 metal exporters includes Armenia, Australia (as a comparator advanced economy), Botswana, Chile, the Democratic Republic of Congo, Kosovo, the Kyrgyz Republic, Mauritania, Mongolia, Peru, and South Africa. The sample period differs across countries depending on data availability (table 4A.1). Among the 11 metal exporters in

the sample, copper is the main export of base metals for Armenia, Chile, the Democratic Republic of Congo, Mongolia, and Peru. Iron is the main export of base metals for Mauritania (table 4A.2). Botswana and the Kyrgyz Republic mostly export precious metals, gold, and diamond, which are not included as base metals (table 4A.3).

Prices are from the World Bank's Pink Sheet and are converted into real terms using the U.S. consumer price index from the Bureau of Economic Analysis. Real interest rates and the index of global real economic activity are sourced from the Federal Reserve Economic Data (FRED) database. Country-specific variables are obtained from Haver Analytics. Country-specific consumer price indexes are used to convert fiscal expenditure and revenue into real terms. Finally, for series that are not reported in seasonally adjusted terms, the ARIMA-X13 seasonal adjustment method is used.

Metal price index calculation

The model uses a country-specific metal price index that reflects the mix of base metals in total metal exports. A country-specific index is built by weighting the commodity price data from the World Bank's Pink Sheet (using gold as proxy for precious metals) with the country average metal export shares as reported in table 4A.2. The weighted prices are added and normalized using 2010 as the base year. The index for country c can be written as:

$$Index_c = \sum_m \frac{\text{Exports}_c \text{ of metal } m}{\text{Exports}_c \text{ of all metal}} \times \text{Normalized price of metal } m.$$

The index is converted into real terms using the U.S. consumer price index from the Bureau of Economic Analysis. Figure 4A.1 reports the country-specific metal index for Australia, Chile, and Kyrgyz Republic over the period 1991–2024. Country indexes differ according to the composition of their export basket for base metals. Australia is a main exporter of iron and aluminum, Chile of copper, and the Kyrgyz Republic of precious metals.

Additional analysis

The sensitivity of the results is explored along two dimensions. First, an alternative metal index is constructed to include precious metals to account for Botswana and the Kyrgyz Republic, which are mostly exporters of gold and diamond. The country-specific metal price index is built using the shares of metal exports including base metals, gold, and diamonds (table 4A.3). The price of gold is used as a proxy for diamond prices.¹⁸

Second, a local projection model is used to estimate the impact of metal price shocks on fiscal revenue and expenditure for metal exporters. The results for the immediate impact of metal price shocks are similar to those obtained from the SVAR model. The correlation coefficient between the estimated impacts from the two models is 0.51 for revenue and 0.55 for expenditure. The results for the cumulative responses are also positively correlated, with a correlation coefficient of 0.64 for revenue impacts and 0.25 for expenditure impacts.

¹⁸ Diamond prices are not available in the World Bank's Pink Sheet.

TABLE 4A.1 Sample of metal exporters

Country	Sample Period	Sample Period
	Start	End
Armenia	2014q1	2025q3
Australia	1992q1	2025q3
Botswana	2008q2	2025q3
Chile	2004q1	2025q3
Congo, Dem. Rep.	2016q1	2022q3
Kosovo	2012q1	2022q3
Kyrgyz Republic	2015q1	2025q3
Mauritania	2007q1	2022q3
Mongolia	2011q1	2024q4
Peru	1996q1	2025q3
South Africa	1992q1	2025q3

Source: World Bank.

TABLE 4A.2 Average share in total metal exports (1991–2024)

	Shares in total metal exports (in percent)							
	Aluminum	Copper	Iron	Lead	Nickel	Precious metals	Tin	Zinc
Armenia	16	77	0	0	0	4	0	2
Australia	25	11	51	3	5	1	0	6
Botswana	1	58	0	0	39	2	0	0
Chile	0	97	3	0	0	0	0	0
Congo, Dem. Rep.	0	99	0	0	0	0	0	0
Kyrgyz Republic	18	7	0	7	0	56	10	1
Mauritania	0	28	72	0	0	0	0	0
Mongolia	0	84	10	1	0	1	0	4
Peru	0	63	4	8	0	3	4	18
South Africa	26	12	43	2	8	9	0	1

Sources: UN Comtrade (database); World Bank.

Note: Table reports the average share of exports of each metal in total metal exports over 1991–2024. Trade data are based on the Standard International Trade Classification (SITC; third revision) and are disaggregated at the four-digit level (within sections 28 and 68). Base metals include aluminum, copper, iron, lead, nickel, some categories of precious metals (code 289 “Ores & concentrates of precious metals; waste, scrap” of the SITC), tin, and zinc. For Kosovo, trade shares are not reported, so the analysis uses the average metal price index from the World Bank’s Pink Sheet.

TABLE 4A.3 Average share in total metal exports, including gold and diamond (1991–2024)

Shares in total metal exports (in percent)									
	Aluminum	Copper	Gold and diamond	Iron	Lead	Nickel	Precious metals	Tin	Zinc
Armenia	9	42	45	0	0	0	2	0	1
Australia	18	8	22	41	2	3	1	0	4
Botswana	0	5	90	0	0	5	0	0	0
Chile	0	94	3	2	0	0	0	0	0
Congo, Dem. Rep.	0	98	1	0	0		0	0	0
Kyrgyz Republic	1	1	90	0	1	0	8	0	0
Mauritania	0	17	27	56	0	0	0	0	0
Mongolia	0	66	21	8	1	0	1	0	3
Peru	0	44	30	3	6	0	2	3	12
South Africa	13	7	48	22	1	4	4	0	1

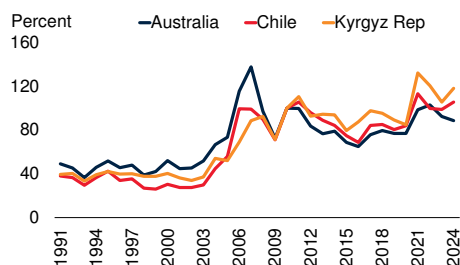
Sources: UN Comtrade (database); World Bank.

Note: Table reports the average share of exports of base and precious metals, and gold and diamond, over the period 1991–2024. Base metals include aluminum, copper, iron, lead, nickel, some categories of precious metals (code 289 “Ores & concentrates of precious metals; waste, scrap” of the SITC), tin, and zinc. Trade data are based on the Standard International Trade Classification (SITC; third revision) and are disaggregated at the four-digit level (within sections 28 and 68). Trade data for Kosovo are not available.

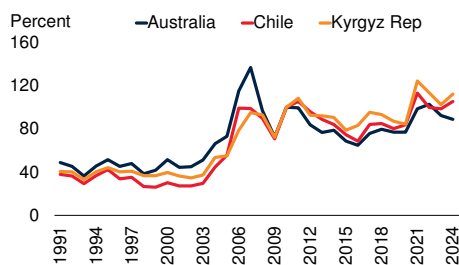
FIGURE 4A.1 Metal price indexes

Country-specific metal price indexes co-move, while reflecting the varying price movements and export shares for the base metals constituting the export basket.

A. Metal price index based on base metals



B. Metal price index based on base metals and precious metals



Source: World Bank.

Note: The country-specific metal price index is constructed by weighting the metal price data from the World Bank's Pink Sheet with the average metal export shares of a country. The weighted shares are then summed and normalized to the year 2010. The base metals used are aluminum, copper, iron, lead, nickel, tin, and zinc.

A. The constructed index includes base metals.

B. Index includes base metals as well as precious metals and diamonds. Due to data availability issues, gold prices are used as a proxy for precious metal and diamond prices.

ANNEX 4B Energy transition scenarios

The IEA (2025b) STEPS scenario used in the chapter is derived from the International Energy Agency's Global Energy and Climate (GEC) Model, which provides broad scope and detailed insights into the energy system. The GEC model covers 29 regions and all sectors across the energy system.¹⁹ It employs a bottom-up approach for modeling:

- *Final energy demand*, covering industry, transport, buildings, agriculture, and other non-energy uses.
- *Energy transformation*, including electricity generation and heat production; refineries; the production of biofuels, hydrogen, and hydrogen-based fuels; and related transmission and distribution systems, storage, and trade.
- *Energy supply*, including fossil fuels exploration, extraction and trade, and the availability of renewable energy resources.

In the STEPS, total energy demand increases from 654 exajoules (EJ) to over 705 EJ in 2035, an increase roughly equivalent to the current EU energy demand. The share of fossil fuels in total energy demand declines from 79 percent currently to about 70 percent in 2035, and to under 60 percent in 2050. Coal demand initially remains broadly stable at its current level, but peaks before 2030 and then declines through 2035 as it is edged out of the power sector. By 2035, coal demand is around 20 percent lower than in 2024. Demand for oil rises from 100 million barrels per day (mb/d) in 2024 to a peak level of about 102 mb/d by 2030, before beginning a slow decline in subsequent years, with notable reductions in oil demand for road transport broadly offset by increased oil use for petrochemicals. Oil demand falls by about 0.2 mb/d each year on average from 2035 to 2050. Demand for natural gas increases by 1 percent per year through 2035, driven mainly by growth in industry and power, before broadly plateauing thereafter.

In contrast, demand for renewables increases by an average of 5.5 percent per year to 2035, driven mainly by the power sector although the direct use of renewables also increases (particularly in industry and biofuels in transport). Renewable power capacity increases by about 3.7 times from 2022 to 2035. Electricity production from nuclear also increases by 3 percent on average to 2035.

The IEA scenarios are meant to be illustrative trajectories underpinned by carbon price assumptions. In the GEC model, the policy stance under each scenario is associated with an assumed carbon price, with the prices for oil, coal, and natural gas reflecting the price levels that are needed to stimulate sufficient investment in supply to meet projected demand. These prices are one of the key factors driving the demand and supply projections for fossil fuels in all sectors and are derived through iterative modelling (IEA

¹⁹ A detailed description of the model can be found at IEA (2025c).

2022; 2025b). As such, the price paths do not attempt to track the fluctuations and price cycles that characterize commodity markets in practice. The potential for volatility is ever present, especially in systems that are undergoing a necessary and profound transformation.

Although STEPS includes policies to reduce fossil fuel use, demand remains high. Decreasing oil demand brings down the price at which markets find equilibrium, but high levels of investment are still required to compensate for declining output from existing fields and for the development of new resources. Prices remain around 2024 levels over the next decade and decrease to \$76/barrel by 2050 (IEA 2025b).

References

- Abdou, M., H. Dudu, K. Gerling, and D. Kadissi. 2025. "Macroeconomic Exposure to the EU's Carbon Border Adjustment Mechanism: The Case of the Middle East and Central Asia." IMF Working Paper 2025/182, International Monetary Fund, Washington, DC.
- Ackah, I. 2021. "No African Country Is Norway! A Perspective on Sovereign Wealth Funds and the Energy Transition." *Energy Research & Social Science* 75: 102048.
- Agarwala, M., M. Burke, P. Klusak, K. Mohaddes, U. Volz, and D. Zenghelis. 2021. "Climate Change and Fiscal Sustainability: Risks and Opportunities." *National Institute Economic Review* 258 (1): 28–46.
- Agu, D. O., and E. N. Ogbeide-Osaretin. 2016. "An Enquiry into the Political Economy of the Global Clean Energy Transition Policies and Nigeria's Federal and State Governments' Fiscal Policies." In *The Political Economy of Clean Energy Transitions*, edited by D. Arent, C. Arndt, M. Miller, F. Tarp, and O. Zinaman, 209–27. Oxford University Press.
- Al Jabri, S., M. Raghavan, and J. Vespignani. 2022. "Oil Prices and Fiscal Policy in an Oil-Exporter Country: Empirical Evidence from Oman." *Energy Economics* 111: 106103.
- Allen, T., S. Dees, J. Boissinot, G. Caicedo, C. M. Graciano, V. Chouard, L. Clerc, A. de Gaye, A. Devulder, S. Diot, N. Lisack, F. Pegoraro, M. Rabaté, R. Svartzman, and L. Vernet. 2020. "Climate-related Scenarios for Financial Stability Assessment: An Application to France." Banque du France Working Paper 774, Banque de France, Paris.
- Arena, M., A. Garcia Huitron, B. Huang, D. Kolpakova, R. Perrelli, A. Shah, and P. Wingender. 2025. "Macro-fiscal Impacts of Colombia's Energy Transition Plan." Selected Issues Paper 2025/145, International Monetary Fund, Washington, DC. <https://doi.org/10.5089/9798229029278.018>.
- Arndt, C., M. Miller, F. Tarp, O. Zinaman, and D. Arent, eds. 2017. *The Political Economy of Clean Energy Transitions*. Oxford, UK: Oxford University Press.
- Baunsgaard, T. 2001. "A Primer on Mineral Taxation." IMF Working Paper 01/139, International Monetary Fund, Washington, DC.
- Benninger, T., D. Devlin, E. C. Godinez, and N. Vernon-Lin. 2024. "Cash Flow Analysis of Fiscal Regimes for Extractive Industries." IMF Working Paper 24/89, International Monetary Fund, Washington, DC.
- Bhandari, L., and A. Dwivedi. 2022. "India's Energy and Fiscal Transition." CSEP Working Paper 27, Centre for Social and Economic Progress, New Delhi.

Black, S., R. de Mooij, V. Gaspar, I. Parry, and K. Zhunussova. 2024. "Fiscal Implications of Global Decarbonization." IMF Working Paper 24/45, International Monetary Fund, Washington, DC.

Blagoeva, D. T., P. Alves Dias, A. Marmier, and C. C. Pavel. 2016. *Assessment of Potential Bottlenecks along the Materials Supply Chain for the Future Deployment of Low-Carbon Energy and Transport Technologies in the EU. Wind Power, Photovoltaic and Electric Vehicles Technologies, Time Frame: 2015-2030*. JRC Science for Policy Report. Luxembourg: Publications Office of the European Union.

Blanchard, O., and R. Perotti. 2002. "An Empirical Characterization of the Dynamic Effects of Changes in Government Spending and Taxes on Output." *The Quarterly Journal of Economics* 117 (4): 1329–68.

Born, K., S. Heerwig, and I. Steel. 2023. *Economic Implications of the Energy Transition on Government Revenue in Resource-Rich Countries*. German Federal Ministry for Economic Cooperation and Development (BMZ), Braun & Sohn, Maintal, Germany

Bridle, R., C. Muzondo, M. Schmidt, T. Laan, A. Viswamohanan, and A. Geddes. 2022. *South Africa's Energy Fiscal Policies*. IISD: International Institute for Sustainable Development.

Calverley, D., and K. Anderson. 2022. "Phaseout Pathways for Fossil Fuel Production within Paris-Compliant Carbon Budgets." Available at: <https://research.manchester.ac.uk/en/publications/phaseout-pathways-for-fossil-fuel-production-within-paris-compliant>.

Carbon Tracker Initiative. 2021. *Beyond Petrostates: The Burning Need to Cut Oil Dependence in the Energy Transition*. Carbon Tracker Initiative Report- <https://carbontracker.org/reports/petrostates-energy-transition-report>.

Carley, S., and D. M. Konisky. 2020. "The Justice and Equity Implications of the Clean Energy Transition." *Nature Energy* 5 (8): 569–77.

Cherif, R., F. Hasanov, and A. Pande. 2021. "Riding the Energy Transition: Oil Beyond 2040." *Asian Economic Policy Review* 16 (1): 117–37.

Cordes, T., T. Kinda, and P. S. Muthoora. 2015. "Expenditure Rules: Effective Tools for Sound Fiscal Policy?" IMF Working Paper 15/029, International Monetary Fund, Washington, DC.

Dabla-Norris, E., J. Daniel, M. Nozaki, C. Alonso, V. Balasundharam, M. Bellon, C. Chen, D. Corvino, and J. Kilpatrick. 2021. "Fiscal Policies to Address Climate Change in Asia and the Pacific." Departmental Paper 21/007, International Monetary Fund, Washington, DC.

de Mello, L., and T. Ter-Minassian. 2023. "Decarbonization and Intergovernmental Fiscal Relations: Policy Challenges and Reform Options." OECD Working Papers on Fiscal Federalism, No. 43. Paris: OECD Publishing.

- Elgouacem, A., et al. 2020. "The Fiscal Implications of the Low-Carbon Transition." OECD Green Growth Papers 2020/01, OECD Publishing, Paris.
- Espagne, E., A. Godin, G. Magacho, A. Mantes, and D. Yilmaz. 2021. "Developing Countries' Macroeconomic Exposure to the Low-Carbon Transition." AFD Research Papers 220, Agence française de développement, Paris.
- European Union. 2023. *Regulation (EU) 2023/956 of the European Parliament and of the Council of 10 May 2023 establishing a carbon border adjustment mechanism (Text with EEA relevance)*. *Official Journal of the European Union* L 130 (16 May 2023): 52. EUR-Lex.
- Fernando, R., W. Liu, and W. J. McKibbin. 2021. "Global Economic Impacts of Climate Shocks, Climate Policy and Changes in Climate Risk Assessment." CEPR Discussion Paper 16154, Center for Economic Policy Research, London.
- Frankel, J. 2018. "How to Cope with Volatile Commodity Export Prices: Three Proposals." In *Rethinking the Macroeconomics of Resource-Rich Countries*, edited by R. Arezki, R. Boucekine, J. Frankel, M. Laksaci and R. van der Ploeg, 35–44. London: CEPR Press.
- Frankovic, I., and B. Kolb. 2024. "The Role of Emission Disclosure for the Low-Carbon Transition." *European Economic Review* 167: 104792.
- Gourdel, R., I. Monasterolo, and K. P. Gallagher. 2025. "Climate Transition Spillovers and Sovereign Risk: Evidence from Indonesia." *Energy Economics* 143 (March): 108211.
- Gratcheva, E. M., B. Gurhy, A. Skarnulis, F. E. Stewart, and D. Wang. 2022. "Credit Worthy: ESG Factors and Sovereign Credit Ratings." *Equitable Growth, Finance and Institutions Insight—Finance*, World Bank, Washington, DC.
- Guterres, A. 2024. "Secretary-General's Remarks for the Launch of the Panel on Critical Energy Transition Minerals." United Nations, 26 April 2024. <https://www.un.org/sg/en/content/sg/statements/2024-04-26/secretary-generals-remarks-for-the-launch-of-the-panel-critical-energy-transition-minerals-delivered>.
- Hasanov, F. J., H. Aliyeva, M. S. Almozaini, and C. Bollino. 2025. "Evaluating Hypothetical Carbon Pricing for Saudi Arabia using a Macroeconometric Modeling Framework." *Energy Economics* 145: 108437. <https://doi.org/10.1016/j.eneco.2025.108437>.
- He, X., F. Zhai, and J. Ma. 2025. "Global Impact of the Carbon Border Adjustment Mechanism: A Quantitative Assessment." *Journal of Globalization and Development* 16 (1): 29–53.
- Henderson, J., and T. Mitrova. 2020. "Implications of the Global Energy Transition on Russia." In *The Geopolitics of the Global Energy Transition*, edited by M. Hafner and S. Tagliapietra. Lecture Notes in Energy, volume 73. Springer.
- Hoang, N. T., and B. H. Nguyen. 2018. "Oil and Iron Ore Price Shocks: What Are the Different Economic Effects in Australia?" *Economic Record* 94 (305): 186–203.

- Hoffart, F. M., P. D'Orazio, F. Holz, and C. Kemfert. 2024. "Exploring the Interdependence of Climate, Finance, Energy, and Geopolitics: A Conceptual Framework for Systemic Risks Amidst Multiple Crises." *Applied Energy* 361 (May): 122885.
- Huxham, M., M. Anwar, and D. Nelson. 2019. *Understanding the Impact of a Low Carbon Transition on South Africa*. A CPI Energy Finance Report, Climate Policy Initiative, London.
- IEA (International Energy Agency). 2021. *The Role of Critical Minerals in Clean Energy Transitions*. International Energy Agency, Paris.
- IEA (International Energy Agency). 2022. *Global Energy and Climate Model*. Paris: International Energy Agency.
- IEA (International Energy Agency). 2023. *The Oil and Gas Industry in Net Zero Transitions*. Paris: International Energy Agency.
- IEA (International Energy Agency). 2024. *World Energy Outlook 2024*. Paris: International Energy Agency.
- IEA (International Energy Agency). 2025a. *World Energy Investment 2025*. International Energy Agency, Paris.
- IEA (International Energy Agency). 2025b. *World Energy Outlook 2025*. Paris: International Energy Agency. November.
- IEA (International Energy Agency). 2025c. GEC Model. Paris: International Energy Agency. November.
- IMF (International Monetary Fund). 2023. *Republic of Kosovo: Selected Issues*. IMF Staff Country Report 23/055. Washington, DC.
- IMF (International Monetary Fund). 2024. *Islamic Republic of Mauritania: Selected Issues*. IMF Staff Country Reports 24/269. Washington, DC.
- Jensen, L. 2024. "The Economic and Fiscal Transition Costs of Global Climate Mitigation in Fossil Fuel Export Dependent Economies." *Resources Policy* 96: 105234.
- Karanfil, F., and L. D. Omgba. 2023. "The Energy Transition and Export Diversification in Oil-Dependent Countries: The Role of Structural Factors." *Ecological Economics* 204 (B): 107681. <https://doi.org/10.1016/j.ecolecon.2022.107681>.
- Khadan, J. 2017. "An Econometric Analysis of Energy Revenue and Government Expenditure Shocks on Economic Growth in Trinidad and Tobago." *Journal of Developing Areas* 51 (2): 183–203.
- Kohn, D., F. Leibovici, and H. Tretvoll. 2021. "Trade in Commodities and Business Cycle Volatility." *American Economic Journal: Macroeconomics* 13 (3): 173–208.
- Kumah, F. Y., and J. M. Matovu. 2007. "Commodity Price Shocks and the Odds on Fiscal Performance: A Structural Vector Autoregression Approach." IMF Staff Papers 54 (1): 91–112.

- Kuzov, T., D. Shtjefni, K. Mrkusova, E. Lecomte, M. Chinellato, E. V. W. Lonning, S. Baleva, M. Soede, T. Schleker, A. Mountraki, A. Georgakaki, and E. Tzimas. 2022. *SET Plan Progress Report*. Edited by C. Black. Luxembourg: Publications Office of the European Union. doi:10.2760/281247, JRC131032.
- Laan, T., and A. G. Maino. 2022. “Boom and Bust: The Fiscal Implications of Fossil Fuel Phase-out in Six Large Emerging Economies.” GSI Report, International Institute for Sustainable Development.
- Lebrand, M., G. Vasishta, and H. Yilmazkuday. 2024. “Energy Price Shocks and Current Account Balances: Evidence from Emerging Market and Developing Economies.” *Energy Economics* 129 (January): 107201.
- Lin, B., and H. Zhao. 2024. “Threatening the Poor? The Economic Impacts of Carbon Border Adjustment Mechanism on Developing Countries.” *Structural Change and Economic Dynamics* 71 (December): 582–93.
- Magacho, G., E. Espagne, A. Godin, A. Mantes, and D. Yilmaz. 2023. “Macroeconomic Exposure of Developing Economies to Low-Carbon Transition.” *World Development* 167 (July): 106231.
- Magacho, G., E. Espagne, and A. Godin. 2023. “Impacts of the CBAM on EU Trade Partners: Consequences for Developing Countries.” *Climate Policy* 24 (1): 1–17.
- Månberger, A., and B. Stenqvist. 2018. “Global Metal Flows in the Renewable Energy Transition: Exploring the Effects of Substitutes, Technological Mix and Development.” *Energy Policy* 119 (August): 226–41.
- Maur, J.-C., V. Palmade, A. N. T. Achomuma, N. Agapitova, R. Daga, D. Rambeloarison, M. Rossanaly, and B. S. Faye. 2022. *Country Private Sector Diagnostic: Creating Markets in the Democratic Republic of Congo—Putting Natural Resources to Sustainable Productive Use*. Country Private Sector Diagnostic, World Bank Group, Washington, DC.
- Medina, L. 2016. “The Effects of Commodity Price Shocks on Fiscal Aggregates in Latin America.” *IMF Economic Review* 64: 502–25.
- Mendoza Bellido, W., M. Vega, C. Rojas, and Y. Anastacio. 2021. “Fiscal Rules and Public Investment: The Case of Peru, 2000-2019.” IDB Working Paper 1186, Inter-American Development Bank, Washington, DC.
- Miller, H., S. Dikau, R. Svartzman, and S. Dees. 2023. “The Stumbling Block in ‘the Race of Our Lives’: Transition-Critical Materials, Financial Risks and the NGFS Climate Scenarios.” Working Paper 417, Centre for Climate Change Economics and Policy, London.
- Mills, R. 2020. “A Fine Balance: The Geopolitics of the Global Energy Transition in MENA.” In: (eds) *The Geopolitics of the Global Energy Transition. Lecture Notes in Energy*, edited by M. Hafner and S. Tagliapietra, Volume 73. Cham, Switzerland: Springer. https://doi.org/10.1007/978-3-030-39066-2_6.

Mirzoev, T., L. Zhu, Y. Yang, T. Zhang, E. Roos, A. Pescatori, and A. Matsumoto. 2020. "The Future of Oil and Fiscal Sustainability in the GCC Region." Middle East and Central Asia and Research Departments Paper 20/01, International Monetary Fund, Washington DC.

Moss, R., E. Tzimas, P. Willis, J. Arendor, L. Espinoza, et al. 2013. *Critical Metals in the Path towards the Decarbonisation of the EU Energy Sector: Assessing Rare Metals as Supply-Chain Bottlenecks in Low-Carbon Energy Technologies*. Petten, Netherlands: Joint Research Centre of the European Union.

Nalule, V. R., P. Anaman, and T. Acheampong. 2022. "Energy Transition and Africa's Oil and Gas Resources: Challenges and Opportunities." In *Petroleum Resource Management in Africa Lessons from Ten Years of Oil and Gas Production in Ghana*, edited by T. Acheampong and T. K. Stephens, 523–72. Cham, Switzerland: Palgrave Macmillan.

NGFS. 2024. *NGFS Long-Term Climate Scenarios Phase V: High-Level Overview*. Network for Greening the Financial System.

NGFS. 2025. *Statement Regarding Physical Risk Estimates in Phase V of NGFS Long-Term Scenarios*. "Network for Greening the Financial System." Press release dated December 3, 2025.

Peszko, G., D. van der Mensbrugghe, A. Golub, J. Ward, D. Zenghelis, C. Marijs, A. Schopp, J. Rogers, and A. Midgley. 2020. *Beyond Stranded Assets: Climate Strategies of Fossil Fuel-Dependent Countries*. Climate Change and Development Series. Washington, DC: World Bank Publications.

Puyo, D. M., A. J. Panton, T. Sridhar, M. Stuermer, C. Ungerer, and A. T. Zhang. 2024. "Key Challenges Faced by Fossil Fuel Exporters during the Energy Transition." IMF Staff Climate Note 2024/001, International Monetary Fund, Washington, DC.

Raimi, D., E. Grubert, J. Higdon, G. Metcalf, S. Pesek, and D. Singh. 2022. "The Fiscal Implications of the US Transition Away from Fossil Fuels." Resources for the Future.

Rishanty, A., D. F. Anugrah, and D. Rahmawati, D. 2023. "Coal Phase-Out: Socioeconomic Impact in Achieving Just Energy Transition in Indonesia." Working Paper 04/2023, Bank Indonesia.

Roemer, K. F., and J. H. Haggerty. 2022. "The Energy Transition as Fiscal Rupture: Public Services and Resilience Pathways in a Coal Company Town." *Energy Research & Social Science* 91 (September): 102752.

Sohag, K., A. Sokhanvar, Z. Belyaeva, and S. R. Mirnezami. 2022. "Hydrocarbon Price Shocks, Fiscal Stability, and Consolidation: Evidence from the Russian Federation." *Resources Policy* 76: 102635. <https://doi.org/10.1016/j.resourpol.2022.102635>.

- Solano-Rodríguez, B, S. Pye, P-H Li, P. Ekins, O. Manzano, and A. Vogt-Schilb. 2021. "Implications of Climate Targets on Oil Production and Fiscal Revenues in Latin America and the Caribbean." *Energy and Climate Change* 2: 100037.
- Tagliapietra, S. 2019. "The Impact of the Global Energy Transition on MENA Oil and Gas Producers." *Energy Strategy Reviews* 26: 100397.
- TCD-IMF (Task Force on Climate, Development and the International Monetary Fund). 2022. *The Fiscal Implications of Climate Transitions: The Importance of IMF Surveillance*. Available at <https://www.bu.edu/gdp/files/2022/04/TF-PB-04-FIN.pdf>.
- Titelman, D., N. Perez Benitez, M. Hanni, and M. S. Hazin. 2022. "Fiscal Impact Estimates of a Net-Zero Emissions Transition for Major Hydrocarbon Producers in Latin America and the Caribbean." The Task Force on Climate, Development and the International Monetary Fund.
- Vinturis, C. 2023. "How do Fiscal Rules Shape Governments' Spending Behavior?" *Economic Inquiry* 61 (2): 322–41.
- Vtyurina, S. 2015. "The Role of Fiscal Policies in Peru's Transformation." In *Peru: Staying the Course of Economic Success*, edited by A. Santos and A. Werner, 67–83. Washington, DC: International Monetary Fund.
- Wang, H. 2025. "Carbon Leakage through Supply Chain Adjustments." IDOS Discussion Paper 10/2025. Bonn: German Institute of Development and Sustainability.
- Welsby, D., J. Price, S. Pye, and P. Ekins. 2021. "Unextractable Fossil Fuels in a 1.5°C World." *Nature* 597 (7875): 230–4.
- World Bank. 2017. *The Growing Role of Minerals and Metals for a Low Carbon Future*. World Bank, Washington, DC.
- World Bank. 2020. "Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition," World Bank, Washington, DC.
- World Bank. 2021. "Special Focus: Causes and Consequences of Metal Price Shocks." In *Commodity Market Outlook*. April. Washington, DC: World Bank.
- World Bank. 2022a. *Commodity Markets: Evolution, Challenges, and Policies*. Washington, DC: World Bank.
- World Bank. 2022b. *Global Economic Prospects*. January. Washington, DC: World Bank.
- World Bank. 2023a. *Commodity Markets Outlook: Under the Shadow of Geopolitical Risks*. October. Washington, DC: World Bank.
- World Bank. 2023b. *Minerals for Climate Action: The Mineral Intensity of the Clean Energy Transition*. Washington, DC: World Bank.
- World Bank. 2025. *Global Economic Prospects*. January. Washington, DC: World Bank.
- World Integrated Trade Solution (WITS) (database). World Bank. Accessed March 20, 2026. <https://wits.worldbank.org>.

Governments can undertake a variety of policies to increase the likelihood of obtaining more revenues and of making sure revenues are well spent.

Joseph E. Stiglitz (2005)

2001 Sveriges Riksbank Prize in Economic Sciences in
Memory of Alfred Nobel, and
University Professor, Columbia University

CHAPTER 5

Managing the Impact of Commodity Price Volatility: Fiscal Policy Options

Coping with swings in commodity prices remains a persistent challenge for policy makers in commodity-exporting emerging market and developing economies (EMDEs). Since 2000, many commodity exporters have strengthened their fiscal policy frameworks and institutions to better manage the fiscal and macroeconomic consequences of commodity price swings. Well-designed and credible fiscal institutions and frameworks are associated with better fiscal policy outcomes—including lower fiscal procyclicality and volatility, and enhanced fiscal sustainability—and stronger growth prospects. The effectiveness of these frameworks, however, depends critically on country-specific factors. Fiscal frameworks tend to be more effective in countries with stronger governance institutions and budget transparency, and where political commitment supports enforcement and compliance. Strong adherence to fiscal discipline is paramount for these frameworks and institutions to be effective in achieving their objectives.

Introduction

Commodity-exporting emerging market and developing economies (EMDEs) are prone to chronic boom-and-bust cycles in economic activity linked to sharp fluctuations in commodity prices.¹ Commodity dependence makes it harder for policy makers in these economies to formulate appropriate fiscal responses to commodity price swings. The booms and busts in government revenues attributable to commodity price volatility tend to make fiscal policy more procyclical and more volatile in commodity-exporting EMDEs than in others (chapters 2 and 3). This procyclical and volatile nature of fiscal policy can amplify business cycles, with detrimental effects on the volatility of key macroeconomic variables—such as the exchange rate, inflation, and interest rates—which, in turn, hinder investment, employment, and sustainable growth. Procyclical fiscal policies can also cause government deficits and debt positions to ratchet up and deteriorate over time. This secular deterioration can further complicate fiscal management by hampering the implementation of countercyclical fiscal policy in bad times.

Commodity price volatility presents additional challenges for debt management in commodity-exporting EMDEs. Governments may be unable to reliably forecast future revenues and financing requirements, making it difficult to project external borrowing needs. When faced with adverse commodity price shocks, countries dependent on

Note: This chapter was prepared by Joseph Mawejje and Garima Vasishtha.

¹ As in previous chapters, an economy is defined as a commodity exporter if, on average in 2017–19, either (1) total commodities exports were at least 30 percent of total exports or (2) exports of any single commodity were at least 20 percent of total exports. Commodity importers are economies not classified as commodity exporters.

commodity revenues may find it difficult to repay debt or face high interest rates on new external debt as the sovereign risk premium rises. Conversely, when commodity prices rise, governments may take on more debt to finance development needs, including infrastructure projects, in the expectation that commodity revenues will remain elevated. Such procyclical borrowing, in turn, contributes to a substantial increase in debt, which could become unsustainable in the event of large or sustained declines in commodity prices. For example, the plunge in oil prices in 2014–16 led to a sharp increase in government debt ratios and a widening of fiscal sustainability gaps in many oil-exporting EMDEs (IMF 2017a; World Bank 2017a).

These challenges are even more pronounced in an environment of elevated debt and limited fiscal space. Median government debt in commodity-exporting EMDEs has grown substantially since 2010, from about 30 percent of GDP to about 51 percent in 2025. Over the same period, their median primary fiscal deficit averaged about 0.5 percentage point higher than that of commodity importers. The higher cost of servicing elevated debt levels, coupled with weaker growth prospects, has increased the risk of debt distress among some of these economies (chapter 1). Together with the wide commodity price swings since the pandemic, these developments highlight the need for stronger fiscal frameworks and institutions to manage the impact of commodity price volatility, and for renewed attention to the complex task of formulating fiscal policy in commodity exporters.

In the years ahead, the challenges associated with volatile and procyclical fiscal policies are likely to be compounded by fluctuations in commodity prices as the impact on commodity markets of geopolitical tensions, changing weather patterns, and the energy transition becomes more pronounced (chapter 4). The continuation of procyclical and volatile fiscal policies would be detrimental to growth and risk impeding progress toward broader development goals.

Against this backdrop, many commodity exporters have strengthened their fiscal policy frameworks and institutions over the past couple of decades. Many have modernized their fiscal policy management frameworks, including by adopting fiscal rules and fiscal institutions, such as fiscal councils, and establishing sovereign wealth funds (SWFs) (chapter 1; Beetsma et al. 2019; Caselli et al. 2022). These efforts have helped countries reduce fiscal procyclicality and volatility to some extent, improve fiscal sustainability, and mitigate the adverse impacts of commodity price fluctuations.² However, there is still considerable scope for further progress.

In this context, the chapter draws on an extensive literature review to examine the impact of fiscal frameworks and institutions on fiscal policy management in commodity exporters. For the purposes of this chapter, fiscal frameworks and institutions are broadly defined as including fiscal rules, fiscal councils, budget transparency mechanisms, medium-term expenditure frameworks, and SWFs. The chapter also

² Refer to, for example, Arroyo Marioli and Végh (2023); Arroyo Marioli, Fatás, and Vasishtha (2024); Arroyo Marioli and Vasishtha (2025); Céspedes and Velasco (2014); Frankel, Végh, and Vuletin (2013); Huidrom, Kose, and Ohnsorge (2018); and Mawejje and Odhiambo (2024).

examines the role of market-based mechanisms as complementary tools to help countries smooth the fiscal impacts of commodity price volatility and improve fiscal sustainability.³ It addresses the following questions:

- What fiscal frameworks and institutions have commodity-exporting EMDEs adopted since 2000?
- What has been the impact of fiscal frameworks and institutions on fiscal policy outcomes in commodity-exporting EMDEs?
- Under what conditions are fiscal frameworks and institutions in commodity-exporting EMDEs effective in achieving their objectives?

Contributions to the literature

The chapter contributes to a large and growing literature on the role of fiscal frameworks and institutions. *First*, it offers a comprehensive and systematic review of the literature on the impact of a broad range of fiscal frameworks and institutions on fiscal policy outcomes in EMDEs, particularly for commodity exporters. It also discusses the role of market-based mechanisms, such as options, futures, forwards, and swap contracts. *Second*, it examines the conditions that shape the efficacy of fiscal frameworks and institutions in supporting policy outcomes in commodity-exporting EMDEs. *Third*, it presents case studies to distill lessons from country experiences in the design and implementation of fiscal policy frameworks. *Fourth*, based on the comprehensive review of the literature and case studies, it offers a menu of policy options to strengthen fiscal policy outcomes in commodity-exporting EMDEs.

Main findings

This chapter presents the following findings:

Many commodity-exporting EMDEs have strengthened their fiscal frameworks and institutions since 2000. This includes the adoption of fiscal rules and fiscal councils, the establishment and use of SWFs, and processes to improve fiscal transparency. Some countries have adopted a mix of these frameworks in an integrated way.⁴ On balance, the adoption and strengthening of these frameworks and institutions are associated with better fiscal policy outcomes, including lower fiscal procyclicality and volatility, enhanced fiscal sustainability, and improved growth prospects. However, country cases highlight that the efficacy of these frameworks often varies, underscoring that their mere presence is not sufficient to guarantee sound fiscal performance.

The effectiveness of fiscal frameworks and institutions fundamentally hinges on strong governance, implementation capacity, and sustained political commitment. Policy outcomes

³ These market-based mechanisms include options, futures contracts, forward contracts, and swap contracts.

⁴ In Brazil, Chile, and Mongolia, for example, fiscal rules are combined with multiyear expenditure ceilings and a fiscal council. In Botswana and Timor-Leste, flows in and out of the sovereign wealth funds are embedded in a fiscal rule.

are better in countries where governance institutions ensure transparency, control corruption, and impose constraints on the bureaucracy. Conversely, fiscal frameworks are less effective where countries lack the technical capacity and governance structures to ensure strong implementation. Strengthening governance, transparency, and institutional quality remains central to improving fiscal outcomes and fostering resilience to commodity price volatility.

Among the core fiscal tools, well-designed fiscal rules and SWFs help reduce fiscal procyclicality and foster long-term fiscal sustainability. Fiscal rules—especially those using structural or cyclically adjusted balances—are associated with lower output volatility and improved fiscal sustainability. These benefits are most apparent when the rules include clearly defined escape clauses and strong legal enforcement procedures. SWFs, which are highly prevalent among commodity exporters (especially energy exporters), can serve multiple objectives. Most operate either as stabilization funds to insulate the budget from short-term price swings or as savings funds to build intergenerational wealth. Both fiscal rules and SWFs tend to be more effective in reducing fiscal procyclicality and fostering long-term fiscal sustainability when complemented by robust monitoring procedures and independent oversight.

Beyond rules-based frameworks, the adoption of transparent budgetary institutions and medium-term expenditure frameworks (MTEFs) enhances policy credibility and resource allocation efficiency. Budget transparency is associated with lower borrowing costs, improved government spending efficiency, and enhanced accountability. MTEFs, which set multiyear budgetary targets, contribute to aggregate fiscal discipline and facilitate more strategic resource allocation. These institutional arrangements can strengthen fiscal governance by improving policy predictability, supporting informed decision-making, and reinforcing accountability in the management of public resources.

Finally, market-based instruments offer specialized methods for managing short-term commodity price risks, although their implementation requires significant expertise and strong communication strategies. Hedging tools—such as options, futures, forwards, and swap contracts—can lock in future prices or insure against large price movements, reducing revenue volatility and improving a country's borrowing capacity. However, countries' experiences with market-based risk-management tools have been rather mixed, with the use of these instruments constrained by technical complexity, cost, and political economy risks.

Fiscal frameworks and institutions

Fiscal rules

Fiscal rules impose numerical constraints on fiscal aggregates and aim to ensure sound fiscal policy management by limiting fiscal policy discretion. The most common reasons for the adoption of fiscal rules are to foster fiscal discipline, anchor long-term fiscal sustainability, and support macroeconomic stabilization (Bova, Carcenac, and Guerguil 2014; Kumar et al. 2009; Wyplosz 2013). There are four main types of fiscal rules, based on the budgetary aggregate they aim to constrain (Davoodi et al. 2022).

- *Budget balance rules.* The objective of a budget balance rule is to constrain the size of the deficit and thus control the evolution of the debt ratio. Such rules involve clear operational limits, which can apply to the overall balance, primary balance, structural balance, or cyclically adjusted balance.⁵ Examples of commodity exporters with budget balance rules include Indonesia and Peru. If followed properly, such rules can help prevent debt sustainability issues. However, in some cases, budget balance rules can induce fiscal procyclicality by forcing expenditures to follow revenues, which are usually procyclical.
- *Revenue rules.* These rules set ceilings and floors on revenues and are aimed at boosting revenue collection and/or preventing an excessive tax burden. Most of these rules are not directly linked to the control of public debt because they do not constrain spending. Moreover, setting ceilings and floors on revenues can be challenging because revenues often have a large cyclical component, fluctuating in line with the business cycle. Revenue rules alone could result in procyclical fiscal policy because floors generally do not account for automatic stabilizers (such as unemployment benefits) in a downturn, and ceilings do not account for them in an upturn. Revenue rules can, however, directly target the size of the government. Examples of commodity exporters with revenue rules include Benin, the Islamic Republic of Iran, and Timor-Leste.
- *Expenditure rules.* Expenditure rules set limits on total, primary, or current government expenditures to limit the procyclicality of fiscal policy (for example, Botswana, Ecuador, and Tanzania). Such limits are relatively easy to monitor and operate, and are typically set either in absolute terms or as growth rates, and sometimes as a percentage of GDP. The time horizon often ranges from three to five years. Expenditure rules can constrain spending during booms, when windfall revenues are temporarily high and deficit limits are easy to comply with. By constraining government spending, expenditure rules can be used to define an adjustment path consistent with debt sustainability objectives. However, expenditure rules do not allow much scope for discretionary fiscal stimulus during economic downturns.
- *Debt rules.* These rules focus on long-term sustainability by setting an explicit anchor or ceiling for public debt (often as a share of GDP). A debt rule is relatively easy to communicate and, in practice, effectively ensures convergence to a debt target. However, debt rules do not provide clear short-term guidance for policy makers because it takes time for budgetary measures to affect debt levels. Moreover, fiscal policy may become procyclical if the economy is hit by shocks and the debt target, defined as a percentage of GDP, is binding. Conversely, when debt is well below its ceiling, such a rule does not provide binding guidance (Budina et al.

⁵ “Pay-as-you-go” rules stipulate that any additional deficit-raising expenditure or revenue measures must be offset in a deficit-neutral manner. Because such rules do not set numerical limits on budgetary aggregates, they are typically considered procedural rather than numerical fiscal rules.

2013). Examples of commodity exporters with debt rules include Cabo Verde, Ecuador, and Zambia.

These rules can be adopted individually or in combination.⁶ The most common arrangements have been a combination of a debt rule and operational limits on expenditures or on the budget balance. Over two-thirds of commodity-exporting EMDEs with fiscal rules have a debt rule together with operational limits on annual budget aggregates. Furthermore, fiscal rules may be adopted at the national or supranational level.⁷

Adoption of fiscal rules

Over the last two decades, the adoption of fiscal rules has increased rapidly in EMDEs, including commodity exporters (figure 5.1.A). As of end-2024, 50 out of a total of 94 commodity-exporting EMDEs had at least one fiscal rule in place. In total, 112 fiscal rules were in place in these countries. The pace of rules adoption, however, has varied across countries. While fiscal rules were initially more prevalent in agricultural exporters, metal exporters adopted rules at a faster pace than other commodity exporters. By 2024, fiscal rules were more common in metal exporters than in agricultural and energy exporters (figure 5.1.B). Many EMDEs have often adopted a combination of fiscal rules, with the average number of rules comparable among commodity exporters and other EMDEs (figure 5.1.C). Within commodity exporters, agricultural exporters have tended to adopt multiple rules more often than energy and metal exporters (figure 5.1.D).

In terms of the types of fiscal rules among commodity-exporting EMDEs, budget balance and debt rules have been most prevalent, followed by expenditure rules. In 2024, budget balance and debt rules accounted for about 38 percent and 37 percent of fiscal rules in these countries, respectively—more than twice the share of expenditure rules. Revenue rules were less common, accounting for only 11 percent of fiscal rules in commodity exporters (figure 5.1.E). The composition of fiscal rules has evolved in starkly different ways across commodity exporters. Since 2000, the share of expenditure rules has declined substantially among energy exporters. The share of budget balance rules has also declined, although to a lesser extent, while the share of debt rules has increased (figure 5.1.F). In metal exporters, budget balance and revenue rules have become less prevalent over time while the share of debt rules has nearly doubled. In agricultural exporters, reliance on expenditure rules has risen while revenue rules have become less common.

For EMDEs that are part of regional economic or monetary unions, fiscal rules may be adopted to facilitate convergence to macroeconomic and fiscal targets. For example, in

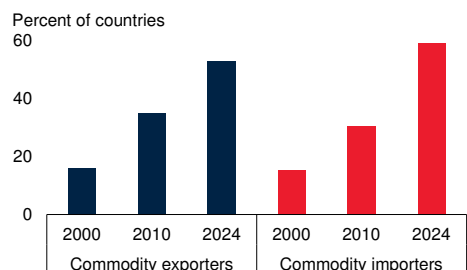
⁶Note that many countries adopt numerical fiscal rules in tandem with “procedural rules.” The latter are procedures for the budgetary process designed to establish good practices, improve transparency, and enhance predictability (refer to, for example, van Eden, Khemani, and Emery 2013). Procedural rules are not included in the Alonso et al. (2025) database on fiscal rules and, hence, are not covered in this chapter.

⁷Fiscal rules can also be adopted at the subnational level, but these are not discussed here.

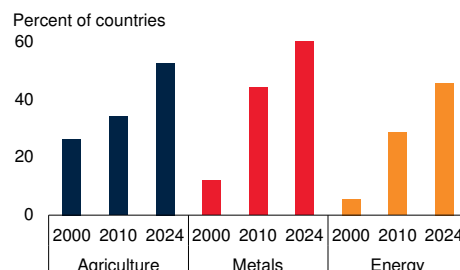
FIGURE 5.1 Fiscal rules

Since 2000, adoption of fiscal rules has increased rapidly in both commodity exporters and other EMDEs. Fiscal rules have been adopted across all types of commodity exporters—agricultural, metal, and energy—with the average number of rules per country at about 2 in 2024. Budget balance and debt rules are the most common types of rules for both commodity exporters and importers.

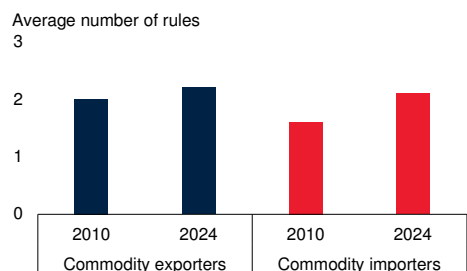
A. Share of EMDEs with fiscal rules, by commodity exporter status



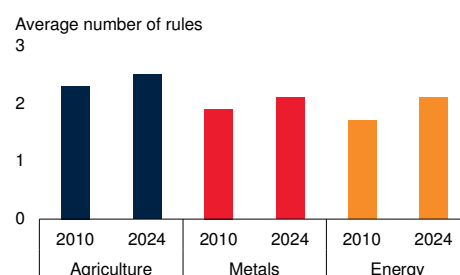
B. Share of economies with fiscal rules, by type of commodity export



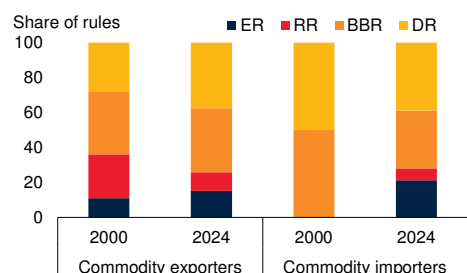
C. Average number of fiscal rules in EMDEs, by commodity exporter status



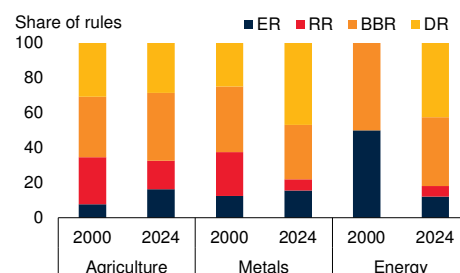
D. Average number of fiscal rules in commodity exporters, by type of commodity export



E. Type of fiscal rules in EMDEs, by commodity exporter status



F. Type of fiscal rules in commodity exporters, by type of commodity export



Sources: Alonso et al. (2025); World Bank.

Note: BBR = budget balance rule; DR = debt rule; EMDEs = emerging market and developing economies; ER = expenditure rule; RR = revenue rule. Data focus on de jure arrangements and not on the extent to which rules have been adhered to in practice. Criteria for identifying fiscal rules are listed in Alonso et al. (2025).

A. Share of countries with at least one fiscal rule in place.

B. Share of agricultural, metal, and energy exporters with at least one fiscal rule in place.

C. Averages are based on a sample of 85 EMDEs, including 50 commodity exporters and 35 commodity importers.

D. Averages are based on a sample of 20 agricultural exporters, 16 energy exporters, and 15 metal exporters.

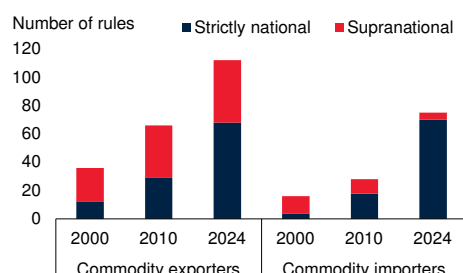
E. Sample includes 85 EMDEs, of which 50 are commodity exporters and 35 commodity importers.

F. Sample includes 20 agricultural exporters, 16 energy exporters, and 15 metal exporters.

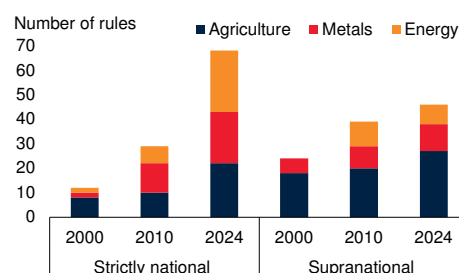
FIGURE 5.2 National and supranational fiscal rules

National fiscal rules are as common among commodity-exporting EMDEs as in other EMDEs. Supranational rules are more prevalent among commodity exporters than among importers. Within commodity exporters, supranational rules are most common among agricultural exporters.

A. National and supranational rules, by commodity exporter status



B. National and supranational rules in commodity exporters



Sources: Alonso et al. (2025); World Bank.

Note: EMDEs = emerging market and developing economies. Supranational fiscal rules may be adopted to facilitate convergence to macroeconomic and fiscal targets among EMDEs that are part of regional economic blocs. These rules are complemented by national rules in some countries. For clarity, data shown distinguish between “strictly national” and “supranational” rules. Data focus on de jure arrangements and not on the degree to which rules have been adhered to in practice.

A. Sample includes 85 EMDEs, including 50 commodity exporters and 35 commodity importers.

B. Sample includes 20 agricultural exporters, 16 energy exporters, and 15 metal exporters.

the West African Economic and Monetary Union (WAEMU), supranational rules impose a public debt ceiling of 70 percent of GDP and set limits on the accumulation of public expenditure arrears (Dessus, Diaz-Sanchez, and Varoudakis 2016). In the East African Community (EAC), supranational fiscal rules require member countries to adhere to fiscal deficits of 3 percent of GDP and to a public-debt limit of 50 percent of GDP in net present value terms (Ltaifa, Yabara, and Williams 2015). Overall, supranational fiscal rules are more prevalent among commodity exporters than among importers (figure 5.2.A). Among commodity exporters, the number of supranational rules in agricultural exporters far outnumbers that for energy and metal exporters (figure 5.2.B).

Evidence on the effectiveness of fiscal rules in commodity exporters

Fiscal policy tends to be more procyclical and more volatile among commodity-exporting EMDEs than in other EMDEs (chapters 2 and 3). The evidence shows that the adoption of fiscal rules is generally associated with less procyclicality.⁸ In addition, fiscal rules have been shown to mitigate the adverse cyclical effects of terms-of-trade volatility and government debt burdens in emerging markets (Bergman and Hutchison 2020). At the same time, fiscal rules can constrain the ability of incumbent politicians to manipulate government finances, which acts to dampen political business cycles (Gootjes, de Haan, and Jong-A-Pin 2021; Strong 2023).

⁸ For recent evidence on the link between fiscal rules and procyclicality, refer to, for instance, Badinger and Reuter (2017); Caselli and Reynaud (2020); Céspedes and Velasco (2014); and Martorano (2018).

Commodity terms-of-trade shocks can precipitate output and macroeconomic volatility in commodity-dependent countries (Drechsel and Tenreyro 2018; Richaud et al. 2019). In these countries, fiscal rules strengthen fiscal governance and foster countercyclical fiscal policies, resulting in lower volatility and improved fiscal sustainability. For instance, in Chile, the structural balance rule and countercyclical fiscal policy have been central in reducing output volatility, preserving external competitiveness, and maintaining fiscal sustainability. These policies were particularly important during the 2009 global recession, following adverse terms-of-trade shocks (Céspedes and Velasco 2014). Moreover, fiscal rules can help reduce government borrowing costs, which are reflected in lower sovereign debt spreads (Afonso and Jalles 2019; Sawadogo 2020).

The effectiveness of fiscal rules varies with country characteristics—notably institutional quality and accountability—and with the economic and political conditions prevailing at the time of adoption (Fatás, Gootjes, and Mawejje 2026). Rules are more effective in constraining procyclical fiscal policies in countries where institutions of governance are strong and can ensure transparency, control corruption, and impose constraints on the bureaucracy.⁹ In addition, their effectiveness is positively associated with government stability. Political commitment is important for the successful implementation of fiscal rules (Baunsgaard et al. 2012). Fiscal space also plays a key role. While fiscal rules can reduce government external debt, their impact at high debt levels is complex and depends crucially on the type and design features of the fiscal rule (Apeti et al. 2024; Combes, Minea, and Sow 2017).

In addition to country characteristics, the design of fiscal rules matters for their efficacy in achieving desired outcomes. Generally, fiscal rules that are well designed and flexible can reduce the procyclicality of government spending and support fiscal sustainability in resource-rich countries (Bova, Carcenac, and Guerguil 2014; Céspedes, Parrado, and Velasco 2014; Guerguil, Mandon, and Tapsoba 2017). In this regard, fiscal rules with clearly defined escape clauses and legal enforcement and monitoring mechanisms are particularly effective. They are most effective when supported by multiyear budgetary frameworks and fiscal councils and when they safeguard public investment. Poorly designed rules, in contrast, can be ineffective or amplify, rather than dampen, the business cycle (Arezki and Ismail 2013; Bova et al. 2016). Moreover, the efficacy of fiscal rules correlates with their number, type (national or supranational), duration since adoption, and measures of government stability and fractionalization (Tapsoba 2012).

Fiscal rules are more effective in achieving their objectives when appropriate monitoring and enforcement procedures are in place (Grembi, Nannicini, and Troiano 2016). Formal enforcement procedures usually involve integrating the rule into the medium-term budget framework and the annual budget (Davoodi et al. 2022). In some instances, fiscal councils are responsible for enforcement by monitoring compliance with the fiscal rule (Beetsma et al. 2019). The number of fiscal rules that have monitoring and

⁹ For example, Bergman and Hutchison (2015); da Costa António and Rodríguez-Gil (2020); Erbil (2011); Frankel, Végh, and Vuletin (2013); and Konuki and Villafuerte (2016).

enforcement procedures has increased since 2000, with such procedures more prevalent in commodity exporters than in other EMDEs. As of 2024, the number of fiscal rules that featured monitoring and enforcement procedures in commodity exporters was about twice that in other EMDEs (figure 5.3.A). Yet the share of fiscal rules with these procedures has trended down in commodity exporters since 2000 and, by 2024, was only slightly higher than in other EMDEs (figure 5.3.B). Among commodity exporters, the adoption of fiscal rules with enforcement procedures has been highest among agricultural exporters and lowest among energy exporters (figures 5.3.C and 5.3.D).

Political economy considerations also matter for the effectiveness of fiscal rules (Eslava 2011). Compliance with fiscal rules tends to be stronger in environments characterized by less government fragmentation (Ardanaz, Ulloa-Suárez, and Valencia 2024). Rules are less effective in the presence of government fragmentation because the so-called “common pool” problem is likely to be stronger in more fragmented and heterogeneous government coalitions (Alesina and Perotti 1995; Tapsoba 2012). According to the “common pool” explanation, the deficit bias in fiscal policy arises because interest groups that benefit from certain categories of public spending tend to free ride on the contributions of others (Debrun et al. 2008; Velasco 1999; Weingast, Shepsle, and Johnson 1981). Over time, this results in large deficits and the accumulation of debt. Numerical fiscal rules aim to contain or eliminate this bias.

Furthermore, fiscal rules are more effective in achieving their objectives in environments of political consensus and lower polarization (Piguillem and Riboni 2021). In countries with sizable commodity revenues, political and social contestation over the distribution of resource rents can weaken institutions and undermine the effectiveness of fiscal frameworks (Eyraud, Gbhoui, and Medas 2023).

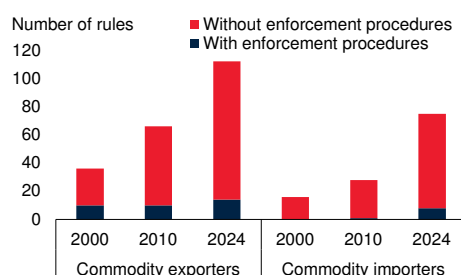
Fiscal councils

Although their mandates, composition, and structure vary across countries, fiscal councils are generally intended as independent, nonpartisan agencies with specific objectives. These objectives include (i) strengthening commitment to sustainable policies, including through public assessments of fiscal plans and performance; (ii) providing or assessing macroeconomic and budgetary forecasts; and (iii) involving independent stakeholders in the policy development and review process (Mooney, Wright, and Grenade 2018). In some countries, fiscal councils were formed as part of long-term fiscal reforms. For example, Chile established a fiscal council as part of a gradual process of implementing a modern institutional framework to manage fiscal policy. In other cases, however, the growth of fiscal councils was triggered by different factors. These include external pressures from adverse shocks, such as the aftermath of the global financial crisis and the plunge in oil prices; supranational directives consistent with convergence criteria as part of regional integration processes; and the presence of an IMF program (Bova, Carcenac, and Guerguil 2014; Davoodi et al. 2022; Debrun and Kinda 2017).

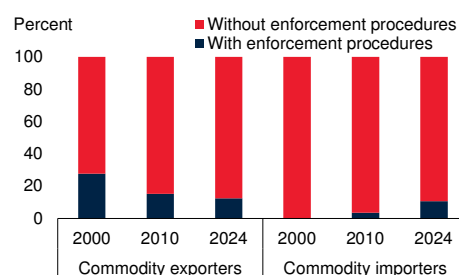
FIGURE 5.3 Enforceability features of fiscal rules

The number of fiscal rules with enforcement procedures in commodity exporters is about twice as high as in commodity importers. However, the share of fiscal rules with these procedures in commodity exporters has trended down since 2000, driven by agricultural and metal exporters.

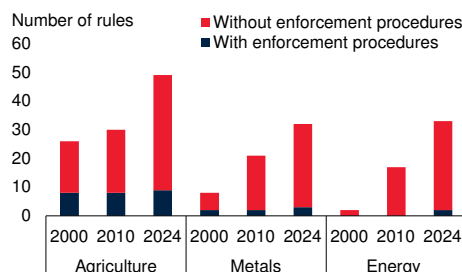
A. Fiscal rules with enforcement procedures, by commodity exporter status



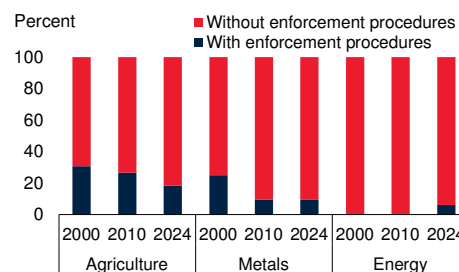
B. Share of fiscal rules with enforcement procedures, by commodity exporter status



C. Fiscal rules with enforcement procedures in commodity exporters



D. Share of fiscal rules with enforcement procedures in commodity exporters



Sources: Alonso et al. (2025); World Bank.

Note: EMDEs = emerging market and developing economies. Data focus on de jure arrangements and not on the degree to which rules have been adhered to in practice.

A.B. Sample includes 85 EMDEs, of which 50 are commodity exporters and 35 are commodity importers.

C.D. Sample includes 20 agricultural exporters, 16 energy exporters, and 15 metal exporters.

Adoption of fiscal councils

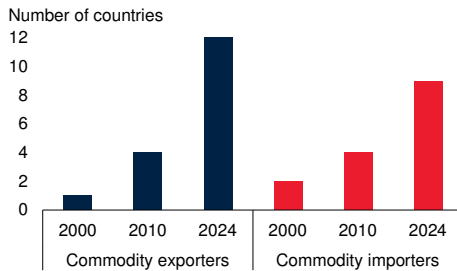
The adoption of fiscal councils has gained increasing appeal for imposing constraints on policy makers' discretion and curbing biases toward procyclical policies and excessive deficits (Beetsma et al. 2019). While early adopters were advanced economies with strong administrative and technical capacity, several EMDEs followed suit, particularly in the aftermath of the 2007–09 global financial crisis. Nevertheless, the adoption of fiscal councils in EMDEs has lagged that in advanced economies. As of end-2024, 55 fiscal councils were in place in 51 countries, of which 21 are EMDEs, including 12 classified as commodity exporters (figure 5.4.A).¹⁰ Fiscal councils are more prevalent in agricultural exporters than in metal and energy exporters (figure 5.4.B).

¹⁰ Belgium, Chile, Colombia, and the Netherlands have two fiscal councils each.

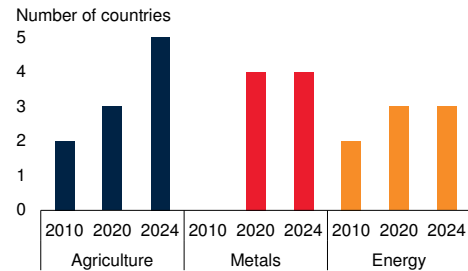
FIGURE 5.4 Fiscal councils

A growing number of countries have adopted fiscal councils as independent fiscal oversight institutions, although adoption remains limited among EMDEs. The number of EMDE commodity exporters with fiscal councils has increased more than threefold from 2000 to 2024. Of the 21 EMDEs that had fiscal councils in 2024, more than one-half are commodity exporters.

A. Fiscal councils in EMDEs, by commodity exporter status



B. Fiscal councils in commodity-exporting EMDEs, by commodity export type



Sources: Alonso et al. (2025); World Bank.

Note: EMDEs = emerging market and developing economies.

A. Number of EMDEs with fiscal councils. Based on a sample of 21 EMDEs, of which 12 are commodity exporters.

B. Number of EMDE commodity exporters with fiscal councils, by commodity type. Based on a sample of 12 EMDE commodity exporters, of which 5 are agricultural commodity exporters, 3 are energy exporters, and 4 are metal exporters.

Evidence on the effectiveness of fiscal councils in commodity exporters

Independent fiscal councils have played a particularly important role in commodity-exporting countries that have been able to transition from procyclical to countercyclical fiscal policies. Evidence shows that fiscal councils can be effective in reducing fiscal policy discretion and fiscal procyclicality (Hagemann 2011). Fiscal councils have been shown to reduce biases in fiscal forecasts, as well as support compliance with fiscal rules (Beetsma et al. 2019; Debrun and Kinda 2017).

Ensuring that fiscal councils are independent, adequately resourced, and have clear mandates is key to their success (Hagemann 2011). Indeed, evidence from resource-dependent Caribbean countries shows that fiscal councils are effective where their operations are well defined and enshrined in law with robust legal and regulatory mechanisms. They are also effective when mandates are clear, quantitative objectives are anchored in fiscal rules, and operations are free from political influences (Schwartz and Beuermann 2021). Otherwise, poorly designed or inadequately resourced fiscal councils may not be able to achieve their stated objectives and improve fiscal performance (Davoodi et al. 2022). Lessons from the country case studies of fiscal rules and fiscal councils in Chile and Uganda support this notion (box 5.1). Chile is often regarded as a good example of successful fiscal institutions that have supported countercyclical fiscal policies (Frankel 2011; Hagemann 2011). An independent fiscal council was formalized in Chile in 2019, completing a set of institutions. The set includes the Economic and Social Stabilization Fund (ESSF), established in 2006, and the fiscal rule, established in 2001 (box 5.1; Fuentes, Schmidt-Hebbel, and Soto 2021).

Budget transparency mechanisms

Budget transparency refers to the complete disclosure of all relevant fiscal policy information, including that related to policy intentions, formulation, and implementation, in a systematic and timely manner (Bastida and Benito 2007; OECD 2002). The following principles are considered best practices for fiscal transparency (IMF 2019a):

- *Fiscal reporting.* Fiscal reports should provide a comprehensive, relevant, timely, and reliable overview of the government's financial position and performance.
- *Fiscal forecasting and budgeting.* Budgets and their underlying fiscal forecasts should clearly state the government's budgetary objectives and policy intentions, while providing comprehensive, timely, and credible projections of the evolution of public finances.
- *Fiscal risk analysis and management.* Governments should disclose, analyze, and manage risks to public finances and ensure effective coordination of fiscal decision-making across the public sector.
- *Resource revenue management.* Government revenues from natural resource exploration and extraction activity should be collected, managed, and disbursed in an open and transparent manner.

Evolution of budget transparency

Budget transparency tends to be lower in EMDEs than in advanced economies. Within EMDEs, budget transparency (as measured by the *Open Budget Index*) is lower, on average, in commodity exporters than in commodity importers (figure 5.5.A).¹¹ Budget transparency tends to be lower in energy exporters than among metal and agricultural commodity exporters (figure 5.5.B). More generally, greater dependence on commodity export revenues can erode institutional quality or delay institutional development (Isham et al. 2005). Stronger public governance institutions can improve transparency in commodity exporters (Ross 2011).

Evidence on the effectiveness of budget transparency mechanisms

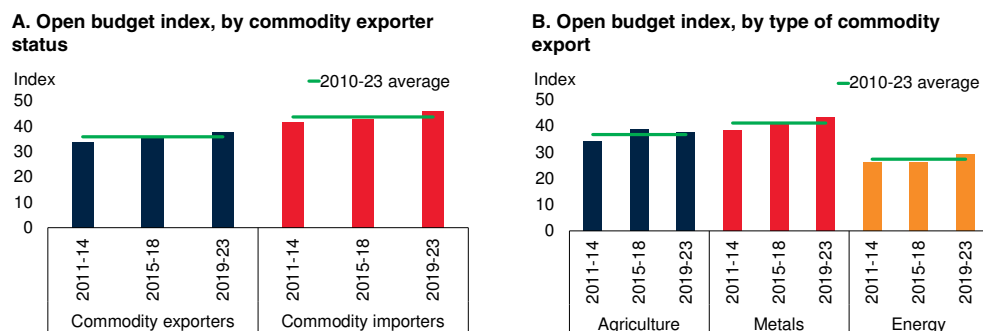
Overall, transparency in budget management is associated with better fiscal outcomes.¹² In addition to strengthening governance, more transparent budgets improve the

¹¹ The "Open Budget Index," produced by the International Budget Partnership, captures the extent to which a country makes eight key budget documents available to the public on the relevant government website in a timely manner. It also measures the comprehensiveness of the budget information provided in these publicly available documents. The index ranges from 0 to 100, with higher values representing greater budget accountability.

¹² Given the limited research on budget transparency mechanisms in commodity exporters, the literature reviewed in this section covers a wider group of countries. However, the insights from this literature are also relevant for commodity exporting countries.

FIGURE 5.5 Budget transparency

Commodity exporters rank much lower than commodity importers on budget transparency, according to the Open Budget Index. Budget transparency among energy exporters is lower than in metal and agricultural commodity exporters.



Sources: International Budget Partnership; World Bank.

Note: EMDEs = emerging market and developing economies. Open Budget Index ranges from 0 to 100 and is based on various dimensions of the availability, timeliness, and quality of central government budget documents. Bars show unweighted averages. Green horizontal lines show 2010–23 averages.

A. Based on up to 106 EMDEs, including 71 commodity exporters and 35 commodity importers.

B. Sample includes 31 agricultural exporters, 23 energy exporters, and 20 metal exporters.

effectiveness of fiscal rules and enhance fiscal and economic performance in resource-rich countries (El Anshasy and Katsaiti 2013; Gootjes and de Haan 2022). While greater commodity dependence is generally associated with lower budget transparency, the nature and extent of this relationship seem to depend on the degree of reliance on natural resource revenues and the type of political regime and budget institutions (De Renzio, Gomez, and Sheppard 2005).

Some aspects of public financial management (PFM) practices that improve transparency, such as audits of government finances and public access to information, are associated with improved fiscal performance. Better PFM practices improve fiscal sustainability through lower budget deficits and lower external debt levels (Prakash and Cabezon 2008). In addition, fiscal consolidations are more credible and successful when supported by strong PFM systems (Balasundharam et al. 2023). Among the critical aspects of PFM practices correlated with better fiscal outcomes are budget transparency, access to information, and the completion of budget performance audits.¹³ For instance, budget transparency has been shown to have important ameliorating effects on public debt accumulation (Montes, Bastos, and de Oliveira 2019).

Further, budget transparency is associated with improved government spending efficiency and effectiveness. Fiscal transparency, including public participation in budget processes, enhances accountability and citizens' demand for public services. In this

¹³ On the importance of budget transparency and access to information, refer to El Anshasy and Katsaiti (2013) and van Ingen, Wait, and Kleynhans (2014). On the role of budget performance audits, refer to Gui-Diby (2022).

respect, fiscal transparency contributes to improved resource allocation, spending efficiency, and overall government effectiveness (Montes, Bastos, and de Oliveira 2019). While this relationship may be nonlinear, excessive openness can result in higher administrative costs that could potentially lead to political capture of public spending decisions. The positive fiscal effects of transparency result from curbing political and bureaucratic corruption (ElBerry, Naert, and Goeminne 2022).

Budget transparency can support budget credibility—broadly defined as the extent to which outcomes are aligned with budget plans and forecasts—but requires strong, democratic institutions of governance to be effective. The timely disclosure of quality budget information, ensuring parliamentary and public scrutiny, as well as the independent audit of budget outcomes, are critical elements that affect budget credibility (ElBerry and Goeminne 2021). In this respect, strengthening transparency and oversight can reduce deviations of budget outcomes from forecasts and lower uncertainty about fiscal policy in EMDEs. In addition, transparency is associated with lower borrowing costs through its positive impact on credit ratings and sovereign credit spreads (Arbatli and Escolano 2015; Peat, Svec, and Wang 2015). The impact of budget transparency on budget credibility and borrowing costs increases with the level of institutional development. Separately, an emerging strand of the literature shows that the effects of budget transparency on government spending efficiency are stronger in democratic countries but less so in non-democracies (De Simone et al. 2019).

Medium-term expenditure frameworks

MTEFs serve as important tools for governments in setting multiyear budgetary targets for fiscal policy. Such frameworks typically outline the expected government expenditures for the next 3–5 years. They function as an operational mechanism for translating medium-term fiscal objectives into annual budget decisions through the establishment of credible expenditure ceilings and medium-term fiscal targets (Curristine et al. 2024). More broadly, MTEFs aim to achieve three objectives: maintain aggregate fiscal discipline; facilitate more strategic allocation of resources; and encourage more efficient intertemporal planning of expenditure (Holmes and Evans 2003; World Bank 2013). MTEF objectives can be linked to wider social and economic objectives, including public investment efficiency and poverty reduction (Allen et al. 2017).¹⁴

MTEFs usually encompass a three-stage process involving forecasting, budgeting, and allocations. The first phase adopts a top-down approach, wherein budgetary actors, typically led by the ministry of finance, in collaboration with other ministries and the central bank, forecast the availability of resources. These forecasts are then transformed into initial spending allocations. Subsequently, the process employs a bottom-up approach, where corresponding spending agencies assess the costs associated with existing and new programs, translating them into multi-year budget requests. In the final

¹⁴ There can also be links to broader macroeconomic outcomes. For instance, improved fiscal outcomes can be associated with higher growth and lower inflation and macroeconomic volatility (Grigoli et al. 2012).

stage, the ministry of finance meticulously reviews all budget requests. Through active discussions with spending agencies and a comprehensive consideration of trade-offs, the ministry ultimately determines multiyear allocations for all spending units (World Bank 2013).

MTEFs can be categorized based on three key features corresponding to their developmental stages. As an initial feature, MTEFs primarily focus on aligning fiscal policy objectives, such as the general government budget balance, with overall expenditure and revenue estimates over the medium term. Moving to the next stage, these frameworks start providing more detailed information on fiscal policy projections, including a thorough reconciliation of all expenditure and revenue measures at the annual budget level. Finally, advanced MTEFs may include a detailed explanation and discussion of fiscal policy estimates linked to medium-term output and outcome targets. These linkages facilitate the measurement and evaluation of government performance (Castro and Dorotinsky 2008).

Following these features, MTEFs can be classified into three phases corresponding to their level of development (Grigoli et al. 2012; World Bank 2013). These phases are “nested” in the sense that a higher-phase MTEF contains the previous lower-phase MTEF.

- *Medium-Term Fiscal Framework (MTFF)*: An MTFF follows a top-down approach, establishing the aggregate resource envelope. Features include budget or other reports containing the government’s macro-fiscal strategy, macroeconomic and fiscal forecasts, and debt sustainability analysis.
- *Medium-Term Budgetary Framework (MTBF)*: In addition to the features of an MTFF, an MTBF includes the bottom-up determination of spending needs across sectors, programs, and agencies. It also reconciles these with the top-down resource envelope established under the MTFF. MTBF indicators include a budget strategy paper detailing budgetary objectives and constraints, spending agency or other reports explaining aggregate and sectoral expenditure objectives and strategies, and budget circulars detailing medium-term expenditure ceilings or forecasts.
- *Medium-Term Performance Framework (MTPF)*: Building on an MTBF, an MTPF emphasizes the measurement and evaluation of performance, setting sectoral performance targets. In other words, an MTPF is a full-fledged medium-term expenditure framework. MTPF indicators include budget, spending agency, or other reports explaining program objectives and strategies; listing specific agency and/or program output or outcome targets; and explaining results.

Adoption of MTEFs

The number of countries with MTEFs increased from an estimated 11 in 1990 to 132 at the end of 2008 (Vlaicu et al. 2014; World Bank 2013). Initially adopted by a select group of advanced economies in the early 1980s to address public overspending, MTEFs

became widely accepted as integral components of fiscal governance throughout the 1990s and 2000s. Among EMDEs, MTEFs were introduced to strengthen public finance management and realign expenditures with long-term development needs (World Bank 1998). In more recent decades, the adoption of MTEFs accelerated in the aftermath of financial crises, with a view of reconciling short-term pressures with longer-term priorities (Raudla, Douglas, and MacCarthaigh 2022). The lack of data makes it difficult to estimate the current number of EMDEs with MTEFs.¹⁵

Evidence on the effectiveness of MTEFs

The introduction of an MTEF can lead to improvements in fiscal performance, characterized by reduced budget deficits (Vlaicu et al. 2014; World Bank 2013). However, these improvements tend to be transient, especially in the case of frameworks lacking comprehensive metrics for monitoring and evaluating fiscal performance. MTEFs exert a significant and sizeable impact on government budgets. Their effects improve when countries implement a full-fledged MTEF—the MTPF. More advanced MTEFs can also be associated with lower spending volatility and higher spending efficiency (Vlaicu et al. 2014; World Bank 2013).

MTEFs require strong supporting institutions to be effective and work best when established within a clearly defined legal framework (Filc and Scartascini 2010). In contrast, these frameworks may fail to meet their objectives where institutions are weak and key government functions are hindered by capacity constraints in critical technical and administrative areas (Schiavo-Campo 2009). Similarly, a lack of fiscal transparency can impair budget credibility and increase uncertainty about fiscal policy in EMDEs (ElBerry and Goeminne 2021). They can also complement other fiscal frameworks to achieve desired fiscal policy objectives. For instance, when MTEFs are combined with fiscal rules, they can help improve fiscal balances and the quality of budget forecasts (Hansen 2020; von Hagen 2010).

The challenges in establishing MTEFs are especially pronounced in developing countries. Implementing a robust and well-functioning MTEF hinges on the availability of sufficient technical and human resources (Jones and Lawson 2000). For instance, proficiency in working with macro-fiscal models and generating high-quality fiscal forecasts is pivotal for the development and success of these frameworks (World Bank 2013). However, in many developing countries, the essential resources and skills needed for this purpose are limited. Introducing an all-encompassing MTEF without these foundational elements may inadvertently shift resources and focus away from the framework's core tasks and objectives. This shift could impede its capacity to enhance fiscal performance. The effectiveness of MTEFs can also be enhanced by ensuring the credibility of the annual budget process (Allen et al. 2017).

¹⁵ The IMF's Fiscal Rules Dataset (Alonso et al. 2025) includes information on countries with multi-year expenditure ceilings but does not provide a complete picture of the number of countries that have adopted an MTEF or a similar framework. The dataset provides information on MTEFs only for countries that have fiscal rules.

Strong political commitment is important for the credibility of MTEFs. Countries adopt MTEFs for various reasons consistent with prevailing economic conditions and medium-term policy objectives. However, their success depends crucially on strong government ownership and support (Schiavo-Campo 2009). In South Africa, for example, an MTEF was introduced in the context of high government debt and sought to improve the cost efficiency of public spending. With widespread support at the top levels of government, the long-standing problems of underspending by the central government and overspending at the subnational level were brought under control following the introduction of the MTEF (World Bank 2013).

Sovereign wealth funds

SWFs are special-purpose public savings or investment funds that are owned by the government and designed to stabilize business cycles and expand national wealth. SWFs hold, manage, or administer assets to achieve financial objectives and employ investment strategies that include investing in foreign financial assets (IWG 2008). SWFs emerged in contexts of abundance, often to manage excess fiscal revenues from natural resource exports or large foreign exchange reserves (Divakaran et al. 2022). The objectives of SWFs depend on country-specific circumstances, which may evolve over time. SWFs can be categorized into the following types of funds based on their dominant objectives:¹⁶

- *Stabilization funds.* These funds are established by countries rich in natural resources to insulate the budget and economy from commodity price volatility—for example, the Economic and Social Stabilization Fund in Chile. Revenue flows into the funds when government receipts exceed a benchmark, and money can be withdrawn from the fund when government revenue falls below that benchmark.
- *Savings funds.* The primary objective of a savings fund is to build wealth for future generations and ensure intergenerational equity in countries that rely on nonrenewable natural resources, such as oil. Examples include the Petroleum Fund in Timor-Leste and the Pula Fund in Botswana. These funds are characterized by fixed inflows of government revenue and discretionary outflows, reflecting a higher tolerance for short-term volatility and a focus on longer-term returns. Savings funds are established when a government can put aside funds for the future and be reasonably confident that the assets in the fund will not need to be liquidated in the short and medium run (Al-Hassan et al. 2018).
- *Financing funds.* A financing fund combines the characteristics of a stabilization fund and a savings fund, such as Norway's SWF. It is fully integrated into the government budget process. Typically, inflows to the fund come from government resource revenues and returns on the fund's investments. Outflows are transfers to cover any

¹⁶ Other types of SWFs include reserve investment corporations, which seek to earn higher returns on foreign exchange reserves (for example, China and Singapore); development wealth funds (for example, Mongolia); and pension reserve funds, which aim to meet future public pension liabilities (for example, Australia).

non-resource budget deficit. As a result, the fund receives positive net transfers if and only if the government runs a budget surplus when resource revenues are included. This is not necessarily the case for stabilization and savings funds (for example, that of New Zealand) because these funds are not linked to government budget deficits or surpluses (Al-Hassan et al. 2018). A key feature of the financing fund model is the fiscal policy guideline (or rule), which specifies the desired trajectory of the non-resource budget deficit to be financed by transfers from the fund.

Additionally, SWFs can be set up to enhance transparency in fiscal policy and the management of export revenues, especially from commodities. In practice, SWFs typically have multiple objectives that may evolve over time. As circumstances evolve, the objectives of the funds can also shift, especially in commodity-exporting countries. For example, a stabilization fund may be created to manage fiscal revenue fluctuations or to sterilize foreign currency inflows. As the fund's assets accumulate beyond the amount needed for stabilization, authorities might review and adjust its goals, broadening its purpose. This process often results in assets being split into several tranches for different needs or in the creation of distinct funds with specific objectives.

Adoption of SWFs

The adoption of SWFs has grown steadily over the past few decades. Since 1990, the number of SWFs operational in EMDEs has increased eightfold to reach about 90 in 2024. These funds are more prevalent among commodity exporters than in commodity importers (figure 5.6.A). The increase in SWFs among commodity importers reflects the accumulation of reserves not associated with the export of commodities. Furthermore, SWFs have become more prevalent across emerging market regions over the past three decades. In 1990, only a handful of commodity exporters in the Middle East and North Africa (MNA) region and the East Asia and Pacific (EAP) region had SWFs in place. By 2024, SWFs were present in many commodity exporters in all EMDE regions (figure 5.6.B).

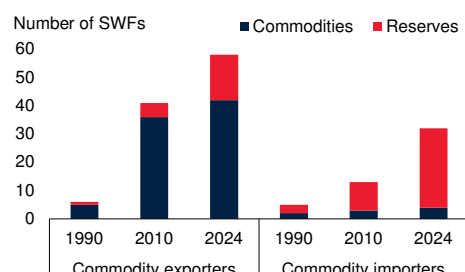
Among commodity-exporting EMDEs, the adoption of SWFs varies considerably across countries. The share of commodity exporters with SWFs is highest among energy exporters, followed by metal exporters, and agricultural exporters (figure 5.6.C). With regard to their mandates, commodity exporters have tended to establish savings and stabilization funds, reflecting the need to manage revenue volatility and promote intergenerational equity. In contrast, commodity importers have increasingly established “strategic” funds, typically aimed at supporting development objectives such as financing infrastructure or promoting long-term economic transformation (figure 5.6.D).

Alongside the increasing adoption of SWFs, the value of assets held by these funds has grown significantly since 2000. The total assets under management of these funds were estimated at about \$11.9 trillion as of May 2024, with funds in EMDEs accounting for about 67 percent (\$8 trillion) of total assets (figure 5.7.A). Among EMDEs, SWFs in commodity exporters accounted for about two-thirds of total assets under management

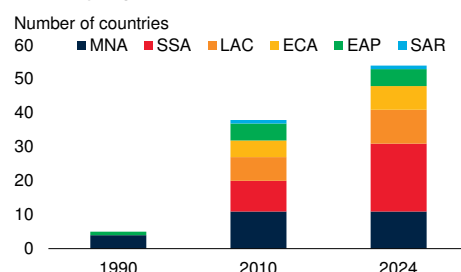
FIGURE 5.6 Sovereign wealth funds

The number of SWFs in EMDEs has grown eightfold since 1990, to an estimated 90 in 2024. These funds are more prevalent among commodity exporters than in commodity importers. SWFs have become more widespread across emerging market regions in recent decades. Among commodity exporters, the share of countries with SWFs is highest for energy exporters. Savings and stabilization funds predominate in commodity exporters, while commodity importers have tended to establish strategic funds.

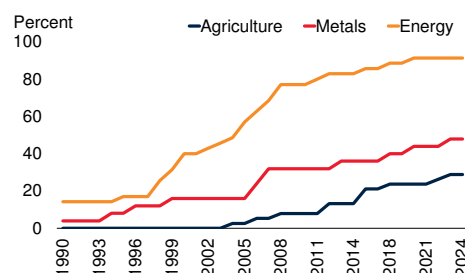
A. SWFs in EMDEs, by source of funds



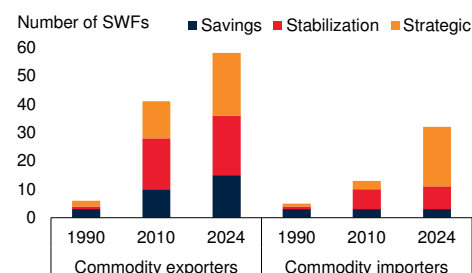
B. Number of EMDE commodity exporters with SWFs, by region



C. Share of commodity exporters with SWFs, by type of commodity export



D. Number of SWFs in EMDEs, by mandate



Sources: Global SWF (database); World Bank.

Note: EAP = East Asia and Pacific; ECA = Europe and Central Asia; EMDEs = emerging market and developing economies; LAC = Latin America and the Caribbean; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; SWF = sovereign wealth fund.

A. Number of SWFs in EMDEs, by source of funds (export of commodities or accumulation of reserves). Based on up to 84 EMDEs, including 54 commodity exporters.

B. Number of EMDE commodity exporters with at least one SWF, by EMDE region. Based on 54 EMDE commodity exporters.

C. Share of EMDE commodity exporters with SWFs. Based on 38 agricultural exporters, 35 energy exporters, and 25 metal exporters.

D. Number of SWFs in EMDEs, by SWF mandate (savings, stabilization, or strategic). Based on up to 85 EMDEs, including 54 commodity exporters.

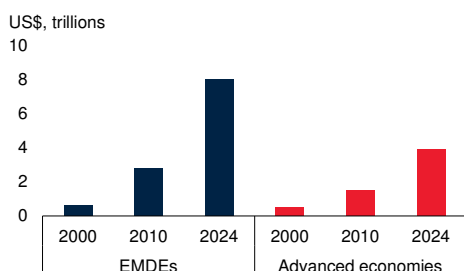
(figure 5.7.B). The countries with the largest SWF assets—both in total value and in per capita terms—are mostly energy exporters (figures 5.7.C and 5.7.D).

Countries that specialize in exporting commodities whose prices are relatively more volatile are more likely to establish SWFs (Amar, Lecourt, and Kinon 2018; Carpentier and Vermeulen 2018). This is consistent with the notion that precautionary savings can smooth government consumption, and that SWFs help commodity exporters reduce fiscal policy volatility associated with commodity price fluctuations (Al-Sadiq and Gutiérrez 2023). Moreover, countries with higher governance quality and democratic

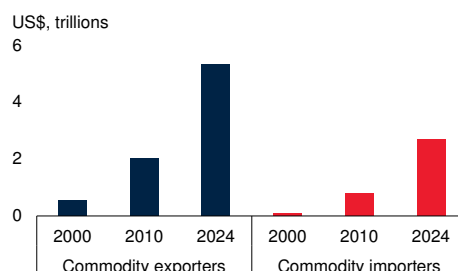
FIGURE 5.7 Value of sovereign wealth funds

As of mid-2024, SWFs managed total assets estimated at about \$11.9 trillion, with funds in EMDEs contributing about 67 percent (\$8 trillion). Among EMDEs, SWFs in commodity exporters accounted for about two-thirds of total assets under management. Countries with the largest SWFs are mostly energy exporters.

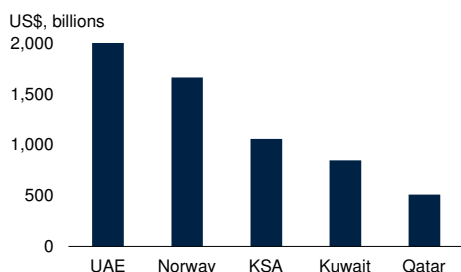
A. Value of SWFs



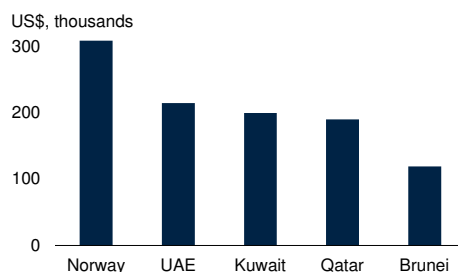
B. Value of SWFs in EMDEs, by commodity exporter status



C. Commodity exporters with the largest SWFs



D. Commodity exporters with the largest per capita SWF assets



Sources: Global SWF (database); United Nations; World Bank.

Note: EMDEs = emerging market and developing economies; KSA = Kingdom of Saudi Arabia; SWF = sovereign wealth fund; UAE = United Arab Emirates.

A. Panel shows total value of SWF assets among advanced economies and EMDEs. Based on a sample of 107 economies, of which 22 are advanced economies and 85 are EMDEs.

B. Panel shows total value of SWF assets among EMDEs. Based on a sample of 85 EMDEs, of which 54 are commodity exporters.

C. Panel shows commodity exporters with the largest total SWF assets in 2024.

D. Panel shows commodity exporters with the largest per capita SWF assets in 2024. Per capita values are computed using population data from the United Nations.

systems are more likely to have SWFs than those with weaker institutions (Aizenman and Glick 2009; Carpentier and Vermeulen 2018).

Evidence on the effectiveness of SWFs

There is growing evidence that SWFs can reduce the procyclicality of government spending in commodity-dependent EMDEs (Coutinho et al. 2022; Elbadawi, Soto, and Youssef 2017). The ability of SWFs to dampen the negative impact of commodity terms-of-trade volatility depends crucially on the strength of institutions, which act to shield these funds from political influence (chapter 2; Koh 2017; Mohaddes and Raissi 2017; World Bank 2024). While these funds reduce government expenditure volatility

in countries with strong institutional frameworks and fiscal rules, their effectiveness is hampered where integration with the budget is limited and controls are inadequate (Le Borgne and Medas 2007; Sugawara 2014; Tsani 2013, 2015).

SWFs can support countercyclical fiscal policy and improved economic outcomes if they are tailored to a country's level of development. While stabilization funds play an important role in short-term stabilization, savings funds play a critical role in transforming a temporary boom into permanent wealth over the longer term (James et al. 2022). Although SWFs have traditionally invested in external assets, they are increasingly being tapped to finance domestic investment, including human and physical capital (Gelb et al. 2014). In this respect, SWFs can support long-term development needs, especially in capital-scarce countries at lower levels of development (Addison and Lebdioui 2022; Van der Ploeg and Venables 2011).

However, domestic investment by SWFs risks de-stabilizing macroeconomic management as well as undermining the quality of public investment and the wealth objectives of the fund. Another concern is that governments may use them to support failing enterprises or to benefit politically-connected elites (Addison and Lebdioui 2020). These risks can be mitigated by clearly delineating the government's role as promoter of investments from its role as owner of the SWF. In addition, domestic investment by the SWF should not be used to finance public expenditure that circumvents the budgetary process (Gelb et al. 2014). It is also important to ensure that domestic investments by the SWF are an integral part of a sustainable public investment plan rather than costly boom-bust macroeconomic cycles.

Market-based instruments

The preceding sections presented evidence on the adoption of fiscal frameworks and institutions in commodity-exporting EMDEs and their effectiveness in managing the impacts of commodity price volatility. Beyond these frameworks and institutions, market-based instruments can help reduce some of the volatility of fiscal revenues. The following section focuses on these instruments.

Hedging instruments

Hedging instruments—such as options, futures, forward, and swap contracts—can be used to manage short-term risks associated with commodity price volatility. These instruments work by either locking in the price of future production or insuring against large commodity price movements, or both (Daniel 2003). The following instruments can be used (UNCTAD 2023a):

- *Options:* An option gives the hedger the right to buy (call) or sell (put) a given quantity of a commodity at a predetermined price within a given period. Options allow market participants to hedge against adverse price movements while benefiting from favorable market conditions.

- *Futures contracts:* Futures contracts are legal agreements to buy or sell a commodity at a predetermined price and a specified date in the future. These contracts are traded on futures exchanges and allow producers and buyers to lock in commodity prices, reducing uncertainty and volatility associated with spot prices. However, because prices are locked in, the holder has limited ability to benefit from positive price movements that may occur in the future.
- *Forward contracts:* These contracts are derivative contracts between two parties to buy or sell an asset at a predetermined price and on a specified date in the future. Unlike futures contracts, forward contracts are not traded on exchanges. By using forward contracts, the holder can hedge exposure to price volatility.
- *Swap contracts:* Swap contracts allow two parties to exchange cash flows based on commodity price movements, allowing them to manage associated risks.

Hedging instruments, particularly options, can support short-term price risk management and increase welfare in commodity-exporting countries. Theoretical models show that this can be achieved by reducing export revenue volatility, improving the country's ability to borrow against future export revenue, and reducing risk spreads on sovereign debt (Borensztein, Jeanne, and Sandri 2013; Ma and Valencia 2024).

Adoption of hedging instruments

While, in principle, financial markets provide mechanisms for efficient commodity price risk sharing, very few countries have used hedging instruments in practice. Several factors may explain why these instruments are relatively underutilized in developing countries. These contracts can be technically complex, difficult to communicate to stakeholders, costly, and politically risky. For instance, hedging programs may entail costs related to reduced consumption and welfare, including the risk that contract negotiations lock in commodity prices that are below market trends (Borensztein, Jeanne, and Sandri 2013; Samaké and Spatafora 2012). Such risks can also be politically costly, leading some countries to delay or abandon hedging programs. Over longer horizons, opportunities for financial hedging are incomplete (Becker et al. 2007).

Mexico's government has a long history of using a hedging program to manage oil price risk.¹⁷ The program was set up in 2001, although Mexico's first hedge, which constituted a put option, was implemented as early as 1990 (box 5.1; Ma and Valencia 2024). Other countries have also used these instruments, although much less so in low-income countries (LICs), except when international financial institutions are involved. Ghana first instituted an oil price hedging program to stabilize import prices in 2010. Following the start of commercial oil production, an oil export price hedging program was started in 2011 but abandoned in 2013 (IFS 2015). Ghana also used futures

¹⁷ While Mexico is not classified as a commodity exporter under the classification used here, it nonetheless provides an instructive example of how hedging programs can operate in countries that derive a substantial share of government revenue from commodity exports.

markets to hedge risks related to cocoa export prices (using three-month forwards), with some degree of success (IMF and World Bank 2011).

In Uruguay, the World Bank assisted in managing oil price volatility by partnering with the national oil company to develop a hedging program. The program covered about half of total annual oil imports for 12 months and reduced the impact of rising oil prices on the budget and economy (Navarro-Martin 2017). Other commodity-exporting countries, including Argentina, Brazil, Chile, Colombia, Ecuador, Papua New Guinea, Uruguay, and República Bolivariana de Venezuela, have used hedging instruments to mitigate the impact of commodity price fluctuations, with varying degrees of success.

Evidence on the effectiveness of hedging instruments

Country experiences with market-based risk management tools have been mixed. Among countries that have utilized oil price hedging instruments, Mexico provides a good example of how a well-managed hedging program can reduce revenue volatility. The development of a framework to optimize the execution of hedging strategies and the timing of hedges to trade in good liquidity conditions has been key to the success of the country's hedge programs (box 5.1; Duclaud and Garcia 2012). In contrast, other countries, such as Ecuador and Ghana, have been less successful. The experience of Ghana illustrates the potential advantages as well as some of the challenges for countries at lower income levels in using hedging instruments.

Given that the administration of hedging instruments is complex and knowledge intensive, political economy considerations and the availability of technical expertise play a role in their successful implementation. The risk of loss inherent in these instruments may deter some governments from participating in commodity hedging programs. One distinct feature of hedging programs is that their benefits are usually in the form of avoided costs, which may be interpreted by the public as spending on insurance that was not needed. Such perceptions can potentially precipitate political backlash.¹⁸ In addition, hedging programs require substantial technical expertise, which may be lacking in many commodity-exporting EMDEs, especially LICs.

Other market-based mechanisms

State-contingent bonds

State-contingent bonds are a type of financial instrument where the issuer's obligation to pay is contingent on the occurrence of a predefined state, such as an adverse economic event (IMF 2017b). For commodity-exporting EMDEs, state-contingent fiscal instruments are attractive and can help countries with limited fiscal space to access international financial markets. Indexing the terms of new loans to the price of the main commodity export can help such countries maintain fiscal sustainability in the event of a decline in the underlying commodity price (Atta-Mensah 2004; Caballero 2002; Frankel

¹⁸ As an example, the authorities in Ecuador suffered a political backlash in 1993 after a poorly designed hedge program resulted in significant losses.

2018). Commodity-indexed bonds can be beneficial for commodity-exporting countries facing debt sustainability challenges when the dollar prices of their primary commodity exports decline. The potential role of GDP-linked bonds in supporting fiscal sustainability in commodity-exporting countries has also been discussed (Borensztein and Mauro 2004). While the theoretical argument for state-contingent bonds is not new, the market for such bonds is not yet well developed.

Commodity exchanges

Commodity exchanges provide a platform for buyers and sellers to trade commodity-linked contracts, including agricultural, metal, and energy resources, for future delivery under rules and procedures established by the exchange (UNCTAD 2023a). This helps countries and traders mitigate risks associated with commodity price volatility. Examples of commodity-exporting countries that have used commodity exchanges to stabilize prices and manage risks associated with price fluctuations include Ethiopia and Nigeria (UNCTAD 2009). Nigeria's Abuja Securities and Commodity Exchange (ASCE) started agricultural spot trading in July 2006 with six listed products, including maize, soybeans, sorghum, sesame seeds, millet, and cowpea. The Ethiopia Commodity Exchange (ECEX) became operational in 2008, with an initial focus on grains, oilseeds, spices, and beverage crops. A few other commodity-exporting EMDEs have established commodity exchanges with varying degrees of success. Commodity exchanges work well when they are adequately regulated. Otherwise, they run the risk of being used for speculation in commodity prices, which may limit their effectiveness (UNCTAD 2023b).

Policy options

As documented above, many commodity-exporting EMDEs have taken steps to strengthen their fiscal policy frameworks and institutions over the past couple of decades. Broadly speaking, these improvements have been critical in managing the adverse impacts of commodity price volatility. However, there remains considerable scope for progress. While specific policy priorities will depend on country circumstances, the following broad strands of policy options can be distilled from country case studies and the literature.

Fiscal frameworks and institutions

Proper design, monitoring, and enforcement of fiscal rules

While a growing number of commodity-exporting EMDEs have adopted fiscal rules since 2000, evidence indicates that the mere presence of such rules is not enough to improve fiscal outcomes. Country circumstances matter for the choice of fiscal rules. Countries tend to adopt fiscal rules that are consistent with their main fiscal policy objective, which may be short-term stabilization, long-term fiscal sustainability, or both. The design and implementation of rules also matter. Poorly designed fiscal rules or rules that are not sufficiently well defined can entrench fiscal procyclicality. Furthermore,

fiscal rules are more effective when they can be monitored and enforced to support compliance and when they are supported by strong, transparent, and independent institutions of governance. Less than one-half of all fiscal rules have formal enforcement procedures, which weakens their implementation and compliance. Strengthening the design of fiscal rules and improving their implementation can help reduce fiscal procyclicality, support macroeconomic stabilization, build and preserve fiscal space, and ensure long-term fiscal sustainability.

Independent and well-resourced fiscal councils

Fiscal councils can enhance the credibility of fiscal frameworks. Yet the adoption of fiscal councils has been limited to about one in eight EMDEs, half of which are commodity exporters.¹⁹ Fiscal councils can reduce fiscal procyclicality by improving the quality of budget estimates and forecasts, and by adding a layer of scrutiny to support compliance with fiscal rules. However, for fiscal councils to be effective, they must be adequately resourced, established within clearly defined legal and regulatory mechanisms, independent and free from political influences, and have clear mandates.

Transparent and independent budgetary institutions

Budget transparency, including public participation in budget processes, enhances accountability and contributes to improved resource allocation, spending efficiency, and overall government effectiveness. In addition, fiscal transparency is associated with lower borrowing costs through its positive impact on credit ratings and sovereign credit spreads. The introduction of an MTEF can also improve fiscal policy management and outcomes, leading to improvements in budget balances, lower spending volatility, and higher spending efficiency. However, the effectiveness of these mechanisms and institutions depends crucially on government ownership and support and on the capacity of government institutions to implement them. In the absence of these conditions, budgetary frameworks may impose significant transaction costs on governments without yielding better fiscal outcomes.

Well-managed SWFs

SWFs can reduce the procyclicality and volatility of government spending in commodity-dependent EMDEs. SWFs work well when they are shielded from political influence and when their objectives and operational rules are clear and aligned with a country's development goals. Additionally, the effectiveness of SWFs depends crucially on management quality and overall commitment to fiscal discipline.

Public institutions, governance, and implementation capacity

Strong public institutions and governance frameworks

Resource abundance can be advantageous if the government has a long-term plan for extracting resources and a sound mechanism for using resource revenues to meet

¹⁹ Based on the Alonso et al. (2025) database on fiscal councils.

development needs. However, resource wealth can undermine institutions and long-term growth by promoting rent seeking, corruption, and the squandering of resources through unproductive spending, poor-quality investment, and the depletion of government savings. In general, resource-rich countries with stronger economic and political institutions tend to achieve better macroeconomic and growth outcomes (Arezki and Bruckner 2010; Arezki, Hamilton, and Kazimov 2011; van der Ploeg 2011). Fiscal frameworks and institutions have been successful in delivering their desired policy outcomes when they are adopted within supportive legal, regulatory, and institutional environments and where their independence is safeguarded.

Robust public institutions help limit the procyclicality of fiscal expenditures (chapter 2; Ossowski et al. 2008; Sugawara 2014). Improvements in institutional quality, such as government stability and law and order, have played an important role in the decline in fiscal procyclicality in EMDEs since the global financial crisis (Arroyo Marioli and Végh 2023). In LICs, the quality of budget institutions—measured by the quality of the various stages of the budget process and the number of checks and balances in place—is positively associated with the ability of these countries to conduct countercyclical policies (Dabla-Norris et al. 2010).

Case studies of commodity-exporting countries also demonstrate that fiscal rules and SWFs work best when well designed, closely linked to broader policy objectives, and supported by strong institutions and a commitment to fiscal discipline (chapter 3). When such enabling factors are lacking, fiscal rules are often not adhered to closely, diminishing their effectiveness.

Complementarities between fiscal frameworks

There can be mutually reinforcing interactions between fiscal policy frameworks and institutions that countries can seek to strengthen. Some countries have combined fiscal policies with strong institutions to build sustainable fiscal frameworks and reduce fiscal policy volatility. For instance, in Chile, Colombia, Mongolia, and Peru, fiscal rules have been combined with multiyear expenditure ceilings and a fiscal council. Such a mix of fiscal policies can support consumption smoothing in commodity-exporting EMDEs in various ways. By improving forecasting accuracy and enhancing compliance monitoring, fiscal councils can strengthen fiscal policy frameworks (Beetsma et al. 2019). In a similar vein, MTEFs can improve the performance and effectiveness of other fiscal frameworks by adding a layer of credibility, predictability, and transparency (Kąsek and Webbe 2009; Vlaicu et al. 2014). Likewise, the effectiveness of SWFs can be enhanced by supportive fiscal rules that put operational guidelines on government consumption, investment, and savings (Le Borgne and Medas 2007; Tsani 2013, 2015). In Botswana, for example, flows in and out of the sovereign wealth fund are embedded in a fiscal rule (Pouokam 2021).

Implementation capacity

Successful implementation of the frameworks discussed in this chapter may depend on the broader policy environment. The effectiveness of fiscal policy frameworks can be

undermined if they are implemented poorly or inconsistently. The lessons distilled from the literature and country cases underscore that authorities need the capacity and technical expertise to implement fiscal policy frameworks effectively and deliver expected results. For instance, fiscal councils require technical expertise in fiscal policy analysis and forecasting. Successful implementation of MTEFs may be hindered by capacity constraints in critical technical and administrative areas. Management quality matters for the success of sovereign wealth funds. Similarly, the design and implementation of hedging instruments require specialized technical expertise. Weak technical and administrative capacity in some EMDEs, particularly LICs, can hinder the establishment and effective implementation of fiscal policy frameworks. However, strengthening implementation capacity takes time and may require technical assistance.

Policies to foster diversification

To tackle macroeconomic volatility induced by commodity price fluctuations at its source, EMDEs can encourage greater economic diversification over the longer run, away from production of commodities.²⁰ Policies that promote export diversification can help achieve this objective. Beyond diversifying exports and economic structures, which is difficult in practice and may not be feasible in the short run, governments could also focus more on diversifying their “national asset portfolios.” This includes diversifying the mix of natural resources and human and physical capital by fostering investment in infrastructure and strengthening economic institutions (Gill et al. 2014; World Bank 2021a).

Multiple policy levers can facilitate economic diversification (World Bank 2022a). A comprehensive strategy to reduce commodity reliance could entail the gradual scaling up of domestic fixed investments in tangible assets while diversifying the tradable sectors (Chang and Lebdioui 2020). Prudent resource rent management is vital for directing resource revenues toward productive capacity building and sustained economic development. Regulatory reforms aimed at improving the business climate are critical for attracting investment. With regard to tradable sectors, policies can support export diversification and sophistication by encouraging firms to undertake multiple stages of production (vertical diversification). Governments may further encourage firms to diversify their output mix (horizontal diversification), with an emphasis on innovation and technological upgrading (Cherif and Hasanov 2014).

Infrastructure development—including transport corridors, ports, telecommunications, and energy infrastructure—is essential to reduce trade costs and enable firms to participate in regional and global value chains. Additional strategies to promote diversification encompass education and skills development, with particular attention to learning outcomes rather than enrollment rates. Cross-country studies indicate that diversifying exports and government revenue streams away from commodities enhances long-term growth prospects and bolsters resilience to external shocks (for example, Hesse 2008; Papageorgiou and Spatafora 2012; World Bank 2018).

²⁰ For a detailed discussion, refer to Gill et al. (2014); Joya (2015); and World Bank (2022a).

Despite its apparent economic benefits, few EMDEs have successfully overcome commodity dependence. Analysis of relatively successful diversification experiences reveals diverse, context-specific pathways rather than a one-size-fits-all approach. For example, Chile pursued a two-track diversification strategy. First, it diversified *within* industry by increasing value added in the copper sector through improved extraction processes and ancillary services development. Second, it diversified *across* industries, including through the development of fisheries and increased exports of high-value-added agricultural goods (World Bank 2017b). Chile also established mechanisms to save resource rents and invest strategically during commodity busts, underpinned by fiscal rules and SWFs.

Other examples of relatively successful diversification point to different internal and external factors and highlight the role of natural endowments. The experience of Indonesia suggests that active diversification policies can yield results under favorable conditions, including access to markets and foreign technologies. The country's size, large domestic market, natural endowments for agribusiness and labor-intensive manufacturing, and favorable demographics supported diversification (Lashitew, Ross, and Werker 2021).

Balancing the risks and advantages of market-based instruments

Market-based instruments can help countries cushion the impact of commodity price volatility. However, the use of these instruments requires considerable technical expertise, which may constrain the ability of countries to adopt them. Overcoming these challenges requires countries to develop the requisite technical capacity and independent institutions to manage market-based instruments. At the same time, hedging instruments can entail political risks. Managing expectations through effective communication of potential benefits and risks is crucial, requiring countries to adopt clearly crafted strategies that emphasize benefits while helping to mitigate public discontent.

Global support for fiscal frameworks and institutions

The global community can bolster efforts to strengthen domestic fiscal frameworks by supporting capacity-building initiatives that enhance their effectiveness and credibility. Such efforts can help rebuild fiscal space, including through well-coordinated and efficient debt treatment frameworks where needed. Policy advice and technical assistance from international financial institutions can help address gaps in implementation capacity.

The World Bank, working primarily through the International Development Association (IDA), has supported the strengthening of fiscal frameworks, including medium-term fiscal and budget frameworks, fiscal rules, budget systems, and core PFM systems more broadly. Capacity-development initiatives have typically focused on diagnostics, legal reforms, systems rollout, and staff training. However, the impact of these initiatives has been limited where enforcement, institutional capacity, and links to

annual budgeting remained weak (World Bank 2021b). To complement these efforts, the World Bank and the International Monetary Fund have adopted a three-pillar approach to mobilize existing and new tools into a comprehensive package to support low-income and vulnerable EMDEs in addressing liquidity challenges (IMF and World Bank 2024). The approach involves: (1) strengthening structural reforms and domestic resource mobilization; (2) mobilizing sufficient international support to help countries meet financing needs and ensure net positive flows, particularly for LICs; and (3) where relevant, reducing debt-servicing burdens.

Beyond strengthening institutional foundations, international support can help alleviate financing constraints that limit the effective implementation of fiscal frameworks in EMDEs, and especially in IDA countries where implementation capacity remains relatively weak. This includes providing concessional financing to stabilize fiscal positions and support reform implementation. Such support should be tailored to each country's needs as well as the strength and ambition of the domestic reform agenda. In parallel, greater international coordination can reinforce fiscal policy frameworks and help sustain reform momentum. Such coordination can also ease structural constraints to economic diversification and strengthen long-term economic resilience.

Conclusions

Commodity-exporting EMDEs face persistent challenges in managing swings inherent in global commodity prices. Sharp fluctuations can trigger chronic boom-and-bust cycles that undermine macroeconomic stability and ultimately hinder investment and sustainable growth. High commodity dependence can also complicate debt management. This chapter shows that successfully navigating such an environment requires decisive action to strengthen fiscal institutions and frameworks. While many commodity exporters have improved their fiscal frameworks—adopting fiscal rules, establishing SWFs, and bolstering transparency—considerable scope for progress remains. An extensive review of the literature confirms that enhancements to fiscal frameworks and institutions are generally associated with better fiscal policy outcomes, contributing to lower fiscal procyclicality and volatility, improved fiscal sustainability, and stronger growth prospects.

Fiscal rules serve as essential instruments for imposing numerical constraints on fiscal aggregates, fostering discipline, and anchoring long-term fiscal sustainability. Evidence suggests that rules work best in countries with strong institutions of governance, high budget transparency, and a political commitment to fiscal discipline. Additionally, independent and well-resourced fiscal councils provide a necessary layer of scrutiny and credibility to fiscal frameworks, helping to curb discretion and reduce procyclical tendencies. Moreover, budget transparency is associated with better fiscal outcomes, stronger governance, and greater overall effectiveness. Greater transparency enhances accountability, improves spending efficiency, and leads to lower government borrowing costs by improving credit ratings and narrowing sovereign spreads. Given that budget transparency is generally lower in commodity exporters, especially energy exporters,

strengthening public financial management practices is essential for rebuilding credibility.

Complementing transparency, MTEFs aim to achieve aggregate fiscal discipline, strategic resource allocation, and efficient planning. Their introduction can significantly improve fiscal performance, including by reducing budget deficits and spending volatility. Successful implementation of MTEFs requires strong government ownership, political support, and adequate technical capacity in macro-fiscal modeling and forecasting.

Many commodity exporters have established SWFs to stabilize business cycles and build national wealth. SWFs are effective when shielded from political influences and supported by clear operational guidelines, often embedded within the country's fiscal rule framework. Beyond institutional reforms, market-based instruments offer tools to manage short-term commodity price risks through hedging strategies like options and futures contracts. These instruments can buffer the budget against severe price shocks, reduce revenue volatility, and narrow sovereign debt risk spreads. However, these instruments remain underutilized due to technical complexity and the risk of domestic political backlash when outcomes are unfavorable.

Taken together, this chapter highlights that managing fiscal challenges posed by commodity price volatility hinges on a synergistic relationship between robust institutions and well-designed frameworks. Weak design, limited enforcement, or insufficient technical capacity can undermine these frameworks and entrench poor fiscal policy outcomes, often manifesting in heightened procyclicality and fiscal volatility. By committing to a comprehensive approach that integrates institutional independence, transparency, and a strong commitment to fiscal discipline, policy makers in commodity-exporting EMDEs can strengthen macroeconomic resilience to commodity price volatility.

The international community has a critical role to play in helping EMDEs strengthen fiscal institutions and policy frameworks through capacity development, policy advice, and concessional financing where needed. A coordinated international approach—combining structural reforms, adequate external financing, and, where necessary, debt treatment—can help alleviate financing constraints, support implementation, and enhance the credibility and durability of fiscal frameworks over time.

BOX 5.1 The role of fiscal rules, sovereign wealth funds, and hedging programs: Lessons from country case studies

Many commodity-exporting emerging market and developing economies (EMDEs) have established sovereign wealth funds and adopted fiscal rules, fiscal councils, as well as market-based mechanisms to address the challenges associated with commodity price volatility. The effectiveness of these measures has varied considerably across countries, depending on country-specific factors, including the presence of strong supporting institutions and a commitment to fiscal discipline.

Introduction

Many commodity-exporting EMDEs have adopted various policies to strengthen their fiscal and institutional frameworks to improve fiscal policy outcomes. However, the success of such reforms has varied, suggesting that country-specific factors play an important role. This box reviews selected country experiences with three fiscal frameworks—sovereign wealth funds (SWFs), fiscal rules, and fiscal councils—as well as relatively less used market-based mechanisms, such as commodity price hedging programs.

It addresses the following questions:

- How successful have fiscal frameworks and market-based mechanisms been in achieving their objectives?
- What lessons do country experiences offer for the design and implementation of these measures?

Country case studies

Experiences with fiscal rules, fiscal councils, and sovereign wealth funds

Chile

Chile is the world's largest copper exporter—copper accounts for about half of the country's total exports. Copper plays an important role in the Chilean economy, with copper exports accounting for about 15 percent of GDP and fiscal revenue from copper at about 1.3 percent of GDP in 2023 (IMF 2024, 2025). Fiscal policy management in Chile has been anchored in the successful implementation of its fiscal rules, the creation of a fiscal council, and the establishment of SWFs.

Chile's fiscal rules are an integral part of its fiscal framework. The structural balance rule, established in 2001, is supported by the Fiscal Responsibility Bill, which was enacted in 2006. While the rule has been subject to several institutional and methodological amendments, its core features have remained unaltered (Schmidt-Hebbel 2016). The fiscal rule limits the growth of budgeted central government spending to the estimated growth of structural revenue, subject to achieving a targeted structural budget balance (Hagemann 2011). It

BOX 5.1 The role of fiscal rules, sovereign wealth funds, and hedging programs: Lessons from country case studies (*continued*)

corrects not only for business cycle fluctuations, as reflected by deviations of GDP from its trend, but also for cyclical deviations of the price of the main export commodity from its trend. According to the rule, the authorities can run a deficit larger than the target if (1) output falls short of its long-run trend during a recession or (2) the price of copper falls below its medium-term (10-year) equilibrium (Frankel 2011). The operation of the fiscal rule is supported by two expert panels that estimate long-term copper prices and the output gap. In the aftermath of the pandemic, Chile upgraded its fiscal framework in 2022 to introduce a debt rule—a ceiling on central government gross debt (45 percent of GDP)—and an explicit escape clause provision (Lam et al. 2023).^a The modified framework seeks to promote countercyclical fiscal policy and enhance the sustainability of public finances.

In addition to the fiscal rule, the Autonomous Fiscal Council (CFA) was created following the enactment of the Autonomous Fiscal Council Bill in January 2018. It replaced the Advisory Fiscal Council, which was established in 2013 and served as an independent fiscal institution until 2018 (Davoodi et al. 2022). The CFA enjoys legal independence, has its own resources, and operates under a broader mandate. It provides views on the fiscal rule, including methodological changes to the structural balance rule, and aims to strengthen its rigor and transparency (Lam et al. 2023).

Chile's fiscal management institutions also include two types of SWFs.

- The Economic and Social Stabilization Fund (ESSF) was established under the Fiscal Responsibility Law of 2006. The fund is designed for short-term purposes, with the main aim of stabilizing fiscal spending and insulating the budget from economic downturns and volatile copper prices, thereby reducing the need to issue debt. Provisions for contributions to and withdrawals from the ESSF are well established in law and closely tied to fiscal rules (World Bank 2018). The ESSF has followed its mandate successfully and helped Chile finance countercyclical fiscal policy when needed. For example, during the pandemic, the government used the stabilization fund to provide fiscal support (Lam et al. 2023).
- The Pension Reserve Fund (PRF) aims to accumulate resources over the longer term. The PRF was created to support the state guarantee of pension and disability benefits. The PRF receives a minimum annual contribution of 0.2 percent of the previous year's GDP, as specified in the Fiscal

a. The escape clause (applicable only starting in 2026 to promote credibility) can be triggered in the event of a major natural disaster, pandemic-related confinement, or a significant deterioration in the economy. It allows spending above the fiscal rule limits for up to two years while establishing a clear convergence path to the target when the clause is triggered.

BOX 5.1 The role of fiscal rules, sovereign wealth funds, and hedging programs: Lessons from country case studies (*continued*)

Responsibility Law. Additional contributions to the PRF can be made if the effective fiscal surplus is high, with a maximum contribution of 0.5 percent of the previous year's GDP. The funds' governance and asset management strategy match international best practices (Lam et al. 2023).

Additionally, a new fund, dedicated to natural disasters, was created in 2022. The objective of the Fund for Natural Disasters (FODEN) is to finance expenditures and fiscal initiatives related to natural disasters. It will receive contributions from the sale of assets, cash surpluses from the Public Treasury, and from the ESSF, up to a total of \$1 billion (0.3 percent of 2022 GDP) (Lam et al. 2023).

Credible fiscal rules and strong governance structures that provide the space for their implementation, and a competent, independent, and adequately resourced fiscal council have enabled Chile to develop some of the best fiscal management institutions among commodity-exporting EMDEs (Izquierdo et al. 2008). For example, the fiscal rule enabled Chile to save substantial amounts of resources during the copper boom years of 2003–08, which allowed the country to implement a credible countercyclical fiscal policy response to the 2009 global recession (Frankel 2011).

Even so, implementation of the fiscal rule has not been without challenges. For instance, during 2001–04, the computation of the structural balance was relatively easy to replicate because copper prices were quite stable during this period. However, after 2005, the computation of the structural balance became quite challenging as the structure of the economy evolved (Dabán 2011).^b As a result, the government established a high-level commission to recommend reforms to make the rule more effective. In recent years, however, Chile has faced difficulties in meeting its structural balance targets, reflecting revenue underperformance and difficulty in adjusting expenditure plans quickly.

Uganda

Uganda is one of the world's largest producers and exporters of coffee. Coffee and other primary commodity exports constitute more than half of the country's merchandise exports (IMF 2019b). Like many other LICs, Uganda's fiscal policy has typically been procyclical over the past four decades (Arroyo Marioli and Végh 2023). In contrast to Chile's successful implementation of its fiscal rule and the supportive role of its fiscal council, Uganda's experience has been mixed.

b. The main challenges were related to the nonlinear impact of surging copper prices on mining tax collections, the introduction of new mining taxes, the production of other minerals (for example, molybdenum), and increased returns from the sovereign funds. The adjustments made to the rule in light of these developments made it difficult to replicate the methodology for the calculation of the structural balance rule. For further details, refer to Dabán (2011).

BOX 5.1 The role of fiscal rules, sovereign wealth funds, and hedging programs: Lessons from country case studies (continued)

Uganda has implemented an ambitious program of macroeconomic adjustment and structural reforms in the 1990s.^c Widely considered one of Africa's most committed economic reformers during the decade, Uganda serves as a good comparator to examine the conditions under which reforms may or may not succeed. Following the discovery of oil and gas resources in 2006, Uganda adopted the 2008 National Oil and Gas Policy (NOGP) and the 2012 Oil and Gas Revenue Management Policy (OGRMP). These policy frameworks set the stage for a legal framework for oil revenue management. Specifically, the OGRMP detailed how revenues from the oil and gas sector would be managed and integrated into existing government revenue and expenditure frameworks (Mawejje and Bategeka 2013). The 2015 Public Finance Management Act (PFMA) provides general guidelines for petroleum revenue management in Uganda. Uganda's Petroleum Investment Fund was set up in 2015 under the PFMA as part of the framework guiding fiscal policy in anticipation of oil revenues (Kayizzi-Mugerwa 2020). In addition, the PFMA provides for the creation of an "Investment Advisory Committee" to provide expert advice on the investments made under the Petroleum Revenue Investment Reserve.

Uganda adopted two supranational fiscal rules in 2013 associated with the East African Monetary Union (EAMU) convergence criteria. These rules include, as primary criteria, a ceiling of 50 percent of GDP on gross public debt (in net present value terms) and a budget balance rule with a ceiling on the fiscal deficit (including grants) of 3 percent of GDP (Ltaifa, Yabara, and Williams 2015). The Charter for Fiscal Responsibility, implemented in 2016, sets out criteria consistent with the requirements of the supranational rules. The fiscal framework was strengthened in 2022 with the adoption of an expenditure rule and a revenue rule. The expenditure rule constrains growth in recurrent spending (as a share of GDP) so that it does not exceed growth in non-oil revenue (also as a share of GDP). The revenue rule targets an annual increase in the non-oil revenue-to-GDP ratio of at least 0.5 percentage points and caps transfers of oil revenue to the budget at 0.8 percent of the preceding year's estimated non-oil GDP. A new charter of fiscal responsibility was published in 2021. It includes fiscal rules to guide fiscal policy in anticipation of oil revenues. Supporting these frameworks, a fiscal council—the Parliamentary Budget Office (PBO)—has been in place since 2001.

Despite the adoption of fiscal rules and other measures to strengthen fiscal frameworks, fiscal outcomes have weakened over time. In the 2000s, debt relief initiatives and development assistance programs championed by the international

c. In April 1998, Uganda became the first country to reach its completion point under the Heavily Indebted Poor Countries (HIPC) Initiative (IMF 1997).

BOX 5.1 The role of fiscal rules, sovereign wealth funds, and hedging programs: Lessons from country case studies (continued)

community played a significant role in restoring fiscal sustainability (Kitabire 2010). However, the stock of government debt has risen each year since 2011, leading to a deterioration in Uganda's debt sustainability rating from "low risk" of distress to "moderate risk" beginning in 2021. Limited government commitment to implementation, poor execution of processes, and insufficient follow-up to ensure that new mechanisms work as intended were major concerns (Andrews 2018). Although the PBO assesses and makes recommendations on the budget, it has limited influence over the budget process itself. Budgetary discipline is undermined by the excessive influence of the executive arm of government (Bukonya and Muhumuza 2017). Consequently, budget implementation has suffered from leakages and absorption constraints, resulting in revenue shortfalls, the accumulation of arrears, and rising debt (Mawejje and Odhiambo 2021).

Botswana

Botswana discovered the world's largest diamond deposits in the 1960s. Buoyant diamond exports, resulting in large revenue inflows, prompted the establishment of a sovereign wealth fund, the Pula Fund, in 1994, which serves both as a savings fund and as a short-term stabilization fund. The fund's main objective is to preserve part of the diamond export earnings for the future. It also provides a stabilization mechanism for the government budget and foreign reserves during an economic downturn or a slump in mineral prices. The Pula Fund consists of two accounts: the Government Investment Account, which belongs to the Government of Botswana, and a foreign exchange reserve account that belongs to the Bank of Botswana (Imi 2007).

To bolster fiscal sustainability and prevent excessive spending, the authorities also established fiscal rules, which have largely been set as nonbinding political commitments. There are four main rules that target public spending, the fiscal balance, and debt:

- An indicative expenditure rule, the Sustainable Budgeting Index (SBI), was established in 1994 to ensure the productive use of all mineral resources (Apeti, Basdevant, and Salins 2023; Kojo 2010). The SBI computes the ratio of recurrent spending (excluding development spending) to nondiamond revenue, with the objective of keeping the ratio below 1. Adherence to this rule sets aside diamond revenue to finance the accumulation of financial assets and development spending.
- An indicative target on the composition of spending that specifies that development spending should be at least 30 percent of total spending.
- An indicative target of a nonnegative fiscal balance was established in 2003.

BOX 5.1 The role of fiscal rules, sovereign wealth funds, and hedging programs: Lessons from country case studies (continued)

- External and domestic debt ceilings of 20 percent of GDP each.

These rules have allowed the Pula Fund to meet the government's stabilization needs in addition to its long-term savings objectives. Nevertheless, the operational rules of the fund lack clarity. In effect, the fund is not governed by clearly defined withdrawal or deposit rules; deposits are determined by the size of the budget surplus, and withdrawals by the size of deficits (Markowitz 2020). On balance, however, Botswana has pursued a fairly prudent fiscal policy, avoiding many pitfalls experienced by other commodity-dependent countries. Botswana's commitment to fiscal discipline has helped the country implement countercyclical fiscal policies, maintain low debt levels, and support broader development objectives (Iimi 2007).

The strength and stability of Botswana's institutions have been critical to achieving this success (Kojo 2010; Richaud et al. 2019). More recently, Botswana's fiscal position has weakened amid declining diamond revenues. The increase in the statutory debt ceiling from 40 to 60 percent of GDP, to support investment and diversification, signals a shift toward greater reliance on borrowing and heightens fiscal sustainability risks.

Nigeria

Although Nigeria's economy has become increasingly diversified in recent years, the oil sector remains an important pillar of the economy, accounting for about 25 percent of government revenues and nearly 90 percent of export revenues. The governance challenges facing Nigeria's oil sector are well documented: corruption, lack of transparency, and failure to implement appropriate fiscal policy measures that support stabilization and long-term development are major concerns (Gboyega et al. 2011; Katsouris and Sayne 2013). Although the Fiscal Responsibility Act (adopted in 2007) provides a broad framework for the prudent management of public resources, its enforcement has been weak (Venables 2016).

In 2011, Nigeria established three SWFs with the objectives of stabilization, infrastructure investment, and intergenerational savings, respectively (Carpantier and Vermeulen 2021). The SWFs were expected to increase transparency and accountability, and strengthen fiscal and economic management (Bortolotti, Fotak, and Megginson 2015).^d However, faced with limited independence from the executive branch of the government, progress on these fronts has been

d. In addition, Nigeria adopted fiscal rules in 2007 to delink public expenditures from oil revenue earnings and promote macroeconomic stabilization. The rule contains an escape clause that allows the deficit to exceed the limit in the event of emergencies declared at the discretion of the authorities, without clear guidelines on its activation and suspension. As such, performance has been mixed despite initial gains, reflecting long-standing challenges stemming from weak institutions of governance and accountability (Okonjo-Iweala and Osafo-Kwaako 2007; World Bank 2022b).

BOX 5.1 The role of fiscal rules, sovereign wealth funds, and hedging programs: Lessons from country case studies (*continued*)

disappointing, with corruption leading to substantial leakages from the funds (Carpantier and Vermeulen 2021; Oshionebo 2017). Consequently, Nigeria has not been able to leverage its vast oil resources to place the country on a path of inclusive growth and development.

Experiences with oil hedge programs

Mexico

Oil plays an important role in Mexico's economy, albeit one that has declined over the years. With the first hedge completed in 1990, Mexico has implemented several oil price-hedging programs to address the fiscal vulnerabilities associated with volatile global oil prices. The country also established an Oil Income Stabilization Fund in 2000. However, the modern Mexican hedge started in the early 2000s after the legal framework for the hedging program was adopted. The program, whose objective is to hedge the value of oil exports at a price consistent with that assumed in the federal budget law for a given fiscal year, is managed by the central bank (Duclaud and Garcia 2012). The hedging strategy is determined by the oil price-hedging subcommittee, which includes experts from the Ministry of Finance, Pemex (the state-owned petroleum company), the Ministry of Energy, and Banco de México.

Mexico has spent, on average, about 0.1 percent of GDP since 2001 to purchase hedge options. The hedge requires sophisticated technical expertise to implement, and its timing requires expert knowledge. Nevertheless, the hedging program has helped the country cushion the macroeconomic impacts of oil price volatility and pursue more countercyclical measures (Zhang, Garcia-Quiles, and Thelen 2015). The hedge program has proven beneficial in helping the country avert fiscal crises in 2009, 2015, 2016, and more recently in 2020, when oil prices declined significantly (Frankel 2018; Reuters 2022).

Ghana

After launching oil exploration efforts in 2004, Ghana confirmed commercially viable oil deposits in 2007, with production commencing in 2010. Ghana's experience with hedging programs began in 2010 with the implementation of the Petroleum Price Risk Management Program, a program intended to stabilize the domestic market by guaranteeing the provision of petroleum products at affordable prices (IFS 2015; IMF and World Bank 2011). Following its success, the scope of the program was expanded in 2011 to include the use of put options to insulate oil tax revenues from declines in oil prices. In June 2011, the authorities hedged 100 percent of the state share of oil production, locking in a price of \$107 per barrel through FY 2011/12. The hedge was intended to

BOX 5.1 The role of fiscal rules, sovereign wealth funds, and hedging programs: Lessons from country case studies (continued)

safeguard the budget against adverse oil price movements and improve fiscal sustainability while boosting growth (Reuters 2011).

The hedging program involved the purchase of call options from counterparty banks. The call option specified a cap on the price of crude oil purchases over the period of the option, thereby insuring against price increases above the cap. Increases in prices above the cap were settled in cash by counterparty banks in Ghana's favor. The choice of a call option ensured that Ghana retained the ability to buy at the market price if the crude oil price fell below the cap (IMF and World Bank 2011). The hedging program was implemented by the Ministry of Finance and Economic Planning (MFEP) and overseen by the National Risk Management Committee, with oversight from the Cabinet.

Despite its initial success, the hedging program was placed under review in 2013 and has not been used since (Ministry of Finance 2019). When oil prices crashed in 2015–16 and 2020, Ghana lacked sufficient fiscal space and effective policy levers to support credible policy responses. More recently, the country's public finances have deteriorated rapidly, and its debt risk rating moved from “moderate” in 2014 to “in distress” in 2023 and subsequently to “high risk” in 2024 and 2025 (IMF 2023, 2025).

Conclusions

Many commodity-exporting EMDEs have adopted fiscal institutions, frameworks, and market-based mechanisms, with varying degrees of success. The country cases examined in this box suggest that solid political commitment to fiscal discipline and strong institutions of governance are needed for fiscal rules and SWFs to work well. Governments also need to commit adequate resources to maintain the functionality of fiscal institutions. For market-based instruments, successful implementation depends partly on political economy considerations and the availability of technical expertise, because these instruments are complex and knowledge-intensive to administer.

References

- Addison, T., and A. Lebdioui. 2022. "Public Savings in Africa: Do Sovereign Wealth Funds Serve Development?" WIDER Working Paper 2022/159, United Nations University World Institute for Development Economics Research, Helsinki.
- Afonso, A., and J. T. Jalles. 2019. "Fiscal Rules and Government Financing Costs." *Fiscal Studies* 40 (1): 71–90.
- Aizenman, J., and R. Glick. 2009. "Sovereign Wealth Funds: Stylized Facts about Their Determinants and Governance." *International Finance* 12 (3): 351–86.
- Al-Hassan, A., S. Brake, M. G. Papaioannou, and M. Skancke. 2018. "Commodity-Based Sovereign Wealth Funds: Managing Financial Flows in the Context of the Sovereign Balance Sheet." IMF Working Paper 18/26, International Monetary Fund, Washington, DC.
- Al-Sadiq, A. J., and D. A. Gutiérrez. 2023. "Do Sovereign Wealth Funds Reduce Fiscal Policy Pro-Cyclicality? New Evidence using a Non-Parametric Approach." IMF Working Paper 23/133, International Monetary Fund, Washington, DC.
- Alesina, A., and R. Perotti. 1995. "The Political Economy of Budget Deficits." *IMF Staff Papers* 42: 1–31.
- Allen, R., T. Chaponda, L. Fisher, and R. Ray. 2017. "Medium-Term Budget Frameworks in Sub-Saharan African Countries." IMF Working Paper 2017/203, International Monetary Fund, Washington, DC.
- Alonso, V., C. Arroyo, O. Aydin, V. Balasundharam, H. R. Davoodi, G. Hegab, W. R. Lam, A. Nguyen, N. Salazar Ferro, G. Sher, A. Solovyeva, and N. Tchelishvili. 2025. "Fiscal Rules Dataset: 1985–2024." International Monetary Fund, Washington, DC.
- Amar, J., C. Lecourt, and V. Kinon. 2018. "Is the Emergence of New Sovereign Wealth Funds a Fashion Phenomenon?" *Review of World Economics* 154 (4): 835–73.
- Andrews, M. 2018. "Overcoming the Limits of Institutional Reform in Uganda." *Development Policy Review* 36: 159–82.
- Apeti, A. E., O. Basdevant, and V. Salins. 2023. "Do Fiscal Rules Foster Fiscal Discipline in Resource-Rich Countries?" IMF Working Paper 23/088, International Monetary Fund, Washington, DC.
- Apeti, A. E., B. W. W. Bambe, J. L. Combes, and E. D. Edoh. 2024. "Original Sin: Fiscal Rules and Government Debt in Foreign Currency in Developing Countries." *Journal of Macroeconomics* 80: 103600.
- Arbatli, E., and J. Escolano. 2015. "Fiscal Transparency, Fiscal Performance, and Credit Ratings." *Fiscal Studies* 36 (2): 237–70.

- Ardanaz, M., C. Ulloa-Suárez, and O. Valencia. 2024. “Why Don’t We Follow the Rules? Drivers of Compliance with Fiscal Policy Rules in Emerging Markets.” *Journal of International Money and Finance* 142 (2): 103046.
- Arezki, R., and M. Bruckner. 2010. “Commodity Windfalls, Polarization, and Net Foreign Assets: Panel Data Evidence on the Voracity Effect.” IMF Working Paper 10/209, International Monetary Fund, Washington, DC.
- Arezki, R., K. Hamilton, and K. Kazimov. 2011. “Resource Windfalls, Macroeconomic Stability and Economic Growth.” IMF Working Paper 11/142, International Monetary Fund, Washington, DC.
- Arezki, R., and K. Ismail. 2013. “Boom–Bust Cycle, Asymmetrical Fiscal Response, and the Dutch Disease.” *Journal of Development Economics* 101 (March): 256–67.
- Arroyo Marioli, F., A. Fatás, and G. Vasishtha. 2024. “Fiscal Policy Volatility and Growth in Emerging Market and Developing Economies.” *International Review of Economics and Finance* 92 (April): 758–77.
- Arroyo Marioli, F., and G. Vasishtha. 2025. “Fiscal Procyclicality and Volatility in Commodity-Exporting Emerging and Developing Economies.” Policy Research Working Paper 11037, World Bank, Washington, DC.
- Arroyo Marioli, F., and C. A. Végh. 2023. “Fiscal Procyclicality in Commodity Exporting Countries: How Much Does It Pour and Why?” Policy Research Working Paper 10428, World Bank, Washington, DC.
- Atta-Mensah, J. 2004. “Commodity-Linked Bonds: A Potential Means for Less-Developed Countries to Raise Foreign Capital.” Bank of Canada Working Paper 2004-20, Bank of Canada, Ottawa.
- Badinger, H., and W. H. Reuter. 2017. “The Case for Fiscal Rules.” *Economic Modelling* 60: 334–43.
- Balasundharam, V., O. Basdevant, D. Benicio, A. Ceber, Y. Kim, L. Mazzone, H. Selim, and Y. Yang. 2023. “Fiscal Consolidation: Taking Stock of Success Factors, Impact, and Design.” IMF Working Paper 23/63. International Monetary Fund, Washington, DC.
- Bastida, F., and B. Benito. 2007. “Central Government Budget Practices and Transparency: An International Comparison.” *Public Administration* 85 (3): 667–716.
- Baunsgaard, T., M. Villafuerte, M. Poplawski-Ribeiro, and C. J. Richmond. 2012. “Fiscal Frameworks for Resource Rich Developing Countries.” Staff Discussion Note 2012/04, International Monetary Fund, Washington, DC.
- Becker, T., O. Jeanne, P. Mauro, J. D. Ostry, and R. Ranciere. 2007. “Country Insurance: The Role of Domestic Policies.” Occasional Paper 254, International Monetary Fund, Washington, DC.

- Beetsma, R., X. Debrun, X. Fang, Y. Kim, V. Lledó, S. Mbaye, and X. Zhang. 2019. "Independent Fiscal Councils: Recent Trends and Performance." *European Journal of Political Economy* 57 (March): 53–69.
- Bergman, U. M., and M. Hutchison. 2015. "Economic Stabilization in the Post-Crisis World: Are Fiscal Rules the Answer?" *Journal of International Money and Finance* 52 (April): 82–101.
- Bergman, U. M., and M. Hutchison. 2020. "Fiscal Procyclicality in Emerging Markets: The Role of Institutions and Economic Conditions." *International Finance* 23 (2): 196–214.
- Borensztein, E., and P. Mauro. 2004. "The Case for GDP-Indexed Bonds." *Economic Policy* 19 (38): 166–216.
- Borensztein, E., O. Jeanne, and D. Sandri. 2013. "Macro-hedging for Commodity Exporters." *Journal of Development Economics* 101 (March): 105–16.
- Bortolotti, B., V. Fotak, and W. L. Megginson. 2015. "The Rise of Sovereign Wealth Funds: Definition, Organization, and Governance." In *Public Private Partnerships for Infrastructure and Business Development*, edited by S. Caselli, G. Corbetta, and V. Vecchi, 295–318. New York: Palgrave Macmillan.
- Bova, E., N. Carcenac, and M. Guerguil. 2014. "Fiscal Rules and the Procyclicality of Fiscal Policy in the Developing World." Working Paper 14/122, International Monetary Fund, Washington, DC.
- Bova, E., P. A. Medas, T. Poghosyan, and B. Akitoby. 2016. "Macroeconomic Stability in Resource-Rich Countries: The Role of Fiscal Policy." Working Paper 16/36, International Monetary Fund, Washington, DC.
- Budina, N., T. Kinda, A. Schaechter, and A. Weber. 2013. "Numerical Fiscal Rules: International Trends." In *Public Financial Management and Its Emerging Architecture*, edited by M. Cangiano, T. Curristine, and M. Lazare. Washington, DC: International Monetary Fund.
- Bukenya, B. and W. Muhumuza. 2017. "The Politics of Core Public Sector Reform in Uganda: Behind the Façade." ESID Working Paper No. 85, Effective States and Inclusive Development Research Centre (ESID) Global Development Institute, School of Environment, Education and Development, The University of Manchester.
- Caballero, R. 2002. "Coping with Chile's External Vulnerability: A Financial Problem." In *Economic Growth: Sources, Trends, and Cycles*, edited by N. Loayza and R. Soto, 377–416. Santiago: Central Bank of Chile.
- Carpantier, J. F., and W. N. Vermeulen. 2018. "Emergence of Sovereign Wealth Funds." *Journal of Commodity Markets* 11 (September): 1–21.

- Carpantier, J. F., and W. N. Vermeulen. 2021. "Success and Failures of Sovereign Wealth Funds: On the Macroeconomic Performance, Time-Varying Objectives and First Liquidations of Sovereign Wealth Funds." In *Handbook of Sustainable Politics and Economics of Natural Resources*, edited by S. Tsani and I. Overland, 242–60. Northampton, Massachusetts: Edward Elgar Publishing.
- Caselli, F., H. Davoodi, C. Goncalves, G. H. Hong, A. Lagerborg, P. Medas, A. D. M. Nguyen, and J. Yoo. 2022. "The Return to Fiscal Rules." Staff Discussion Note 2022/002, International Monetary Fund, Washington, DC.
- Caselli, F., and J. Reynaud. 2020. "Do Fiscal Rules Cause Better Fiscal Balances? A New Instrumental Variable Strategy." *European Journal of Political Economy* 63 (June): 101873.
- Castro, I., and W. Dorotinsky. 2008. "Medium-Term Expenditure Frameworks: Demystifying and Unbundling the Concepts." World Bank, Washington, DC.
- Céspedes, L. F., and A. Velasco. 2014. "Was This Time Different? Fiscal Policy in Commodity Republics." *Journal of Development Economics* 106 (January): 92–106.
- Céspedes, L. F., E. Parrado, and A. Velasco. 2014. "Fiscal Rules and The Management of Natural Resource Revenues: The Case of Chile." *Annual Review of Resource Economics* 6 (1): 105–32.
- Chang, H., and A. Lebdioui. 2020. "From Fiscal Stabilization to Economic Diversification." WIDER Working Paper 2020/108, United Nations University.
- Cherif, R., and F. Hasanov. 2014. "Soaring of the Gulf Falcons: Diversification in the GCC Oil Exporters in Seven Propositions." IMF Working Paper 14/177, International Monetary Fund, Washington, DC.
- Combes, J. L., A. Minea, and M. Sow. 2017. "Is Fiscal Policy Always Counter-(Pro-) Cyclical? The Role of Public Debt and Fiscal Rules." *Economic Modelling* 65 (September): 138–46.
- Coutinho, L., D. Georgiou, M. Heracleous, A. Michaelides, and S. Tsani. 2022. "Limiting Fiscal Procyclicality: Evidence from Resource-Dependent Countries." *Economic Modelling* 106: 105700.
- Curristine, T., I. Adenauer, V. Alonso Albarran, J. Grinyer, K. H. Tee, C. Wendling, and D. Moretti. 2024. "How to Develop and Implement a Medium-Term Fiscal Framework." IMF How to Note 005, International Monetary Fund, Washington, DC.
- da Costa António, A. E., and A. Rodriguez-Gil. 2020. "Oil Shocks and Fiscal Policy Procyclicality in Angola: Assessing the Role of Asymmetries and Institutions." *Review of Development Economics* 24 (1): 209–37.
- Dabán, T. 2011. "Strengthening Chile's Rule-Based Fiscal Framework." IMF Working Paper 11/17, International Monetary Fund, Washington, DC.

Dabla-Norris, E., R. Allen, L. Zanna, T. Prakash, E. Kvintradze, V. Lledo, I. Yackovlev, and S. Gollwitzer. 2010. "Budget Institutions and Fiscal Performance in Low-Income Countries." IMF Working Paper 10/80, International Monetary Fund, Washington, DC.

Daniel, J. A. 2003. "Hedging Government Oil Price Risk." In *Fiscal Policy Formulation and Implementation in Oil-Producing Countries*, edited by J. M. David, A. Fedelino, and R. Ossowski, 359–80. Washington, DC: International Monetary Fund.

Davoodi, H. R., P. Elger, A. Fotiou, D. Garcia-Macia, X. Han, A. Lagerborg, W. R. Lam, and P. Medas. 2022. "Fiscal Rules and Fiscal Councils: Recent Trends and Performance During the Covid-19 Pandemic." Working Paper 22/11, International Monetary Fund, Washington, DC.

De Renzio, P., P. Gomez, and J. Sheppard. 2005. "Budget Transparency and Development in Resource-Dependent Countries." *International Social Science Journal* 57 (s1): 57–69.

De Simone, E., M. Bonasia, G. L. Gaeta, and L. Cicatiello. 2019. "The Effect of Fiscal Transparency on Government Spending Efficiency." *Journal of Economic Studies* 46 (7): 1365–79.

Debrun, X., and T. Kinda. 2017. "Strengthening Post-Crisis Fiscal Credibility: Fiscal Councils on the Rise—A New Dataset." *Fiscal Studies* 38 (4): 667–700.

Debrun, X., L. Moulin, A. Turrini, J. Ayuso-i-Casals, M. S. Kumar, A. Drazen, and C. Fuest. 2008. "Tied to the Mast? National Fiscal Rules in the European Union." *Economic Policy* 23 (54): 297–362.

Dessus, S., J. L. Diaz-Sanchez, and A. Varoudakis. 2016. "Fiscal Rules and the Pro-cyclicality of Public Investment in the West African Economic and Monetary Union." *Journal of International Development* 28 (6): 887–901.

Divakaran, S., H. Halland, G. Lorenzato, P. Rose, and S. Sarmiento-Saher. 2022. *Strategic Investment Funds: Establishment and Operations*. International Development in Focus. Washington, DC: World Bank.

Drechsel, T., and S. Tenreyro. 2018. "Commodity Booms and Busts in Emerging Economies." *Journal of International Economics* 112 (May): 200–18.

Duclaud, J., and G. Garcia. 2012. "Mexico's Oil Price Hedging Program." In *Commodity Price Volatility and Inclusive Growth in Low-Income Countries*, edited by R. Arezki, C. Pattillo, M. Quintyn, and M. Zhu, 297–311. Washington, DC: International Monetary Fund.

El Anshasy, A. A., and M. S. Katsaiti. 2013. "Natural Resources and Fiscal Performance: Does Good Governance Matter?" *Journal of Macroeconomics* 37 (September): 285–98.

- Elbadawi, I., R. Soto, and H. Youssef. 2017. "Sovereign Wealth Funds and Macroeconomic Stabilization in the Home Economy." Working Paper 1175, Economic Research Forum, Cairo, Egypt.
- ElBerry, N. A., and S. Goeminne. 2021. "Fiscal Transparency, Fiscal Forecasting and Budget Credibility in Developing Countries." *Journal of Forecasting* 40 (1): 144–61.
- ElBerry, N. A., F. Naert, and S. Goeminne. 2022. "The Impact of Fiscal Openness on Public Spending Technical Efficiency in Developing Countries." *Public Performance & Management Review* 45 (2): 254–81.
- Erbil, N. 2011. "Is Fiscal Policy Procyclical in Developing Oil-Producing Countries?" Working Paper 11/171, International Monetary Fund, Washington, DC.
- Eslava, M., 2011. "The Political Economy of Fiscal Deficits: A Survey." *Journal of Economic Surveys* 25 (4): 645–73.
- Eyraud, L., W. Gbohoui, and P. Medas. 2023. "A New Fiscal Framework for Resource-Rich Countries." IMF Working Paper 23/230. International Monetary Fund, Washington, DC.
- Fatás, A., B. Gootjes, and J. Mawejje. 2026. "Dynamic Effects of Fiscal Rules: Do Initial Conditions Matter?" *Journal of International Money and Finance* 161 (February): 103499.
- Filc, G., and C. Scartascini. 2010. "Is Latin America on the Right Track? An Analysis of Medium-Term Frameworks and the Budget Process." IDB Working Paper 160, Inter-American Development Bank, Washington, DC.
- Frankel, J. 2011. "A Solution to Fiscal Procyclicality: The Structural Budget Institutions Pioneered by Chile." NBER Working Paper 16945, National Bureau of Economic Research, Cambridge, MA.
- Frankel, J. 2018. "How to Cope with Volatile Commodity Export Prices: Three Proposals." In *Rethinking the Macroeconomics of Resource-Rich Countries*, edited by R. Arezki, R. Boucekkine, J. Frankel, M. Laksaci and R. van der Ploeg, 35–44. London: CEPR Press.
- Frankel, J. A., C. A. Végh, and G. Vuletin, G. 2013. "On Graduation from Fiscal Procyclicality." *Journal of Development Economics* 100 (1): 32–47.
- Fuentes, J. R., K. Schmidt-Hebbel, and R. Soto. 2021. "Fiscal Rule and Public Investment in Chile." IDB Working Paper 1189, Inter-American Development Bank, Washington, DC.
- Gboyega, A., T. Soreide, T. M. Le, and G. P. Shukla. 2011. "Political Economy of The Petroleum Sector in Nigeria." Policy Research Working Paper 5779, World Bank, Washington, DC.

- Gelb, A., S. Tordo, H. Halland, N. Afraa, and G. Smith. 2014. "Sovereign Wealth Funds and Long-Term Development Finance: Risks and Opportunities." CGD Policy Paper 041, Center for Global Development, Washington, DC.
- Gill, I. S., I. Izvorski, W. van Eeghen, and D. De Rosa. 2014. *Diversified Development: Making the Most of Natural Resources in Eurasia*. Washington, DC: World Bank.
- Gootjes, B., and J. de Haan. 2022. "Do Fiscal Rules Need Budget Transparency to Be Effective?" *European Journal of Political Economy* 75 (December): 102210.
- Gootjes, B., J. de Haan, and R. Jong-A-Pin. 2021. "Do Fiscal Rules Constrain Political Budget Cycles?" *Public Choice* 188: 1–30.
- Grembi, V., T. Nannicini, and U. Troiano. 2016. "Do Fiscal Rules Matter?" *American Economic Journal: Applied Economics* 8 (3): 1–30.
- Grigoli, F., Z. Mills, M. Verhoeven, and R. Vlaicu. 2012. "MTEFs and Fiscal Performance: Panel Data Evidence." Policy Research Working Paper 6168, World Bank, Washington, DC.
- Guerguil, M., P. Mandon, and R. Tapsoba. 2017. "Flexible Fiscal Rules and Countercyclical Fiscal Policy." *Journal of Macroeconomics* 52 (June): 189–220.
- Gui-Diby, S. L. 2022. "Public Financial Management and Fiscal Performance: Evidence from Panel Data Analyses." *Applied Economics Letters* 29 (19): 1784–90.
- Hagemann, R. 2011. "How Can Fiscal Councils Strengthen Fiscal Performance?" *OECD Journal: Economic Studies* 2011 (1): 1–24.
- Hansen, D. 2020. "The Effectiveness of Fiscal Institutions: International Financial Flogging or Domestic Constraint?" *European Journal of Political Economy* 63 (June): 101879.
- Hesse, H. 2008. "Export Diversification and Economic Growth." Commission on Growth and Development Working Paper 21, World Bank, Washington, DC.
- Holmes, M., and A. Evans. 2003. "Review of Experience in Implementing Medium Term Expenditure Frameworks in a PRSP Context: A Synthesis of Eight Country Studies." Discussion Draft, Overseas Development Institute, London.
- Huidrom, R., M. A. Kose, and F. L. Ohnsorge. 2018. "Challenges of Fiscal Policy in Emerging and Developing Economies." *Emerging Markets Finance and Trade* 54 (9): 1927–45.
- IFS (Institute for Fiscal Studies). 2015. "The Falling Crude Oil Prices: Mitigating the Risk." Policy Brief Paper No. 1, Institute for Fiscal Studies, Accra.
- Imi, A. 2007. "Escaping from the Resource Curse: Evidence from Botswana and the Rest of the World." *IMF Staff Papers* 54 (4): 663–99.

IMF (International Monetary Fund). 1997. “Uganda: Enhanced Structural Adjustment Facility Policy Framework Paper, 1997/98-1999/00.” Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2017a. *Fiscal Monitor: Achieving More with Less*. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2017b. “State-Contingent Debt Instruments for Sovereigns.” IMF Policy Paper, International Monetary Fund, Washington, DC.

IMF (International Monetary Fund). 2019a. *The Fiscal Transparency Code*. International Monetary Fund, Washington, DC.

IMF (International Monetary Fund). 2019b. Uganda 2019 Article IV Consultation-Staff Report. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2023. “Ghana: Staff Report for the 2023 Article IV Consultation, First Review Under the Arrangement Under the Extended Credit Facility, Request for Modification of Performance Criteria, and Financing Assurances Review—Debt Sustainability Analysis.” International Monetary Fund, Washington, DC.

IMF (International Monetary Fund). 2024. *Chile 2023 Article IV Consultation-Staff Report*. Washington, DC: International Monetary Fund.

IMF (International Monetary Fund). 2025. *Ghana: Fourth Review Under the Arrangement Under the Extended Credit Facility, Request for Modification of Performance Criteria, Financing Assurances Review, and Monetary Policy Consultation*. International Monetary Fund, Washington, DC.

IMF (International Monetary Fund) and World Bank. 2011. “Managing Volatility in Low-Income Countries: The Role and Potential for Contingent Financial Instruments.” International Monetary Fund and World Bank, Washington, DC.

IMF (International Monetary Fund) and World Bank. 2024. “IMF-World Bank Non-Paper on Actions to Support Countries Faced with Liquidity Challenges.” International Monetary Fund and World Bank, Washington, DC.

Isham, J., M. Woolcock, L. Pritchett, and G. Busby. 2005. “The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic Growth.” *The World Bank Economic Review* 19 (2): 141–74.

Izquierdo, A., E. Talvi, L. Catão, E. Cavallo, and A. Powell. 2008. “All That Glitters May Not be Gold: Assessing Latin America’s Recent Macroeconomic Performance.” Research Department, Inter-American Development Bank, Washington, DC.

IWG (International Working Group of Sovereign Wealth Funds). 2008. “Sovereign Wealth Funds Generally Accepted Principles and Practices: ‘Santiago Principles.’”

International Forum of Sovereign Wealth Funds. [https://www.ifswf.org/sites/default/files/santiagoprinciples_0_0 .pdf](https://www.ifswf.org/sites/default/files/santiagoprinciples_0_0.pdf).

James, A., T. Retting, J. F. Shogren, B. Watson, and S. Wills. 2022. "Sovereign Wealth Funds in Theory and Practice." *Annual Review of Resource Economics* 14: 621–46.

Jones, S., and A. Lawson. 2000. "Medium Term Expenditure Frameworks—Panacea or Dangerous Distraction?" Paper 2, OPM Review, Oxford Policy Management.

Joya, O. 2015. "Growth and Volatility in Resource-Rich Countries: Does Diversification Help?" *Structural Change and Economic Dynamics* 35 (December): 38–55.

Kąsek, L., and D. Webbe, eds. 2009. *Performance-Based Budgeting and Medium-Term Expenditure Frameworks in Emerging Europe*. Washington DC: World Bank.

Katsouris, C., and A. Sayne. 2013. "Nigeria's Criminal Crude: International Options to Combat the Export of Stolen Oil." Chatham House, London.

Kayizzi-Mugerwa, S. 2020. "Uganda's Nascent Oil Sector: Revenue Generation, Investor-Stakeholder Alignment, and Public Policy." WIDER Working Paper 2020/175, United Nations University World Institute for Development Economics Research, Helsinki.

Kitabire, D. 2010. "Debt Management and Debt Relief." In *Uganda's Economic Reforms: Insider Accounts*, edited by F. Kuteesa, E. Tumusiime-Mutebile, A. Whitworth, and T. Williamson, 264–76. Oxford, U.K.: Oxford University Press.

Koh, W. C. 2017. "Fiscal Policy in Oil-Exporting Countries: The Roles of Oil Funds and Institutional Quality." *Review of Development Economics* 21 (3): 567–90.

Kojo, N. C. 2010. "Diamonds Are Not Forever: Botswana Medium-Term Fiscal Sustainability." Policy Research Working Paper 5480, World Bank, Washington, DC.

Konuki, M. T., and M. Villafuerte. 2016. "Cyclical Behavior of Fiscal Policy Among Sub-Saharan African Countries." International Monetary Fund, Washington, DC.

Kumar, M. S., E. Baldacci, A. Schaechter, C. Caceres, D. Kim, X. Debrun, J. Escolano, J. Jonas, P. Karam, I. Yakadina, and R. Zymek. 2009. "Fiscal Rules: Anchoring Expectations for Sustainable Public Finances." IMF Policy Papers, International Monetary Fund, Washington, DC.

Lam, R. W., Y. Cao, A. Lagerborg, and A. Scipioni. 2023. "Chile Technical Assistance Report—Fiscal Considerations in Managing Stabilization Funds." IMF Country Report 23/249, International Monetary Fund, Washington, DC.

Lashitew, A. A., M. L. Ross, and E. Werker. 2021. "What Drives Successful Economic Diversification in Resource-Rich Countries?" *The World Bank Research Observer* 36 (2): 164–96.

- Le Borgne, E., and P. A. Medas. 2007. "Sovereign Wealth Funds in The Pacific Island Countries: Macro-Fiscal Linkages." IMF Working Paper 07/297, International Monetary Fund, Washington, DC.
- Ltaifa, N. B., M. Yabara, and O. Williams. 2015. "Economic Convergence to Support the East African Monetary Union." In *The Quest for Regional Integration in the East African Community*, edited by P. Drummond, S. K. Wajid, and O. Williams, 39–60. Washington, DC: International Monetary Fund.
- Ma, C., and F. Valencia. 2024. "Welfare Gains from Market Insurance: The Case of Mexican Oil Price Risk." *Journal of International Money and Finance* 142 (April): 103028.
- Markowitz, C. 2020. "Sovereign Wealth Funds in Africa: Taking Stock and Looking Forward." Occasional Paper 304, South African Institute of International Affairs, Johannesburg.
- Martorano, B. 2018. "Cyclicality of Fiscal Policy in Latin America Over the Period 1990–2015." *Review of Development Economics* 22 (1): 67–90.
- Mawejje, J., and L. Bategeka. 2013. "Accelerating Growth and Maintaining Intergenerational Equity Using Oil Resources in Uganda." Research Series No. 111, Economic Policy Research Centre, Kampala.
- Mawejje, J., and N. M. Odhiambo. 2021. "Uganda's Fiscal Policy Reforms: What Have We Learned?" *Public Budgeting & Finance* 41 (2): 89–107.
- Mawejje, J., and N. M. Odhiambo. 2024. "Fiscal Rules and the Cyclicity of Fiscal Policy in the East African Community." *Applied Economics Letters* 31 (15): 1429–32.
- Ministry of Finance. 2019. *Fiscal Risk Statement 2018*. Ministry of Finance, Ghana. <https://www.mofep.gov.gh/sites/default/files/reportsministry/economic/2018-Fiscal-Risk-Statement.pdf>
- Mohaddes, K., and M. Raissi. 2017. "Do Sovereign Wealth Funds Dampen the Negative Effects of Commodity Price Volatility?" *Journal of Commodity Markets* 8 (December): 18–27.
- Montes, G. C., J. C. A. Bastos, and A. J. de Oliveira. 2019. "Fiscal Transparency, Government Effectiveness and Government Spending Efficiency: Some International Evidence Based on Panel Data Approach." *Economic Modelling* 79 (June): 211–25.
- Mooney, H., A. Wright, and K. Grenade. 2018. "Fiscal Councils: Evidence, Common Features, and Lessons for the Caribbean." IDB Policy Brief 300, Inter-American Development Bank, Washington, DC.
- Navarro-Martin, M. 2017. "Managing Exposure to Oil Price Volatility in Uruguay." Treasury Case Study, World Bank, Washington, DC.

OECD (Organisation for Economic Cooperation and Development). 2002. "OECD Best Practices for Budget Transparency." Organization for Economic Cooperation and Development, Paris.

Oshionebo, E. 2017. "Mismanagement of Nigeria's Oil Revenues: Is the Nigeria Sovereign Investment Authority the Panacea?" *The Journal of World Energy Law & Business* 10 (4): 329–47.

Okonjo-Iweala, N., and P. Osafo-Kwaako. 2007. "Nigeria's Economic Reforms: Progress and Challenges." Working Paper No. 6, Brookings Global Economy and Development, The Brookings Institution, Washington, DC.

Ossowski, R., M. Villafuerte, P. A. Medas, and T. Thomas. 2008. "Managing the Oil Revenue Boom: The Role of Fiscal Institutions." IMF Occasional Paper 260, International Monetary Fund, Washington, DC.

Papageorgiou, C., and N. Spatafora. 2012. "Economic Diversification in LICs: Stylized Facts and Macroeconomic Implications." IMF Staff Discussion Note 12/13, International Monetary Fund, Washington, DC.

Peat, M., J. Svec, and J. Wang. 2015. "The Effects of Fiscal Opacity on Sovereign Credit Spreads." *Emerging Markets Review* 24 (September): 34–45.

Piguillem, F., and A. Riboni. 2021. "Fiscal Rules as Bargaining Chips." *The Review of Economic Studies* 88 (5): 2439–78.

Pouokam, N. 2021. "Sharing Resource Wealth Inclusively Within and Across Generations." Working Paper 21/97, International Monetary Fund, Washington, DC.

Prakash, T., and E. R. Cabezon. 2008. "Public Financial Management and Fiscal Outcomes in Sub-Saharan African Heavily Indebted Poor Countries." IMF Working Paper 08/217, International Monetary Fund, Washington, DC.

Raudla, R., J. W. Douglas, and M. MacCarthaigh. 2022. "Medium-Term Expenditure Frameworks: Credible Instrument or Mirage?" *Public Budgeting & Finance* 42 (3): 71–92.

Reuters. 2011. "Ghana Hedging Oil Output at \$107/Barrel." Accessed September 12, 2022. <https://www.reuters.com/article/ozabs-ghana-oil-hedge-20110609-idAFJOE7580CV20110609>.

Reuters. 2022. "Mexico Muddies Waters on Oil Hedge to Avoid Cost Hikes from Wall Street, Oil Majors." Accessed June 21, 2024. <https://www.reuters.com/business/energy/mexico-muddies-waters-oil-hedge-avoid-cost-hikes-wall-street-oil-majors-2022-10-20/>.

Richaud, C., A. G. Mendes, A. Firmin, S. Matta, and S. Essl. 2019. "Fiscal Vulnerabilities in Commodity Exporting Countries and The Role of Fiscal Policy." MTI Discussion Paper 15, World Bank, Washington, DC.

Ross, M. 2011. "Mineral Wealth and Budget Transparency." IBP Working Paper 2, International Budget Partnership, Washington, DC.

- Samaké, N. and I. Spatafora. 2012. “Commodity Price Shocks and Fiscal Outcomes.” IMF Working Paper 12/112, International Monetary Fund, Washington, DC.
- Sawadogo, P. N. 2020. “Can Fiscal Rules Improve Financial Market Access for Developing Countries?” *Journal of Macroeconomics* 65 (September): 103214.
- Schiavo-Campo, S. 2009. “Potemkin Villages: The Medium-Term Expenditure Framework in Developing Countries.” *Public Budgeting & Finance* 29 (2): 1–26.
- Schmidt-Hebbel, K. 2016. “Fiscal Institutions in Resource-rich Economies: Lessons from Chile and Norway.” In *Understanding and Avoiding the Oil Curse in Resource-Rich Arab Economies*, edited by I. Elbadawi and H. Selim, 225–83. Cambridge, U.K.: Cambridge University Press.
- Schwartz, M. J., and D. W. Beuermann. 2021. *Economic Institutions for a Resilient Caribbean*. Washington, DC: Inter-American Development Bank.
- Stiglitz, J.E. 2005. “Making Natural Resources into a Blessing Rather Than a Curse.” In *Covering Oil: A Reporter’s Guide to Energy and Development*, edited by S. Tsalik and A. Schiffrin, 13–19. New York: Open Society Institute.
- Strong, C. O. 2023. “Tying One’s Hand: The Effect of Fiscal Rules on the Political Business Cycle in Africa.” *Journal of African Economies* 32 (4): 438–67.
- Sugawara, N. 2014. “From Volatility to Stability in Expenditure: Stabilization Funds in Resource-Rich Countries.” IMF Working Paper 14/43, International Monetary Fund, Washington, DC.
- Tapsoba, R. 2012. “Do National Numerical Fiscal Rules Really Shape Fiscal Behaviours in Developing Countries? A Treatment Effect Evaluation.” *Economic Modelling* 29 (4): 1356–69.
- Tsani, S. 2013. “Natural Resources, Governance and Institutional Quality: The Role of Resource Funds.” *Resources Policy* 38 (2): 181–95.
- Tsani, S. 2015. “On The Relationship Between Resource Funds, Governance and Institutions: Evidence from Quantile Regression Analysis.” *Resources Policy* 44 (June): 94–111.
- UNCTAD (United Nations Conference on Trade and Development). 2009. “Overview of the World’s Commodity Exchanges–2007.” United Nations Conference on Trade and Development: Geneva.
- UNCTAD (United Nations Conference on Trade and Development). 2023a. “Managing Commodity Price Volatility in Commodity-Dependent Developing Countries.” United Nations Conference on Trade and Development: Geneva.
- UNCTAD (United Nations Conference on Trade and Development). 2023b. “Growth, Debt and Climate—Realigning the Global Financial Architecture.” Trade and Development Report 2023, United Nations Conference on Trade and Development: Geneva.

- van Eden, H., P. Khemani, and R. Emery. 2013. "Developing Legal Frameworks to Promote Fiscal Responsibility: Design Matters" in *Public Financial Management and Its Emerging Architecture*, edited by M. Cangiano, T. Curristine, and M. Lazare, 79–105. Washington, DC: International Monetary Fund.
- van der Ploeg, F. 2011. "Natural Resources: Curse or Blessing?" *Journal of Economic Literature* 49 (2): 366–420.
- van der Ploeg, F., and A. J. Venables. 2011. "Harnessing Windfall Revenues: Optimal Policies for Resource-Rich Developing Economies." *The Economic Journal* 121 (551): 1–30.
- van Ingen, C., R. Wait, and E. Kleynhans. 2014. "Fiscal Policy and Revenue Management in Resource-Rich African Countries: A Comparative Study of Norway and Nigeria." *South African Journal of International Affairs* 21 (3): 367–90.
- Velasco, A. 1999. "A Model of Endogenous Fiscal Deficits and Delayed Fiscal Reforms." In *Fiscal Institutions and Fiscal Performance*, edited by J. Poterba and J. von Hagen. Chicago: University of Chicago Press.
- Venables, A. J. 2016. "Using Natural Resources for Development: Why Has It Proven So Difficult?" *Journal of Economic Perspectives* 30 (1): 161–84.
- Vlaicu, R., M. Verhoeven, F. Grigoli, and Z. Mills. 2014. "Multiyear Budgets and Fiscal Performance: Panel Data Evidence." *Journal of Public Economics* 111: 79–95.
- von Hagen, J. 2010. "Sticking to Fiscal Plans: The Role of Institutions." *Public Choice* 144: 487–503.
- Weingast, B., K. Shepsle, and C. Johnson. 1981. "The Political Economy of Benefits and Costs: A Neoclassical Approach to Distributive Politics." *Journal of Political Economy* 89 (4): 642–64.
- World Bank. 1998. *Public Expenditure Management Handbook*. Washington, DC: World Bank.
- World Bank. 2013. *Beyond the Annual Budget: Global Experience with Medium-Term Expenditure Frameworks*. World Bank, Washington, DC.
- World Bank. 2017a. *Global Economic Prospects: Weak Investment in Uncertain Times*. Washington, DC: World Bank.
- World Bank. 2017b. "Economic Diversification: Guidance Note." Trade and Competitiveness Global Practice, World Bank, Washington, DC.
- World Bank. 2018. "The Role of Major Emerging Markets in Global Commodity Demand." In *Global Economic Prospects: The Turning of the Tide?* June. Washington, DC: World Bank.

World Bank. 2021a. *The Changing Wealth of Nations 2021: Managing Assets for the Future*. Washington, DC: World Bank.

World Bank. 2021b. *World Bank Support for Public Financial and Debt Management in IDA-Eligible Countries*. Independent Evaluation Group, Washington, DC: World Bank.

World Bank. 2022a. *Global Economic Prospects*. January. Washington, DC: World Bank.

World Bank. 2022b. *Nigeria Public Finance Review: Fiscal Adjustment for Better and Sustainable Results*. World Bank, Washington, DC.

World Bank. 2024. *Global Economic Prospects*. January. Washington, DC: World Bank.

Wyplosz, C. 2013. “Fiscal Rules: Theoretical Issues and Historical Experiences.” In *Fiscal Policy After the Financial Crisis*, edited by Alesina, A. and F. Giavazzi, 495–525. Chicago: University of Chicago Press.

Zhang, Y., V. Garcia-Quiles, and N. Thelen. 2015. “Riding the Commodity Rollercoaster: Natural Resource Management in The Context of Increasing Commodity Price Volatility.” *Comparative Economic Studies* 57 (2): 305–25.

Two-thirds of emerging market and developing economies—and 90 percent of low-income countries—depend on commodity exports, leaving their public finances exposed to the boom-bust swings in global commodity prices. When commodity prices surge, spending typically rises in step; when they collapse, public services and investments are often cut, amplifying economic volatility and deepening the slump. Drawing on the most comprehensive analysis to date of a large sample of commodity-exporting developing economies, this book reveals just how deeply these price swings shape government finances, and why some nations weather the cycle better than others. The book offers a practical roadmap for building fiscal resilience—through stronger fiscal frameworks and institutions, prudent saving during good times, and longer-term fiscal planning—while confronting the added uncertainty of the global energy transition. The rich menu of policy options outlined can help make public finances more resilient to shocks, reduce economic instability, and support more durable growth for commodity-dependent economies.



This important study is essential reading for researchers and policymakers on how commodity price volatility affects the fiscal positions of emerging market and developing economy (EMDE) commodity exporters. A key contribution is to show how the fiscal and growth implications differ across EMDE commodity exporters by export type—energy, agriculture, or metals—both in the short term and over longer periods of structural transformation. Some policy recommendations are general to any commodity exporter, such as mitigating fiscal volatility, strengthening fiscal frameworks, and building sovereign wealth funds—but the menu of specific policy options varies substantially across countries.

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Fiscal policy in many emerging market and developing economies tends to be procyclical and generates unnecessary business cycle volatility. But not all these economies face the same challenges, and finding the right policy recommendations requires a good understanding of the context in which fiscal policy is conducted. Commodity exporters are a large group of countries for which these perverse fiscal dynamics tend to be larger and are driven by distinct forces. This book provides a novel and thorough analysis of fiscal policy in commodity exporters. It produces a very large number of stylized facts about how fiscal policy is conducted in these economies and, more importantly, it translates that context into a series of policy recommendations. A must-read for anyone interested in fiscal policy in commodity-dependent economies.

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