

CHAPTER 4

FISCAL POLICY IN COMMODITY EXPORTERS

An Enduring Challenge

Fiscal policy has been about 30 percent more procyclical and about 40 percent more volatile in commodity-exporting emerging market and developing economies (EMDEs) than in other EMDEs. Both procyclicality and volatility of fiscal policy—which share some underlying drivers—hurt economic growth because they amplify business cycles. Structural policies, including exchange rate flexibility and the easing of restrictions on international financial transactions, can help reduce both fiscal procyclicality and fiscal volatility. 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 1 percentage point every four to five years through the 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 strong commitment to fiscal discipline is critical for these institutions to be effective in achieving their objectives.

Introduction

Commodity-exporting emerging market and developing economies (EMDEs) face significant fiscal challenges: Government debt in these countries has grown rapidly over the past decade—from about 33 percent of GDP in 2010 to about 58 percent in 2022, on average. Over the same period, their primary fiscal deficit (which does not include interest payments) averaged about three times that of commodity importers. Increased spending during the pandemic amplified the challenges confronting commodity-exporting EMDEs. The higher cost of servicing elevated debt levels, coupled with weaker growth prospects, is increasing the risk of debt distress among some of these economies (World Bank 2023). Along with the wide swings in commodity prices in recent years, these developments have brought to the fore the complex task of formulating fiscal policy in these economies (figure 4.1.A).

The main challenge faced by policy makers in commodity-exporting countries is coping with the swings in commodity prices; commodities are important sources of export and fiscal revenues for almost two-thirds of EMDEs, including three-fourths of low-income countries (LICs) (figures 4.1.B and 4.1.C; World Bank 2022). Shocks to commodity prices are often large and persistent. Commodity prices have undergone frequent cycles over the past five decades, with the average cycle lasting almost six years (figure 4.1.D). Price

slumps, on average, lasted somewhat longer (39 months) than booms (30 months), with prices falling and rising by 1 to 4 percent per month over the course of the average cycle, respectively (World Bank 2022).

Commodity dependence makes it harder for policy makers to formulate appropriate fiscal responses to commodity price fluctuations. The booms and busts in government revenues attributable to commodities tend to make fiscal policy both more procyclical and more volatile in commodity-exporting EMDEs, amplifying business cycles and harming growth.

- *Fiscal policy tends to be more procyclical*—that is, expansionary in good times and contractionary in bad times—in commodity-exporting EMDEs than in other EMDEs.¹ In commodity-exporting EMDEs, 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. 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

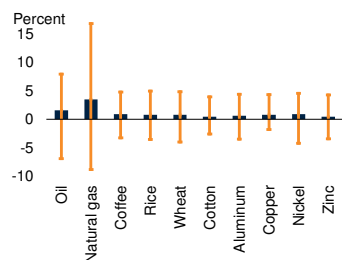
Note: This chapter was prepared by Francisco Arroyo Marioli and Garima Vasishtha. It is based on background studies by Arroyo Marioli and Végh (2023) and Arroyo Marioli, Fatás, and Vasishtha (2023).

¹ See 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), and Richaud et al. (2019), as well as studies documenting evidence for select groups of commodity-exporting countries, including Bova, Medas, and Poghosyan (2016) and Céspedes and Velasco (2014).

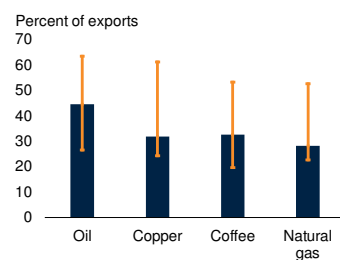
FIGURE 4.1 Commodities: Price volatility and importance for exports and revenues

Commodity prices have fluctuated widely in recent years. Commodities are critical sources of export and fiscal revenues for almost two-thirds of EMDEs and three-quarters of LICs. Energy exporters are more reliant on their commodity exports than are agriculture- and metal-reliant EMDEs on theirs. Resource revenues are an important source of fiscal revenues for commodity exporters, particularly energy exporters. Commodity prices have undergone frequent cycles over the past five decades, with the average cycle lasting almost six years.

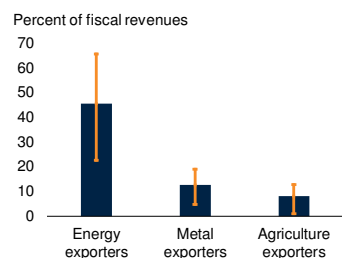
A. Commodity price movements since 2020



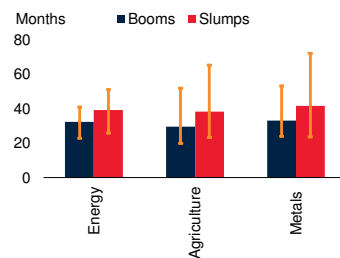
B. Share of EMDE exports for key commodities



C. Resource revenues as share of total fiscal revenues



D. Duration of commodity booms and slumps



Sources: UNU-Wider; UN Comtrade (database); WITS (database); World Bank.

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

A. Bars show the average month-on-month change in commodity prices from January 2020 to November 2023. 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 displays the median export share of oil, copper, coffee, and natural gas for commodity-exporting EMDEs. The number of countries is 20 for oil, 6 for copper, 4 for coffee, and 5 for natural gas. Bars represent medians, while whiskers indicate interquartile ranges.

C. Unweighted average of resource revenues as a percentage of fiscal revenues for EMDE commodity exporters: 30 for energy, 14 for metals, and 10 for agricultural commodities. Whiskers show the interquartile range.

D. Duration measures the average length (in months) of a phase (boom or slump). Whiskers indicate minimum and maximum ranges.

debt positions tend to ratchet up, deteriorating from cycle to cycle. This secular deterioration, in turn, will make it more difficult to implement countercyclical fiscal policy in bad times. In sum, 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 in the provision of govern-

ment services, and introduce a bias toward a deterioration in fiscal positions.

- *Fiscal policy tends to be more volatile* in commodity-exporting EMDEs than in other EMDEs. Swings in commodity prices often result in highly volatile commodity-related fiscal revenues in these countries, leading to more volatile business cycles, which historically move in tandem with commodity price cycles.² Over the past three decades, output volatility in commodity-exporting EMDEs was more than double that in commodity-importing ones. Revenues derived from the commodity sector are also prone to policies associated with rent-seeking behavior. In addition, fiscal policy volatility can act as a transmission mechanism for the “resource curse”—the term coined to describe how commodity abundance, if not managed properly, can damage overall growth.³ Moreover, country-specific evidence suggests that large swings in commodity prices can be socially harmful, as shown in such indicators as poverty indices, highlighting the need for policies that mitigate the adverse effects of such price shocks (Álvarez, García-Marín, and Ilabaca 2021; Estrades and Terra 2012).

In the years ahead, the challenges associated with volatile and procyclical fiscal policies are likely to be compounded by sharp fluctuations in commodity prices as the impact of climate change on commodity markets becomes more pronounced.⁴ The continuation of procyclical and volatile fiscal policies would be detrimental to growth and impede progress in achieving climate and other broader development goals. As the experience of

² See IMF (2015a); Jacks, O'Rourke, and Williamson (2011); Richaud et al. (2019); and World Bank (2009, 2020, and 2022).

³ On the detrimental effects of fiscal policy volatility on growth see, for example, Afonso and Furceri (2008); Fatás and Mihov (2003, 2007, and 2013); and Medina (2010). On the “resource curse,” see Bleaney and Halland (2009) and Sachs and Warner (1995) for detailed discussions.

⁴ Climate change has significant implications for commodity markets as it leads to severe alterations in weather patterns, affecting climate-sensitive industries such as agriculture and fishing. Droughts can reduce harvests, while floods can affect both harvests and transportation. Policies that address climate change can also generate gains for other commodities, such as metals that are used heavily in low-carbon technologies.

recent decades shows, governments have difficulties in establishing macroeconomic policy frameworks that are effective in helping maintain steady growth in the face of commodity price swings (IMF 2015b; UNCTAD 2021; World Bank 2022).

This chapter presents a comprehensive study of the role of fiscal policy in commodity-exporting EMDEs. Specifically, it addresses the following three questions:

- How different has fiscal policy been, in terms of its cyclical and volatility, in commodity-exporting EMDEs relative to other EMDEs?
- How have fiscal procyclicality and volatility affected economic growth in commodity-exporting EMDEs?
- Which policy interventions can help improve the quality of fiscal policy by reducing procyclicality and volatility?

Contributions to the literature. This chapter makes several contributions to the literature, including:

- *Provides a thorough analysis of fiscal procyclicality and volatility.* This is the first study that examines the implications of fiscal policy procyclicality and volatility together. The empirical literature treats the concepts of fiscal cyclical and volatility as distinct. While closely following the literature in terms of the methodology for analyzing the two concepts, this chapter goes beyond the literature in examining the linkages between cyclical and volatility. It provides fresh comprehensive evidence on fiscal procyclicality and volatility for a larger sample of commodity exporters (agricultural, metals, and energy exporters) and commodity importers than previously examined. It also documents how fiscal policy challenges have manifested themselves in different EMDE regions; previous studies have covered either a geographically limited set of countries or mainly oil exporters.
- *Deepens the understanding of the implications of fiscal procyclicality and volatility for economic*

growth. The chapter quantifies how procyclical fiscal policy responses have amplified business cycles in commodity-exporting EMDEs during periods of elevated commodity prices, taking a close look at the 2003-08 commodity price boom. It also quantifies the impact of higher output volatility on economic growth.

- *Presents a large menu of policies.* The chapter presents a comprehensive analysis of policies to reduce fiscal policy procyclicality and volatility. It uses several empirical approaches to examine the roles of cyclical and structural factors in improving the design of fiscal policy. In addition, the chapter 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. 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.

Fiscal policy has tended to be both more procyclical and more volatile 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 cyclical—is 0.40 for EMDEs and near zero for advanced economies. Within EMDEs, the correlation is 0.46 for commodity exporters and 0.36 for commodity importers. Fiscal policy volatility, measured by the volatility of real government expenditure, is about 40 percent higher in EMDE commodity exporters than in other EMDEs. Moreover, among EMDEs, the larger the commodity sector, the more volatile fiscal policy has tended to be. Both fiscal procyclicality and volatility have generally trended downward in EMDEs in recent decades. However, procyclicality has fallen less among commodity-exporting EMDEs than in other EMDEs. Fiscal volatility has declined by nearly half in EMDEs over the

past three decades, but it remains much higher 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 (box 4.1). 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.

Fiscal policy volatility has often amplified the business cycle and reduced growth. Fiscal policy volatility has tended to be associated with more volatile business cycles and lower 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 1 percentage point in per capita growth every four to five years by reducing fiscal policy volatility.

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. Procyclical fiscal policy amplifies the business cycle, which in turn exacerbates the volatility of output. That is, given a shock to output, a procyclical fiscal response further exacerbates the business cycle. Hence, the initial shock to output has larger overall economic impacts when there also is procyclicality, thereby amplifying volatility.

Structural policies can help reduce fiscal procyclicality and volatility. In particular, more stable governments, a stronger rule of law, greater capital account openness, fiscal rules to constrain government spending, and SWFs have all been associated with lower fiscal procyclicality. Fiscal rules and SWFs, essentially state-owned investment companies, have been most effective when surrounded by robust institutional frameworks. Stronger institutions and stricter constraints on fiscal policy have also been associated with less fiscal volatility. Specifically, the presence of fiscal rules, less constraints on international financial transactions, and flexible exchange rates are all associated with lower fiscal policy volatility. Medium-term expenditure frameworks can also help lower the procyclicality and volatility of fiscal policies by improving fiscal discipline.

Fiscal policy procyclicality

Conceptual definitions

Because the concept of fiscal policy cyclicality is important to guiding actual policy, it is critical to define policy cyclicality in terms of policy instruments (such as, government expenditure) rather than outcomes (such as, the fiscal balance). This chapter follows the literature and measures fiscal cyclicality 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 1980–2020.

Economies are placed into two groups—“commodity exporters” and “commodity importers”—by applying the classification criteria used in World Bank (2022). An economy is classified as a commodity exporter if, on average in 2017–19, either its combined exports of all

⁵For details about this measure, see Frankel, Végh, and Vuletin (2013) and Kaminsky, Reinhart, and Végh (2004). The stylized facts reported in this section are based on the correlations between the cyclical components of real (primary) government expenditure and real GDP, using 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. Results are also robust to the use of nonparametric filters, as documented by Carneiro and Garrido (2016) and Kaminsky, Reinhart, and Végh (2004).

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). Based on these criteria, 92 economies are classified as commodity exporters of which 87 are EMDEs and five are advanced economies. Commodity importers are economies not classified as commodity exporters (table A4.3.1). The panel is unbalanced because some countries do not have data for the whole sample period.

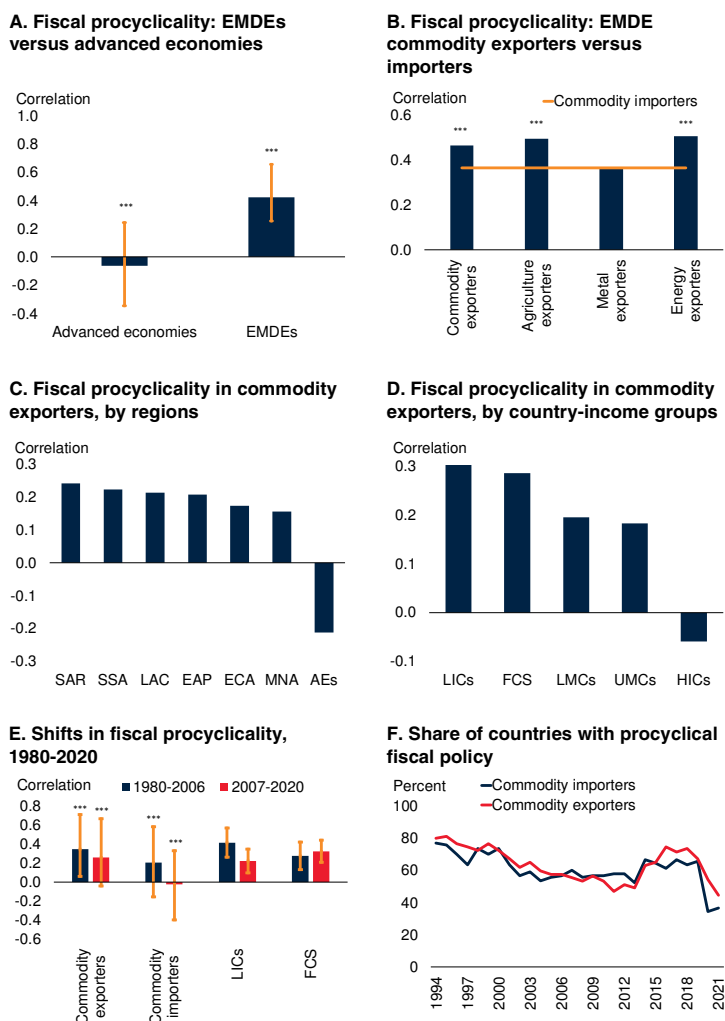
Basic features of procyclicality

The analysis of correlations produces four stylized facts.

- In the period 1980-2020, fiscal policy in EMDEs has been procyclical while that in advanced economies has been acyclical (figure 4.2.A). The correlation between the cyclical components (derived using the Hodrick-Prescott filter) of real government expenditure and real GDP for EMDEs is 0.40, while that for advanced economies is slightly negative.
- Although fiscal policy in both commodity exporters and commodity importers has been procyclical among all EMDEs in the sample, commodity exporters are 30 percent more procyclical than commodity importers on average (figure 4.2.B). The correlation between the cyclical components of real government spending and real GDP for commodity exporters is 0.46 compared with 0.36 for commodity importers, with both coefficients as well as the difference between them being statistically significant. This procyclical behavior has been widespread across all EMDE regions (figure 4.2.C).
- The degree and nature of fiscal procyclicality have varied across country-income groups. Fiscal procyclicality in LICs and fragile and conflict-affected situations (FCSs) was higher than in lower- and upper-middle income countries, while in high-income countries fiscal policy was countercyclical (figure 4.2.D).

FIGURE 4.2 Procyclicality of government expenditures

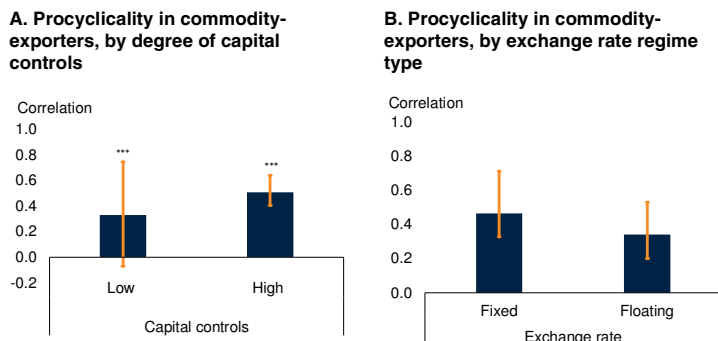
Over the past four decades, fiscal policy in EMDEs has been strongly procyclical, while that in advanced economies has been acyclical, on average. Commodity-exporting EMDEs tend to display significantly higher procyclicality than other EMDEs. Procyclicality tends to be more pronounced in low-income countries than in lower- and upper-middle-income commodity exporters. On average, fiscal procyclicality has been declining in commodity exporters over the past decade and a half.



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 country; LAC = Latin America and the Caribbean; LIC = low-income country; LMC = lower-middle-income country; MNA = Middle East and North Africa; SAR = South Asia; SSA = Sub-Saharan Africa; UMC = upper-middle-income country.
 A.-E. Bars show average correlation between the (Hodrick-Prescott-filtered) cyclical components of real GDP and real government spending within groups. The sample period is 1980-2020. A.B.E. Whiskers show the 25th and 75th percentiles. Black asterisk indicates a statistically significant difference in means.
 A. Sample includes 36 advanced economies and 146 EMDEs. *** indicates that the difference between the average correlation for the two country groups is statistically significant at the 10 percent level or better.
 B. Sample of EMDEs includes 87 commodity exporters (38 agricultural, 31 energy, and 21 metals) and 59 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.D. Panels show the average of the procyclicality measure for the various country groups.
 E. 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.
 F. Share of countries with procyclical policies based on five-year rolling windows. Sample has 184 countries.

FIGURE 4.3 Fiscal procyclicality and macroeconomic factors in commodity exporters

Among commodity exporters, more capital account restrictions and the presence of fixed exchange rate regimes are associated with more procyclical policy, on average.



Sources: Arroyo Marioli and Végh (2023); Chinn and Ito (2006); Ilzetzki, 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.

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 54 countries with high capital controls. *** indicates that the difference between the means for the two country groups is statistically significant at the 10 percent level or better.

B. Sample has 63 countries with fixed exchange rates and 29 with floating rates, based on the classification in Ilzetzki, Reinhart, and Rogoff (2022). The difference between the means for the two country groups is not statistically significant.

- Fiscal procyclicality has declined over the past four decades. To examine the evolution of fiscal procyclicality, the sample is split into two subperiods: before and after 2006. 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). Fiscal procyclicality in commodity exporters has been falling over the past decade-and-a-half. Nevertheless, procyclicality in commodity exporters still prevails and has fallen much less than in commodity-importing countries (which are, on average, acyclical since 2006) (figure 4.2.E). The fraction of countries running procyclical fiscal policies has declined over the past few decades. This decline was more pronounced for commodity importers (from 33 percent in the mid-1990s to 24 percent in 2021) compared with commodity exporters (from 40 percent in the mid-1990s to 36 percent in 2021) (figure 4.2.F).

Determinants of fiscal procyclicality

To assess how fiscal cyclicality has varied with macroeconomic and institutional features of countries, this section first compares fiscal cyclicality across different groups of countries. It then presents a cross-country regression analysis to disentangle the roles of key factors in driving procyclicality.

The country groupings are based on certain macroeconomic characteristics, including the degree of capital account openness, the exchange rate regime, and the level of external debt. In addition to these macroeconomic characteristics, the degree of fiscal procyclicality can also depend on political economy considerations and institutional features. The choice of these variables is guided by the literature on fiscal procyclicality.

Restrictions on international financial transactions. Countries with more restrictions on the capital account tend to have more limited access to international financial markets, which makes the cost of borrowing more expensive. 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 And the data indeed 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 4.3.A).⁷ On average, the correlation between cyclical components of real government spending and real GDP for countries with more capital controls is 0.51 compared with 0.33 for countries with fewer capital controls; the difference between the correlations is statistically significant.

Exchange rate regime. Flexible exchange rates are often associated with greater fiscal discipline

⁶For details of this argument, see Kose et al. (2010). This result is 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 Fernández et al. (2021).

⁷The results shown in figures 4.3 and 4.4 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.

because of the immediacy of the repercussions of imprudent fiscal policies (Tornell and Velasco 2000). It is likely, then, that the degree of fiscal procyclicality is higher in countries with fixed exchange rate regimes. Indeed, 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 (0.36)—although the difference between the two is not statistically significant (figure 4.3.B).

External debt. Fiscal cyclicity is found not to have varied significantly with the level of external debt over the sample period. The correlation between cyclical components of real GDP and real government spending is essentially the same for countries with low and high external debt.⁸

Political economy factors. Extensive research has documented the role of political variables in driving fiscal procyclicality. Political pressures in good times tend to prompt policy makers to reduce primary surpluses, by reducing taxes or increasing spending. Given that more volatile primary surpluses offer more chances of fiscal appropriation, the more volatile output and therefore the tax base are, the more procyclical will fiscal policy tend to be (Talvi and Végh 2005).

The dispersion of political power—the so-called 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 procyclicality (Tornell and Lane 1999). As the intensity of such fiscal competition increases in good times, the rise in government spending could

⁸The 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 reaction in bad times versus good times. This could also be because the size of fiscal multipliers has been found to depend on 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. The difference in the measure of fiscal procyclicality in expansions (0.29) and recessions (0.23) is not statistically significant.

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.

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 variables, 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 are especially important factors in reducing fiscal procyclicality. They can help do so by shrinking government discretion and extending the horizon of policy decision-making.

To analyze the linkages between fiscal cyclicity and institutional quality, five country-specific 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 A4.3.2). The association between procyclicality and the presence of fiscal rules is also examined here because these rules are a significant part of the fiscal institutions in many commodity-exporting countries (box 4.2).

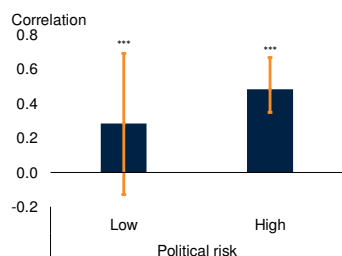
The results indicate that higher political risk is associated with more procyclical fiscal policies. The correlation between the cyclical component of real GDP and real government spending in countries that rank higher on political risk is 0.49, compared with a correlation of 0.28 for countries that rank lower on political risk; the difference between the average correlations for the two country groups is statistically significant (figure 4.4.A). Part of the explanation may be that governments in countries with higher political risk may be more focused on short-term outcomes to stay in power.

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

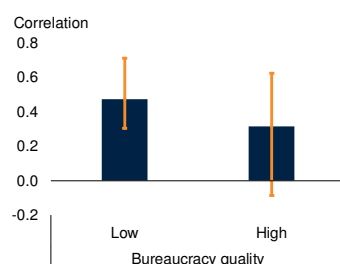
FIGURE 4.4 Fiscal procyclicality, fiscal rules, and institutional factors

The degree of fiscal procyclicality tends to be higher, on average, among commodity exporters with higher political risk. Countries with better-quality bureaucracies and more corruption control display less procyclical behavior. Government stability and better rule of law are also associated with lower procyclicality. The presence of fiscal rules has a dampening effect on procyclicality for the entire sample, but less so among commodity-exporting countries.

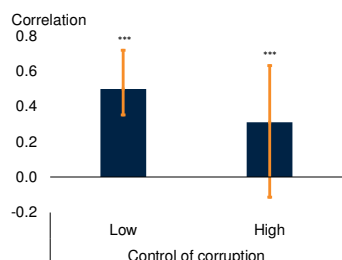
A. Procyclicality and political risk



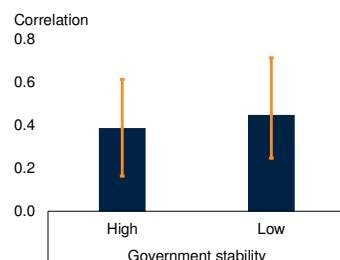
B. Procyclicality and quality of bureaucracy



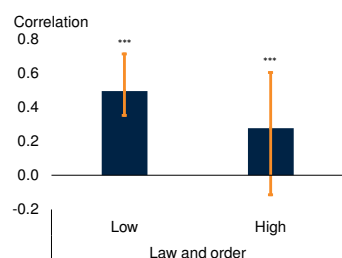
C. Procyclicality and corruption control



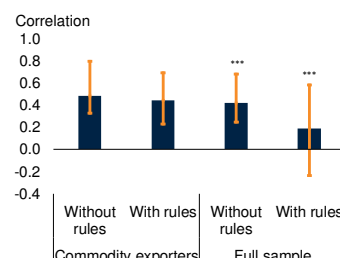
D. Procyclicality and government stability



E. Procyclicality and law and order



F. Procyclicality and fiscal rules



Sources: Arroyo Marioli and Végh (2023); International Monetary Fund; PRS Group (database).
Note: Bars show average correlation between the (Hodrick Prescott-filtered) cyclical components of real GDP and real government spending within groups. Vertical lines show 25th and 75th percentiles.

A. Countries with high (low) political risk are defined as those with political risk above (below) the sample median. Sample has 49 countries with high political risk and 24 countries with low political risk. *** indicates that the difference between the means for the two country groups is statistically significant at the 10 percent level or better.

B. Sample has 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 has 45 countries with low control of corruption and 28 with high control of corruption. *** indicates that the difference between the means for the two country groups is statistically significant at the 10 percent level or better.

D. Sample has 32 countries with high government stability and four with low government stability. The difference between the means for the two country groups is not statistically significant.

E. Sample has 24 countries with high scores (above sample median) for the law-and-order index and 49 countries with low (below sample median) scores. *** indicates that the difference between the means for the two country groups is statistically significant at the 10 percent level or better.

F. For commodity exporters, the sample includes 28 countries with fiscal rules and 20 countries without fiscal rules. The entire sample includes 58 countries with fiscal rules and 47 countries without fiscal rules. The difference between the means for the two country groups (with and without fiscal rules) is statistically significant (indicated by ***) for the entire sample but not for the sample of commodity exporters.

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 4.4.B). Better bureaucracy may be expected to allow for better, rules-based, policy management and to limit 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 4.4.C). Weaker control of corruption makes it easier to capture rents. Likewise, countries with more government stability have tended to demonstrate less fiscal procyclicality than those with less government stability—although the difference in cyclicity measures is not statistically significant (figure 4.4.D). A more stable government allows 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 4.4.E). The difference between the procyclicality measures for countries ranked lower in the law-and-order index and countries ranked higher is statistically significant.

Many commodity exporters have enacted fiscal rules, often in conjunction with stabilization funds—which essentially put aside revenue in good times that can be tapped in 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 across the full sample of countries, although results are less clear for commodity exporters (figure 4.4.F). Increased use of fiscal rules has not shielded EMDEs or commodity exporters from fiscal procyclicality, as evidenced by the continued procyclicality of fiscal policies in these countries after they adopted such rules. Nevertheless, there is evidence that some features of a second generation of fiscal rules—such as the use of

BOX 4.1 How does procyclical fiscal policy affect output growth?

Fiscal responses to commodity price shocks have differed considerably between emerging market and developing economies (EMDEs) and advanced economies. Commodity-exporting EMDEs have tended to react in a procyclical manner, increasing government expenditures when prices of exported commodities rise. Advanced-economy commodity exporters, by contrast, have tended to react countercyclically, reducing spending when prices rise. Fiscal policy procyclicality in the average EMDE commodity exporter has increased the effects of a commodity price shock on the business cycle by more than one-fifth.

Introduction

Procyclical fiscal policy amplifies the effect on output of a shock to economic activity—that is, “when it rains, it pours,” using the analogy of Kaminsky, Reinhart, and Végh (2004). Such shocks could originate from various sources—from the financial sector or from supply or demand shocks associated with external or domestic developments. Kaminsky, Reinhart, and Végh (2004) focused on net capital inflows, finding that such flows were associated with an increase in government expenditure in emerging market and developing economies (EMDEs), while net capital outflows were associated with a decline in government expenditure. A variety of other drivers could lead to procyclical fiscal behavior.

This box examines how increases in commodity prices have affected the behavior of fiscal policy and, in turn, output growth. The total impact of the changes in commodity prices on output can be decomposed into two components. First, the “rains” 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. The increases in 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. But if 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.

This box addresses the following questions:

- How does fiscal policy in commodity-exporting countries react to changes in prices of commodity exports?

- How does the impact of this fiscal reaction on output growth differ between commodity-exporting-EMDEs and advanced economies?

Methodology

To estimate the effect of fiscal policy on output, the analysis proceeds in four steps. First, to quantify the effects of changes in commodity prices on output, panel regressions are used to obtain the response of real GDP to changes in country-specific commodity price indexes.^a The 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 A4.1.3).^b

Second, panel regressions are used to estimate a fiscal policy reaction function (that is, the response of government spending to changes in commodity prices). Results show that EMDEs increase government spending when commodity export prices rise, indicating a procyclical fiscal policy (table A4.1.4). Specifically, a 10 percent increase in commodity export prices leads to an increase in government spending of about 0.6 percent to 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 percent to 1.2 percent. Third, an average fiscal multiplier is estimated for

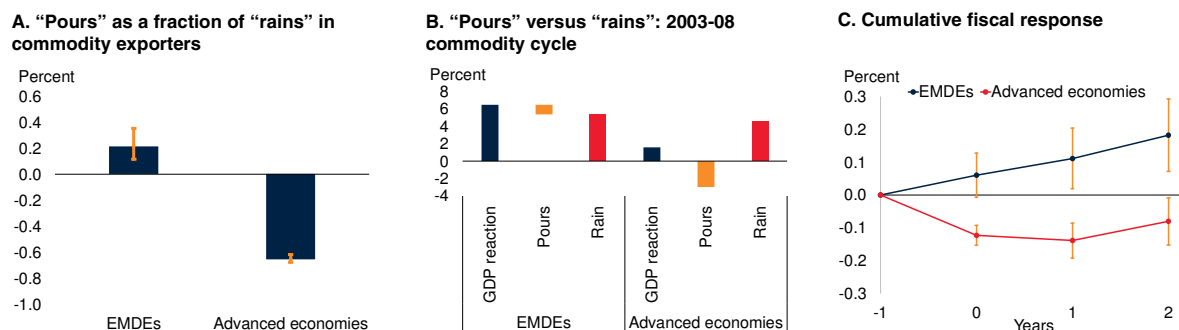
a. Two control variables are used: overall terms of trade (which include terms of trade for all traded goods and services, not just commodities, using data from the IMF) to control for trade effects, and the lagged dependent variable to capture underlying growth unrelated to commodity prices. The country-specific commodity export price index is an index that weights commodities 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 the particular country.

b. In table A4.1.3, the coefficient for EMDEs (0.085) in column (1) is about 3.5 times as much as the coefficient for advanced economies (0.024) in column (4).

BOX 4.1 How does procyclical fiscal policy affect output growth? (continued)

FIGURE B4.1.1 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 cyclicalities of fiscal 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 has 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). The average of these shares for commodity-exporting EMDEs and advanced economies is shown by the blue bars. Whiskers shows 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.

C. Panel shows the cumulative reaction of fiscal expenditure to a 1 percent increase in commodity exports prices in $t=0$, using panel regressions. The regression includes two leads and lags of commodity export prices.

commodity exporters using a panel structural vector autoregression (SVAR) model.^c

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:

$$\text{Pours} = \Delta CEP * \text{Fiscal reaction elasticity} * \text{fiscal multiplier} * \frac{g}{y} \quad (\text{B4.1.1})$$

c. The model is based on the Blanchard-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 (given by 0.88).

where CEP is the commodity export price, $\text{fiscal reaction elasticity}$ 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 price (CEP) trigger a fiscal reaction (elasticity), which in turn affect 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.^d

d. 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 the 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. See Ilzetzki, Mendoza, and Végh (2013) for a detailed discussion.

BOX 4.1 How does procyclical fiscal policy affect output growth? (continued)

Impact of procyclical fiscal policy on output

The results indicate that, if an increase in the price of the exported commodity boosts output by 1.0 percentage point (the “rains” effect), procyclical fiscal policy in commodity-exporting EMDEs increases GDP by another 0.21 percentage point (the “pours” effect), boosting the total change in GDP to 1.21 percent (figure B4.1.A). In contrast, fiscal policy in commodity-exporting advanced economies compensates for the cyclical effect by reacting in the opposite direction, reducing GDP by 0.65 percentage point. This leaves the net increase in GDP of 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 can be more than three times bigger in EMDEs than in advanced economies solely because of the fiscal policy reaction.

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 increased about 76 percent for the EMDEs and 66 percent for the advanced economies in the sample. The analysis estimates the direct effect of the commodity price shock on output (the “rain” component) by applying the 2003-08 cumulative price shock to the estimated parameters. The results indicate that the total effect on output to be 5.4 percent for EMDEs and 4.6 percent for advanced economies—that is, a difference of 0.8 percentage point (figure B4.1.1.B). The procyclical

response of fiscal policy in EMDEs (“pours” component) in 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, 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) can be explained by the responses of fiscal policy—procyclical in EMDEs and countercyclical in advanced economies. Alternative estimates also indicate that fiscal expenditure in EMDEs reacts in a procyclical manner while that in advanced economies reacts in a countercyclical one (figure B4.1.1.C).

Conclusion

Fiscal procyclicality amplifies the effect of commodity price shocks on the business cycle 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 in EMDE commodity exporters fiscal policy has tended to amplify the business cycle, whereas in advanced-economy commodity exporters fiscal policy has tended to dampen it.

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 country cases examined in box 4.2 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.

Armed with the insights from the correlates of fiscal procyclicality established above, the analysis uses cross-country regressions to identify the main drivers of fiscal procyclicality in commodity

exporters.¹⁰ The dependent variable here is the correlation between the annual percentage changes of real government spending and real GDP. The explanatory variables are intended to capture the four explanations for the existence of procyclical fiscal policy described in the previous section: capital account openness (measured by an index of

¹⁰ For an empirical analysis of the drivers of fiscal procyclicality in OECD countries, see Lane (2003). For an analysis of the role of financial and institutional variables, see Calderón and Schmidt-Hebbel (2008) and Calderón, Duncan, and Schmidt-Hebbel (2010). Ilzetzki (2011) provides a novel political economy explanation based on successive governments disagreeing on the desired distribution of public spending and examines different theories of procyclicality by running numerical simulations in calibrated models.

financial openness); 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); macroeconomic stability (measured by the standard deviation of output); and institutional quality (measured by an index of control of corruption).

The coefficients of each of these four variables are statistically significant and three of the four have the expected sign (annex 4.1; table A4.1.1). More open capital accounts and better control of corruption are estimated to have helped reduce fiscal procyclicality while greater output volatility was associated with higher procyclicality. However, the coefficient of the political constraints index does not have the expected sign, suggesting either that the “voracity effect” did not hold or that the political constraints index fails to capture it. The variables are jointly significant when combined and explain about 18 percent of procyclical behavior across countries.¹¹

Cross-country regressions are also used to analyze the role of institutional variables in driving fiscal cyclicality, as highlighted by the correlations reported in the previous section. The roles of SWFs and fiscal rules are also explored. 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 (Asik 2017). The results show that greater government stability, better law and order, and the presence of SWFs and fiscal rules have all tended to reduce fiscal procyclicality (table A4.1.2). Overall, the analysis therefore provides empirical evidence that better institutions are associated with lower fiscal procyclicality. These results are also corroborated by the country case studies (box 4.2) which show that SWFs and fiscal rules are

most effective in meeting their goals when supported by strong institutions.

Fiscal policy volatility

Conceptual definitions

Country-specific measures of fiscal policy volatility are constructed based on the variance of exogenous changes in fiscal policy stance. These are simply derived from fiscal policy reaction functions, following the approach in Fatás and Mihov (2013) (annex 4.2 provides details). The analysis is based on four alternative measures of fiscal policy: primary expenditures (which exclude net interest payments), revenues, government consumption, and the primary budget balance (which excludes net interest). The first three variables are expressed in real (inflation-adjusted) terms and measured as log differences. The primary budget balance is expressed as the annual change of its ratio to GDP. Annual data are used for the 1990-2021 period for 184 countries, including 148 EMDEs and 36 advanced economies. The choice of the sample period is based on data availability. Of these 184 countries, 94 are commodity exporters and the remainder as commodity importers. Among commodity exporters, only five are advanced economies. Among commodity importers, 31 are advanced economies and 59 are EMDEs.

Basic features of fiscal policy volatility

The following stylized facts emerge from a comparison of the measures of fiscal policy volatility between different country groups.

First, over the past three decades, *the volatilities of primary expenditures, government consumption, and revenues were all significantly higher in EMDEs than in advanced economies* (figure 4.5.A). The difference between the average volatility for these two groups of countries is statistically significant. Notably, the difference in the volatility of government consumption 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 percentage of GDP) is

¹¹ In line with Lane (2003), and to check the robustness of our results, GDP per capita, size of the public sector relative to GDP, and openness (the sum of exports and imports as a share of GDP) were added as controls, one at a time. 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.

relatively smaller and closer between the two country groups than with the other fiscal policy indicators.¹²

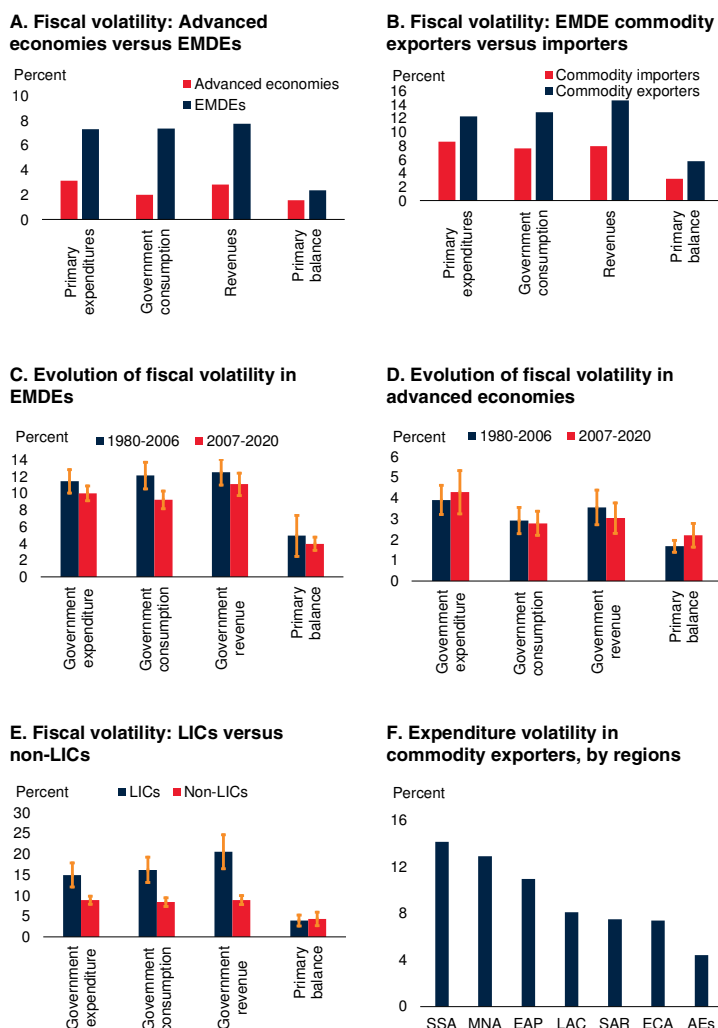
Second, EMDE commodity exporters exhibited more volatility in fiscal policy than commodity importers (figure 4.5.B). The difference in the average volatility for commodity exporters and commodity importers is statistically significant. Government revenues demonstrated greater volatility than the other indicators, although only by a slight margin.

Third, fiscal policy volatility declined somewhat in EMDEs over the past three decades. Volatility of government expenditure, consumption, revenue, and primary balance were all lower on average during 2007-20 than in 1980-2006 (figure 4.5.C). This reduction in fiscal policy volatility in EMDEs mirrors the increasing use of fiscal rules in these countries (Arroyo Marioli, Fatás, and Vasishtha 2023). In advanced economies, however, over the same period, revenue volatility declined while volatility of expenditures and primary balance increased (figure 4.5.D).

Fourth, government expenditures, consumption, and revenue tend to be more volatile in LICs than in other EMDEs. Over the past three decades, government expenditure, consumption and revenue were roughly twice as volatile in LICs as in other EMDEs (figure 4.5.E). The degree of fiscal volatility has also varied across emerging market regions. On average, expenditure volatility in LICs, particularly FCS economies, over the past three decades was higher than that in lower- and upper-middle income countries. Fiscal volatility was the highest among commodity exporters in Sub-Saharan Africa (SSA), the Middle East and North Africa (MNA), and East Asia and Pacific (EAP) than in other emerging market regions (figure 4.5.F).

FIGURE 4.5 Fiscal policy volatility

Over the past three decades, 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 and in LICs compared with non-LICs, on average. Fiscal policy volatility declined somewhat in EMDEs over the past three decades while the evolution of fiscal volatility in advanced economies has varied across different fiscal indicators. Expenditure volatility over the past three decades has been highest among commodity exporters in Sub-Saharan Africa, the Middle East and North Africa, and East Asia and Pacific.



Sources: Arroyo Marioli, Fatás, and Vasishtha (2023); IMF WEO database; 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; 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 (A) and simple averages (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 36 advanced economies and 148 EMDEs over 1990-2021.

C,D,E. Panels 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 35 advanced economies and 142 EMDEs over 1980-2006, and 36 advanced economies and 144 EMDEs over 2007-20.

F. Panel shows the average (unweighted) volatility in commodity exporters in each country group.

¹² However, when comparing the volatility of the primary balance with the other fiscal variables, the average size of the government 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 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.

Determinants of fiscal volatility

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. Like the analysis of procyclicality, the exercise focuses on the spending side of the budget. While each of the four fiscal policy indicators used above contains information about fiscal policy, the variation in primary expenditures provides a more accurate perspective on the volatility of fiscal policy. 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 expenditure net of cyclical components (such as unemployment benefits) that are captured in the volatility measure used in the analysis.

The findings indicate that commodity dependence can be a source of fiscal policy volatility by itself. Being both an EMDE and a commodity exporter explains up to 22 percent of the variation in fiscal policy volatility across countries (table A4.2.1).¹³ That commodity exporters exhibit higher fiscal policy volatility even after their EMDE status is taken into account suggests that reliance on commodities in itself contributes to fiscal policy volatility.

EMDEs and commodity exporters are heterogeneous groups of countries that display substantial variation in their level of development as well as 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. Resource rents are highly correlated with resource revenues as a share of GDP (Arroyo Marioli, Fatás, and Vasishtha 2023).

The results indicate that the lower GDP per capita in EMDEs does not by itself explain the differences in fiscal policy volatility across countries because the presence of larger commodity sectors contributes to greater volatility in fiscal policy. Overall, these findings suggest that both the level of development and the degree of commodity dependence contribute to explaining fiscal volatility.

Energy exporters display higher fiscal policy volatility than exporters of metals and agricultural commodities. Controlling for resource rents, however, the results indicate that commodity dependence is a more important determinant of fiscal volatility than the type of commodity exported (table A4.2.2).

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. These two variables are found to be significant and together help explain up to 40 percent of cross-country variation in fiscal policy volatility. Policy frameworks can also play an important role in driving fiscal policy volatility. The roles of three specific policy variables are examined: the capital account openness, exchange rate regime (floating versus fixed), and the presence of fiscal rules.

The presence of a more open capital account, more flexible exchange rates, and fiscal rules are all associated with lower fiscal policy volatility. Taken together, these explanatory variables can explain up to 71 percent of the cross-country variation in fiscal policy volatility. The estimates suggest that moving from a fixed exchange rate regime to a flexible one can lower expenditure volatility by 3 percentage points (table A4.2.1). 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

¹³ For brevity, table A4.2.1 only shows the regression results when primary expenditure is used as the dependent variable. The regression results with government consumption as the dependent variable are very similar.

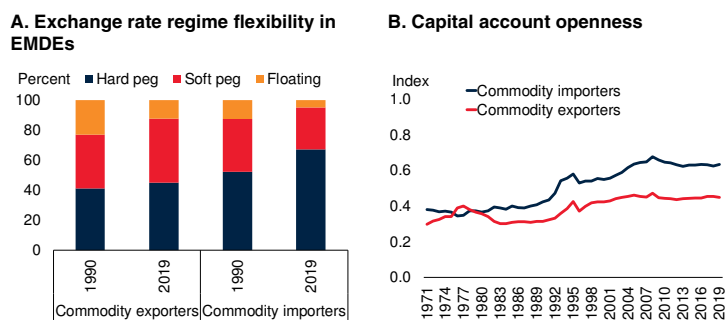
rate adjustment needed to counteract the destabilizing effects of commodity prices on output. A more flexible exchange rate regime, in principle, facilitates a smoother cyclical adjustment to a terms-of-trade shock. For example, during the 2014-16 fall in commodity prices (mainly crude oil and natural 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).¹⁴ In contrast, countries with pegged regimes experienced a larger deterioration in their fiscal balance, on average, relative to those with flexible exchange rate regimes. Pegged exchange rates remain the dominant exchange rate regime among EMDEs (figure 4.6.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 same as in the average advanced economy, expenditure volatility in EMDEs would be reduced by 1.7 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, although markets may respond in a procyclical manner for some countries (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 4.6.B). Measures to increase capital

¹⁴Although a countercyclical fiscal policy response to a temporary commodity price shock is desirable under both fixed and flexible exchange rate regimes, these policies are more effective under a flexible exchange rate regime combined with inflation targeting when monetary policy complements fiscal policy by reducing inflation volatility (IMF 2012a).

FIGURE 4.6 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 between the two has widened.



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

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

B. Based on Chinn-Ito index of financial openness. The lines represent the average of the index in the represented year. Sample includes 98 commodity importers and 98 commodity exporters.

account openness always have to be considered with caution, in combination with consideration of the prudential and other measures that may be needed to avoid instability in the domestic financial system.

In addition, establishing a fiscal rule can reduce expenditure volatility in EMDEs by 0.7 percentage point (from 10.8 to 10.1 percent). The significance of these three variables—that is 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 result is not statistically significant.¹⁵

Implications of fiscal policy volatility for growth

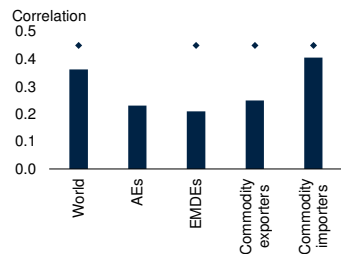
Fiscal policy volatility reduces output growth by exacerbating macroeconomic volatility. Expenditure volatility is found to have significantly hurt

¹⁵It is possible that the effect of establishing a sovereign wealth fund is captured by the other policy variables included in the analysis. For example, the decision to establish one may be correlated with volatility itself.

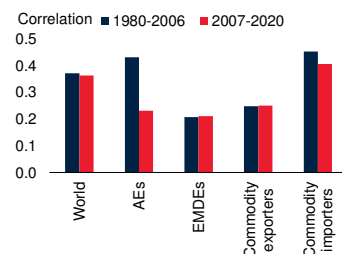
FIGURE 4.7 Fiscal policy volatility and procyclicality

The correlation between fiscal volatility and procyclicality among EMDEs and commodity exporters is mostly due to the procyclical behavior. While the correlation between fiscal procyclicality and volatility in advanced economies declined between 1980-2006 and 2007-2020, it remained unchanged in EMDEs and commodity exporters. High- and upper-middle-income countries have had the highest correlations among country-income groups. Europe and Central Asia and Middle East and North Africa have had the highest correlations among EMDE regions.

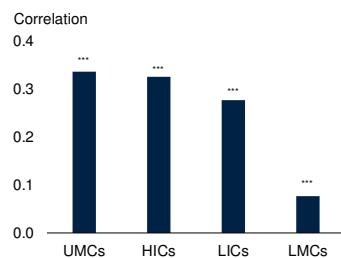
A. Correlation between fiscal volatility and procyclicality



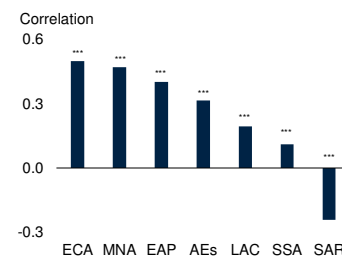
B. Correlation between fiscal volatility and procyclicality over time



C. Correlation between fiscal volatility and procyclicality, by country-income groups



D. Correlation between fiscal volatility and procyclicality, by regions



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; 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; SAR = South Asia; SSA = Sub-Saharan Africa; UMC = upper-middle-income country.

A.B.C.D. 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. Blue diamonds and asterisks represent statistical significance.

per capita output growth (annex 4.2 and table A4.2.3), which supports earlier research showing a negative association between macroeconomic volatility and economic growth (Kose, Prasad, and Terrones 2005; Ramey and Ramey 1995). The estimated impact of fiscal volatility on per capita growth is in line with other recent estimates (for example, Fatás and Mihov 2013).

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 3.1 percentage points—from 12.3 percent to 9.2 percent. That would result in an increase in the average per capita GDP growth rate for commodity-exporting EMDEs from about 1.4 to 1.7 percent per year. In other words, by adopting these policies the average commodity-exporting EMDE could have added about 1 percentage point in per capita growth every four to five years (figure 4.8.A). Over the 30-year sample period of the analysis, an overall 7.6 percentage points would have been added to average growth in GDP per capita in EMDEs.

Links between procyclicality and volatility

Fiscal procyclicality and volatility are intimately related concepts and often driven by similar factors, as highlighted by the preceding analysis. Intuitively, a more procyclical fiscal policy would be expected to result in a more volatile fiscal policy to the extent that it amplifies the business cycle, thus exacerbating the effect of the initial source of volatility.¹⁶ The measures of volatility and procyclicality are positively correlated, a finding in line with some previous studies (figure 4.7.A; IMF 2004). However, when EMDEs and advanced economies are considered separately, the correlation is significant only for EMDEs. The correlation is significant for 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 from other factors. The correlation between fiscal procyclicality and volatility has declined for advanced economies from the 1980-2006 period

¹⁶ It is also possible that if fiscal policy is procyclical relative to the commodity cycle, it may end up being the main transmission channel from the commodity cycle itself. In countries where the commodity export sector is weakly linked with the rest of the economy, government expenditures could be the main link between the overall cycle and 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 Milhov 2013). Under this definition, the relation between the two is less obvious.

to the post-2007 period, while it has remained unchanged for EMDEs and commodity exporters (figure 4.7.B). High- and upper-middle-income countries present the highest correlation among country-income groups (figure 4.7.C). Finally, the Europe and Central Asia (ECA) and Middle East and North Africa (MNA) regions show higher correlation than other EMDE regions (figure 4.7.D).

Fiscal institutions and frameworks

The results of the empirical analysis highlight the role of political pressures in driving fiscal policy procyclicality and volatility in commodity-exporting EMDEs. This section discusses how well-designed and credible institutional mechanisms—fiscal rules, sovereign wealth funds, and medium-term expenditure frameworks—can help foster fiscal discipline and counteract tendencies toward procyclicality. It also highlights the role of strong governance more generally in facilitating countercyclical fiscal policies in these economies.

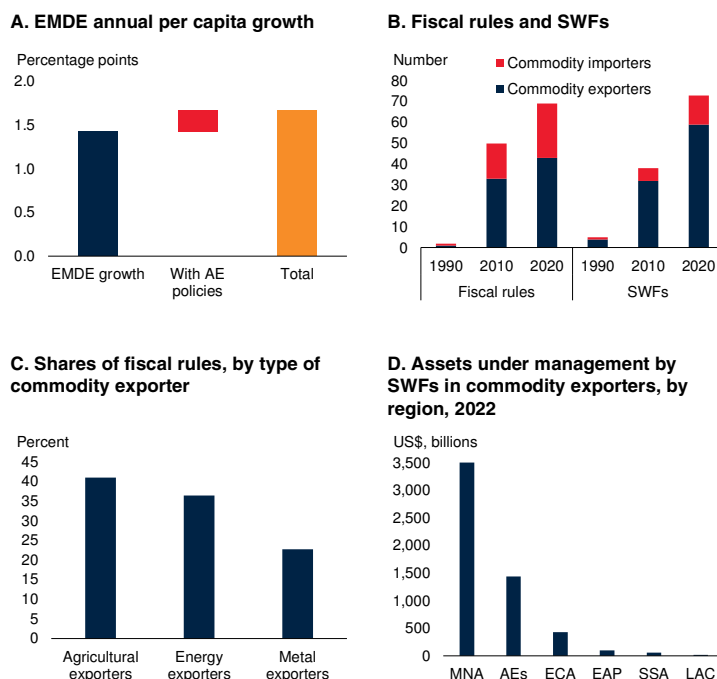
Fiscal rules

Fiscal rules can help reduce the volatility of fiscal policy and deliver better fiscal outcomes. Fiscal rules leave 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 reduce both fiscal procyclicality and volatility.¹⁷

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

FIGURE 4.8 Fiscal volatility, growth, and fiscal frameworks

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 1 percentage point in per capita growth every four to five years by reducing fiscal policy volatility. 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. Fiscal rules are more prevalent in agriculture and energy exporters than in metal exporters. 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: Davoodi et al. (2022); 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. The middle column in the panel illustrates how applying the average advanced-economy policies along three dimensions (exchange rate regimes, 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.

B. Number of EMDEs with fiscal rules and SWFs (sovereign wealth funds).

C. Panel shows the share of EMDEs with fiscal rules according to commodity exporter type, as of 2021.

D. Panel shows the amount of SWF assets under management in commodity-exporting countries, as of 2022.

¹⁷For empirical evidence on the importance of well-designed fiscal rules to deliver lower fiscal deficits, see 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 while Badinger and Reuter (2017) show that fiscal rules also help lower fiscal policy volatility.

such rules—including commodity exporters, such as Chile and Indonesia (Davoodi et al. 2022; box 4.2). By the end of 2020, 43 of 96 commodity-exporting EMDEs had at least one fiscal rule in place (figure 4.8.B). The adoption of fiscal rules has been most prevalent in energy and agricultural

exporters followed by metal exporters (figure 4.8.C). The use of fiscal rules has been associated with more fiscal discipline.¹⁸ However, only well-designed fiscal rules promote more fiscal discipline (Caselli and Reynaud 2020). Additionally, although while fiscal rules are associated with improved fiscal policy management, their success 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).

The adoption of fiscal rules is associated with less procyclicality in fiscal policy. At the same time, fiscal rules can act as a constraint on the ability of incumbent politicians to generate political business cycles using fiscal and monetary expansions. Fiscal frameworks that do not have formal rules but focus on transparent and credible strategies backed by proper fiscal institutions could also provide a viable approach to support fiscal discipline (World Bank 2023b).

Sovereign wealth funds

Over the past few decades, the number of SWFs established has increased rapidly, particularly by commodity-exporting countries. Many commodity exporters have established SWFs as a stabilization fund to channel windfall gains during commodity price booms to accumulate as savings that can be withdrawn during commodity price 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 4.8.D).

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). 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 (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 (Asik 2017; 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 (Sugawara 2014), but their effectiveness is hampered where there are inadequate controls and integration with the budget is limited (Le Borgne and Medas 2007). 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). These results are also corroborated by the country case studies presented in box 4.2, which suggest that the efficacy of SWFs is positively correlated with the presence of strong institutions.

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). Such frameworks can enhance clarity on the purposes of expenditures and help ensure a transparent budgetary process, where government agencies allocate public resources based on strategic priorities. MTEFs foster greater fiscal transparency and accountability by providing a

¹⁸ See, 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).

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 consistent 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).¹⁹

Evidence suggests that credible MTEFs can significantly improve fiscal discipline (Vlaicu et al. 2014; World Bank 2013). Robust implementation of these frameworks is closely related to linkages with broader economic and social policy objectives, to the reliability of the relevant data, and to 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, 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. Nevertheless, 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. For instance, the 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.²⁰

Institutional quality and governance

Resource abundance can be advantageous to a country if the government has a sound long-term plan for extracting the resources and a robust mechanism for using resource revenues to meet economic and social needs to 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 2004). 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).

Higher quality political institutions help limit procyclicality of fiscal expenditures (Ossowski et al. 2008; Sugawara 2014). The observed decline in fiscal procyclicality in EMDEs over the past decade and a half has been mainly attributed to the improved quality of institutions, as measured by indicators on law and order, bureaucracy

¹⁹ 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.

²⁰ On the role of institutions, see Filc and Scartascini (2010) and Schiavo-Campo (2009). On the role of fiscal rules, see Hansen (2020) and von Hagen (2010). For evidence on the impact of MTEFs on spending volatility and efficiency, see Vlaicu et al. (2014) and World Bank (2013). Elberry and Goeminne (2021) provide evidence on how lack of fiscal transparency affects fiscal outcomes.

quality, and corruption (Frankel, Végh, and Vuletin 2013). In LICs, the quality of budget institutions—measured through the quality of the various stages on the budget process and the number of 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 case studies of Norway, Chile, and Botswana show that the quality of their institutions—which is higher than that of their peers—helped limit the negative impact of commodity price volatility (box 4.2; Bova, Medas, and Poghosyan 2016). These country 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. In the absence of strong institutions and political commitment, fiscal rules and SWFs tend not to be followed closely, which reduces their effectiveness.

Conclusions

Many EMDEs are commodity-dependent—in terms of fiscal and export revenues as well as economic activity. The challenges posed by this commodity dependence have again been apparent in recent years because of gyrations in commodity prices, resulting partly from geopolitical tensions. These challenges are likely to be exacerbated in coming years as commodity prices become 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 this increased commodity price volatility is likely to impede growth.

This chapter has focused on two features of fiscal policy in commodity-exporting EMDEs, procyclicality and volatility. Fiscal policy tends to be both more procyclical and more volatile in EMDEs than in advanced economies, and more so in commodity exporters than in commodity importers. Fiscal procyclicality and volatility amplify the effect of commodity price shocks on the business cycle in EMDEs, with 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 the cross-country variation in fiscal policy volatility. Greater government stability, a stronger rule of law, easier access to international financial markets, greater exchange rate flexibility, and the presence of fiscal rules and SWFs have all been associated with lower fiscal policy volatility and procyclicality.

The broader macroeconomic effects of commodity price fluctuations also depend on the policy mix, particularly the interaction of fiscal policy with the monetary and exchange rate policies (IMF 2012b; World Bank 2022). Additionally, the role that commodity revenues play in the budgets of commodity-exporting EMDEs and their impact on fiscal policy volatility suggests potential benefits from diversification of their economies, away from production of commodities.²¹

²¹ For a detailed discussion, see Bleaney and Greenaway (2001); Ghosh and Ostry (1994); Gill et al. (2014); Hesse (2008); Joya (2015); and World Bank (2022).

BOX 4.2 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies

Commodity price movements often induce more procyclical and volatile fiscal policy, which leads to boom-bust cycles and hinders growth in commodity-exporting emerging market and developing economies (EMDEs). In recent decades, many commodity exporters have adopted fiscal rules and established sovereign wealth funds (SWFs) to partly address these challenges. The adoption of these institutional arrangements, as well as their effectiveness in reducing fiscal procyclicality and fiscal volatility, has not been uniform across countries. Overall, fiscal rules and SWFs are found to have been most effective in addressing procyclicality and volatility when well-designed and supported by strong institutions. Chile and Norway, in particular, have managed their commodity exposure relatively successfully owing to their rigorous fiscal frameworks and strong institutions, offering lessons for other resource-dependent countries.

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, particularly in countries where commodities account for a large share of fiscal revenue, which leads to volatile and procyclical public expenditure—that is, expenditure that reinforces rather than moderates a business cycle. To manage the impact of commodity price volatility on fiscal policy, commodity-exporting countries have adopted a variety of policy frameworks, such as fiscal rules and sovereign wealth funds (SWFs). Over the past two decades, several countries have also set up publicly funded independent fiscal institutions, such as “fiscal councils,” to monitor fiscal policy. The independent fiscal monitoring institutions are supposed to act as watchdogs by highlighting fiscal risks. However, these policy frameworks and institutions are far from homogenous and often take different forms in different countries.

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 do fiscal rules and SWFs differ among commodity-exporting countries?
- How have fiscal rules and SWFs helped in reducing fiscal procyclicality and volatility?

Sovereign wealth funds and fiscal rules

Sovereign wealth funds

SWFs are special purpose investment funds or arrangements that are owned by the government and

are designed to expand national wealth and stabilize business cycles. SWFs hold, manage, or administer assets to achieve financial objectives and employ a set of investment strategies. The objectives of SWFs depend on country-specific circumstances, which may evolve over time. SWFs include:^a

- *Stabilization funds.* These funds are established to insulate the economy from commodity price volatility—for example, the Economic and Social Stabilization Fund in Chile. Revenue flows into the funds when government receipts are above a benchmark and money can be withdrawn from the fund when government revenue is below the benchmark level.
- *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 the SWF of Norway. It is fully integrated into the government budget process.

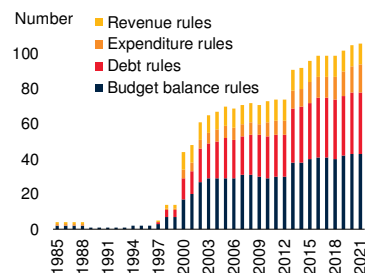
a. Other types of SWFs are reserve investment corporations and development wealth funds. These types of funds are not included in this analysis.

BOX 4.2 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

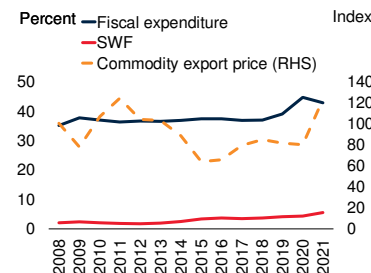
FIGURE B4.2.1 Fiscal rules, fiscal expenditures, and SWFs in commodity exporters

Since the 1990s, the adoption of fiscal rules by commodity exporters has increased, with budget balance and debt rules being the most prevalent type of rules. Sovereign wealth funds in Australia and Norway have consistently accumulated resources in line with their long-term objectives.

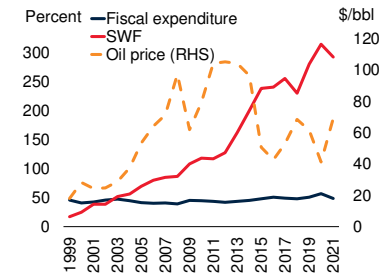
A. Types of fiscal rules in commodity exporters



B. Australia



C. Norway



Sources: Davoodi et al. (2022); Future Fund (website); International Monetary Fund; Norges Bank; World Bank.
Note: bbl = billion barrels; SWF = sovereign wealth fund.

A. Panel shows types of fiscal rules for commodity-exporting countries. The sample consists of four advanced economies and 44 emerging market and developing economies.

B.C. Fiscal expenditure and assets under management of SWFs are expressed as percentages of GDP.

Typically, inflows to the fund come from the resource revenues of the government and the returns on the fund's investments. The outflows are transfers to cover any nonresource 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 nonresource budget deficit that is to be financed by transfers from the fund.

Fiscal rules

Since the 1990s, rules-based fiscal frameworks have become increasingly prevalent across the world. Although fiscal rules were designed to be rigid to constrain government actions and promote compliance, these rules have been evolving, especially in response to economic crises (Budina et al. 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 thereby control the evolution of the debt ratio (for example, Indonesia, Mexico, and Nigeria). Because such rules do not set numerical limits on budgetary aggregates, they are typically considered procedural rather than numerical fiscal rules. If followed properly, they can help prevent debt sustainability issues. However, in some cases, budget balance rules can also induce 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 linked directly to the control of public debt because they do not constrain spending. Furthermore, setting ceilings/floors on revenues can be challenging because

BOX 4.2 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

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 don't account for them in an upturn. Revenue rules can, however, directly target the size of the government.

- *Expenditure rules.* Expenditure rules set limits on total, primary, or current government expenditures to limit the procyclicality of fiscal policy (for example, Botswana, Chad, and Ecuador). Such limits are typically set either in absolute terms, or growth rates, and occasionally, as a percentage of GDP. The time horizon often ranges between three and five years. Expenditure rules can constrain spending during booms, when windfall revenue receipts are temporarily high and deficit limits are easy to comply with. Such rules, however, are not directly linked to the objective of debt sustainability because they do not constrain the revenue side. Moreover, expenditure rules do not allow much scope for discretionary fiscal stimulus during bad economic times.
- *Debt rules.* These rules focus on long-term sustainability by setting an explicit anchor or ceiling for public debt (often as a percentage of GDP). A debt rule is relatively easy to communicate and, by definition, most 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.^b 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. 2013).

As of 2021, budget balance and debt rules were the most prevalent type of rules in commodity-exporting countries. Budget balance rules accounted for about 41

percent of fiscal rules followed by debt rules which were about 33 percent of total fiscal rules (figure B4.2.1.A). Expenditure rules (15 percent) and revenue rules (11 percent) accounted for the rest.

Country case studies

This box analyzes the use of SWFs and fiscal rules in seven diverse commodity-exporting countries: Argentina, Australia, Botswana, Chile, Indonesia, Norway, and Timor-Leste. The analysis aims to include a diverse set of commodity exporters both in terms of the types of commodity exports (agriculture, energy, and minerals) as well as the concentration of commodity exports (that is, single-commodity exporters as well as countries with a more diverse export portfolio). To draw useful insights for resource-rich countries considering adopting fiscal rules and SWFs to mitigate fiscal procyclicality and volatility, the box analyzes countries with well-functioning fiscal rules and SWFs, countries with mixed experiences, and countries without fiscal rules and SWFs. Finally, the sample includes both advanced economies and EMDEs in different geographical regions.

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 allows 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).

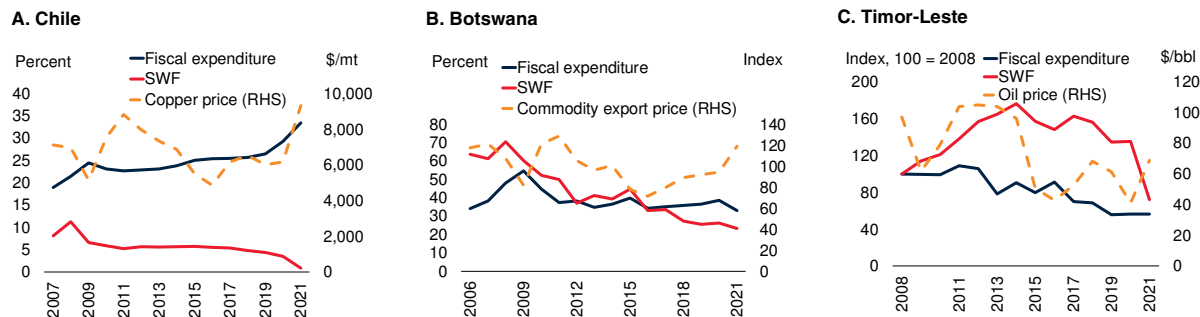
Australia. Australia's commodity exports comprise iron ore, coal, gold, liquefied natural gas, and animal meat.

b. Debt levels can also be affected by developments outside the control of the government, such as changes in interest rates and the exchange rate, as well as "below-the-line" financing operations (such as financial sector support measures), which could result in large fiscal adjustments.

BOX 4.2 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

FIGURE B4.2.2 Fiscal expenditures and SWFs in Chile, Botswana, and Timor-Leste

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 supported the accumulation of sizable financial assets. The quality of institutions seems to play an important role in influencing how these countries manage resource abundance.



Sources: Bank of Botswana; Fondo de Estabilización Económica y Social (website); International Monetary Fund; Timor-Leste Petroleum Fund (website); World Bank.
Note: bbl = billion barrels; mt = metric ton; SWF = sovereign wealth fund.

A.B. Fiscal expenditure and assets under management of SWFs are expressed as percentages of GDP.
C. An index for fiscal expenditure and SWF assets under management was constructed starting in 2008.

The country's fiscal framework is based on the Charter of Budget Honesty Act 1998 (Commonwealth of Australia 2014), which provides for "constrained discretion," that advocates a principles-based approach rather than a numerically oriented, rules-based approach. It adds transparency and discipline to the budget formation 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 B4.2.1.B).^c The minister of finance may make certain discretionary transfers from time to time.

c. The Future Fund has 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. Also, 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).

Norway. Commodity exports of Norway are concentrated in crude oil and petroleum gas. The country has a SWF comprising two separate investment funds.

- The Government Pension Fund-Global (GPFGL), 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 government budget directly. Norway's GPFGL is the largest natural-resource-based SWF in the world with its latest annual holdings at more than US\$1.2 trillion, equivalent to 256 percent of GDP at the end of 2022 (figure B4.2.1.C).
- The Government Pension Fund Norway (GPFN) saves surpluses of the national insurance scheme and held assets of US\$32.7 billion, or 6 percent of 2022 GDP (Lam et al. 2023).

Political will to turn nonrenewable resources into wealth for future generations paved the road for Norway's fund. The GPFGL is fully integrated with the

BOX 4.2 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (*continued*)

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 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, are isolated from both the large variations in oil revenues that result from oil price fluctuations as well as 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. Instead, it established a Model and Method Commission in 2011, which advises the Ministry of Finance.

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, fiscal rules, and the recent creation of a fiscal council. Chile’s SWFs comprise two types of funds.

- The Economic and Social Stabilization Fund (ESSF) was established with 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 withdrawal from the ESSF are well established in the 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 utilized 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 fund’s governance and assets management strategy match international best practices (Lam et al. 2023).

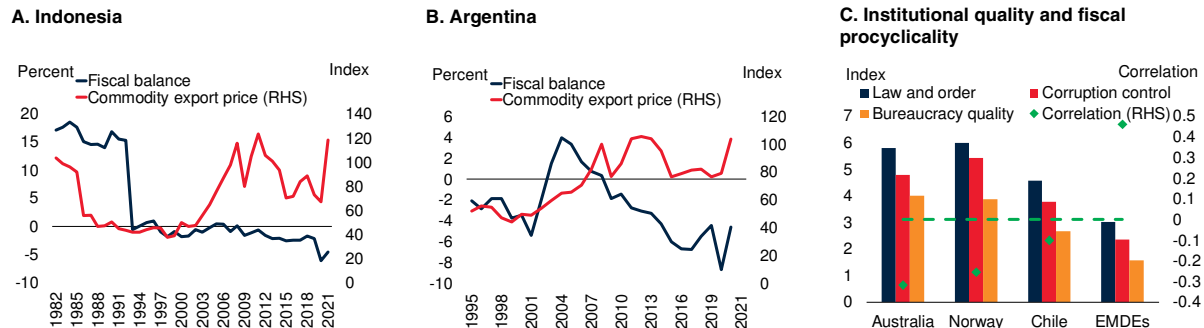
Chile’s fiscal rule, in place since 2001, limits the growth of budgeted central government spending to an estimate of structural revenue growth. The rule’s operation is supported by two expert panels that estimate long-term copper prices and the output gap. According to the rule, the authorities can 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 2011). The ESSF is closely linked to the structural budget balance rule and has followed international best practices to have a flexible inflow and outflow mechanism, a feature similar to the arrangement in Norway (Lam et al. 2023). In addition to the fiscal rule, in January 2018 Chile created the Autonomous Fiscal Council to replace the Advisory Fiscal Council established in 2013. The new fiscal council also continues to have legal independence, its own resources, and has a broader mandate.

The presence of credible fiscal rules; the strong governance structures that provide the space for their implementation; and the recent creation of competent, independent, and adequately resourced fiscal councils have enabled Chile to develop some of the best fiscal management institutions among commodity-exporting EMDEs (IADB 2008). For example, in the aftermath of the 2009 global recession, Chile was able to conduct a countercyclical fiscal policy and maintain 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 B4.2.2.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 percent among other metal exporters (Richaud et al. 2019). Chile’s fiscal sustainability was maintained on account of its fiscal rule, which allowed the country to save a substantial proportion of commodity revenues into its SWF during the commodity supercycle (World

BOX 4.2 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

FIGURE B4.2.3 Institutional quality and fiscal procyclicality

Indonesia's use of fiscal rules has enabled it to follow a prudent fiscal balance path despite increases in its export prices. Argentina's fiscal balance has been deteriorating since the mid-2000s despite generally increasing export prices. Australia, Chile, and Norway have followed prudent fiscal paths, with a relatively low correlation between government spending and commodity export prices. Establishing sovereign wealth funds and fiscal rules supported by strong institutional frameworks have allowed these countries to reduce or avoid fiscal procyclicality.



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

Note: EMDEs = emerging market and developing economies.

A,B. Fiscal balance as a percentage of GDP.

C. The institutional quality indexes give higher scores to countries with better metrics. "EMDEs" shows the simple average of 68 commodity-exporting countries across the three indicators from 1990-2019. The correlation is calculated between the GDP and the real government expenditure of a country after using the Hodrick-Prescott filter to remove the trend component of the time series.

Bank 2017). Part 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 big 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 put 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 slump in mineral prices. For example, the Pula Fund helped stabilize revenue and output during the 2007-09 global financial crisis. During 2008-10, the fiscal deficit in Botswana averaged about 9.4 percent of GDP, as mining revenues declined, and expenditures surged because of an increase in infrastructure spending to offset the adverse effects of the global economic

downturn and to boost long-term productivity (figure B4.2.2.B). The government financed this deficit by drawing upon savings from the Pula Fund and issuing new debt (World Bank 2016).

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 non-binding 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 computes the ratio of recurrent spending (excluding development spending) over non-diamond revenue, with the objective of keeping the ratio below 1. Adhering to this rule sets aside diamond revenue to finance the accumulation of financial assets and development spending.

BOX 4.2 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

- 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 inflow (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 in 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, payment 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.

- 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. That 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 Parliament. The requirement is designed to constrain the government's ability to spend government 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 is consistent with the sustainable use of funds should, in principle, mitigate the impact of oil price cycles on fiscal expenditure. 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 US\$371 million in 2005 to US\$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 accumulation of assets, but the PF still reached a level of about US\$19 billion in 2020. Since the global financial crisis, expenditures have followed oil prices closely (figure B4.2.2.C). Additionally, systematic excess withdrawals have been authorized in recent years, even prior to the pandemic. Given the low 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.

BOX 4.2 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (continued)

Argentina and Indonesia

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 ceiling of 3 percent of GDP and a debt ceiling of 60 percent of GDP. At that time, the government's 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 B4.2.3.A; Ismal 2011). 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. This weakness 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 leaves little room to respond to the economic cycle. However, the subsidies bill has been declining since 2015 owing to a series of reforms.

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; Tenreyro 2012). The lack of strong institutions and fiscal rules contributed to a deterioration in fiscal outcomes once the commodity price boom ended (figure B4.2.3.B). As a result, the country has faced persistent fiscal challenges in the past decade (IMF 2020).

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 dampening the impact of temporary economic shocks). Some rules are designed to make an SWF sustainable, others to make them accessible when needed (Bauer 2014; Richaud et al. 2019). This aspect plays an important role in procyclicality because the criteria governing accessibility will determine the extent to which a government can access funds (and spend them). The sustainability conditions might also impose a limit 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 good governance, are needed for SWFs to work well. 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 B4.2.3.C). In the cases of Norway (oil) and Chile (copper), commodity revenues are channeled directly into the SWFs, severing links from resource revenue to government spending. These funds are then available for specific purposes under certain conditions, avoiding or limiting fiscal

BOX 4.2 Do fiscal rules and sovereign wealth funds make a difference? Lessons from country case studies (*continued*)

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 of the analysis in this chapter, which shows 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.^d 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.

d. 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 4.1 Determinants of fiscal procyclicality

Cross-country regressions for commodity exporters are used to identify the main drivers of fiscal procyclicality. The dependent variable is the correlation between the cyclical components of real government spending and real GDP. The explanatory variables capture each of the four explanations for the existence of procyclical fiscal policy: the financial openness index; the political constraints index; the standard deviation of GDP; and control of corruption. Each of these four variables is significant and three of the four coefficients have the expected sign (table A4.1.1). More financial openness and better control of corruption reduce procyclicality while greater output volatility increases procyclicality. However, the effect of the political constraints index is counterintuitive, suggesting that either the “voracity effect” does not hold or that the political constraint index is not an appropriate proxy for the detrimental effects of more fiscal claimants on available resources. When all these variables are included together, they are jointly significant.

Robustness checks. In line with Lane (2003), GDP per capita, size of the public sector relative to GDP, and openness (sum of exports and imports as a percentage of GDP) are used as controls in the regression one at a time. GDP per

capita is significant at the 5 percent level but the two other control variables are not significant. In all three cases, the *F*-test for the joint significance of the four relevant explanatory variables is significantly different from zero at least at the 10 percent level.

The cross-country regressions are also used to analyze the role of institutional variables in driving fiscal procyclicality, as highlighted by the correlations reported in figure 4.4. The role of sovereign wealth funds (SWFs) and fiscal rules is 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 because these funds are designed to save during commodity price booms and dis-save during price slumps (Asik 2017). Results show that higher government stability, better law and order, and the presence of SWFs and fiscal rules all tend to reduce fiscal procyclicality (table A4.1.2). Overall, the analysis provides evidence that better institutions are associated with lower fiscal procyclicality.

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.

TABLE A4.1.1 Drivers of fiscal procyclicality

Dependent variable: Correlation between real government spending and real GDP					
	(1)	(2)	(3)	(4)	(5)
Financial openness	-0.25**				-0.19
Corruption control		-0.12***			-0.07
Political constraint index			-0.47**		-0.08
GDP volatility				1.58**	1.26
<i>F</i> -test					**
Observations	92	74	92	97	72
<i>R</i> -squared	0.05	0.13	0.05	0.06	0.18

Source: World Bank.

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

TABLE A4.1.2 Institutional drivers of fiscal procyclicality

Dependent variable: Correlation between real government spending and real GDP							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Government stability	-0.09**					-0.01	-0.07
Law and order		-0.13***				-0.12***	-0.06
Fiscal rules			-0.61***		-2.11***	-0.31**	-1.26**
Sovereign wealth funds				-0.53**		-0.37**	-0.21
<i>F</i> -test						***	***
Observations	137	137	106	194	83	83	83
<i>R</i> -squared	0.05	0.24	0.17	0.13	n/r	0.47	0.15

Source: World Bank.

Note: Cross-section regression for full sample. Regressions (1)-(4) and (6): OLS. Regressions (5) and (7): IV (two-stage least squares). n/r means not reported by STATA. For regressions (6) and (7), the *F*-test reported evaluates the joint significance of the three institutional variables. Regression (7), centered *R*-squared. Overidentification tests do not apply to regressions (5) and (7) since equations are perfectly identified. In regressions (5) and (7), 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 level, respectively.

TABLE A4.1.3 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 (<i>t</i> - 1)			0.367***			0.366***
Commodity export price index x EMDE				0.062**	0.046*	0.054**
<i>F</i> -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 that includes advanced-economy commodity exporters. *F*-test in columns (4)-(6) evaluates the joint significance of commodity export price index and the interaction of the index with the dummy variables for EMDEs. *, **, and *** indicate statistical significance at 10, 5, and 1 percent, respectively.

TABLE A4.1.4 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 ($t-1$)			0.688***			0.625***
Commodity export price index x EMDE				0.184***	0.158***	0.183***
<i>F</i> -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. *F*-test in columns (4)-(6) evaluates the joint significance of 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. GDP = gross domestic product.

ANNEX 4.2 Linkages 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 Fatás and Mihov (2013), which involves estimating a fiscal policy reaction function of the following form:

$$\text{Fiscal Policy}_t = \alpha + \beta \text{Economic Activity}_t + \gamma \text{Controls}_t + \epsilon_t \quad (4.2.1)$$

where “Fiscal Policy” is a variable that captures the stance of fiscal policy. Four alternative measures of fiscal policy are used: primary expenditures, revenues, 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 of its ratio to GDP. “Economic Activity” denotes the cyclical stance of the economy and is represented by annual GDP growth. The alternatives—the output gap and the unemployment rate—are more difficult to construct or measure accurately for diverse economies.²²

²² 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.

β summarizes the cyclical behavior of fiscal policy and indicates whether fiscal policy is countercyclical or procyclical. It is composed of both automatic stabilizers and the discretionary response of governments to economic fluctuations.²³ The residual, ϵ , captures changes in fiscal policy that are unrelated to the business cycle or any of the control variables. These decisions 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 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_ϵ).

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 (Barro 1991). The benchmark specification is given by:

²³ 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 makes use of OLS.

$$\overline{\Delta y}_i = \alpha' + \rho' \log(\sigma_i^\varepsilon) + \gamma' Z_i + u_i \quad (4.2.2)$$

where $\overline{\Delta y}_i$ is the average per capita GDP growth for country i ; σ_i^ε is the measure of fiscal policy volatility—the key regressor; Z_i is a vector of variables that have been found to have significant explanatory power for the cross-country variation in growth. Fiscal policy volatility is measured using primary expenditures. Equation (4.2.2) is estimated using both OLS as well as instrumental variables to address endogeneity concerns. Instruments used are political constraints and control of corruption from the PRS Group database, *International Country Risk Guide*.

The controls included in the regression are taken from the specification of Fatás and Mihov (2013), which are based on the growth regressions of Sala-i-Martin, Doppelhofer and Miller (2004).²⁴ The controls included are government size, initial GDP per capita, capital account openness, and the price of investment.

²⁴For robustness, different specifications were estimated with a variety of controls, including the existence of a sovereign wealth fund. The results are not significant. Note that this variable is already included as an instrument for fiscal policy volatility.

TABLE A4.2.1 Determinants of fiscal policy volatility: Cross-sectional regressions

	Dependent variable: Primary expenditure volatility						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
EMDE	4.930*** (0.657)	1.756** (0.870)		-2.381* (1.266)	-0.398 (1.276)	0.536 (1.151)	-1.255 (0.970)
Commodity exporters	3.295*** (0.852)	-1.053 (0.845)		0.661 (0.747)	3.356*** (1.134)	0.0398 (0.849)	1.082 (0.753)
Resource rents		0.376*** (0.0814)		0.281*** (0.0688)		0.543*** (0.180)	0.402*** (0.0678)
GDP per capita		-1.240*** (0.423)		-0.548 (0.464)		1.023 (1.091)	0.282 (0.651)
SWF						-0.324 (0.832)	-0.349 (0.703)
Political constraints			-11.27*** (2.502)	-3.596 (3.224)			3.963 (4.676)
Control of corruption			-1.997*** (0.421)	-1.836*** (0.570)			-0.761* (0.388)
Fiscal policy rules					-0.947*** (0.348)	-1.040** (0.411)	-0.694** (0.308)
Capital account openness					-7.312*** (2.574)	-4.256** (1.729)	-4.202** (1.666)
Exchange rate regime					-4.722*** (1.093)	-4.541*** (1.294)	-3.206*** (0.857)
Constant	3.930*** (0.460)	17.390*** (4.495)	17.92*** (1.305)	19.44*** (5.025)	14.04*** (2.836)	0.928 (10.191)	8.710 (5.579)
Observations	178	177	133	132	93	93	77
R-squared	0.219	0.451	0.394	0.595	0.371	0.636	0.713

Source: World Bank.

Note: Robust standard errors in parentheses. "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. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A4.2.2 Determinants of fiscal policy volatility; by type of commodity

	Dependent variable: Primary expenditure volatility	
	(1)	(2)
EMDE	2.900*** (1.047)	1.794** (0.867)
Agriculture exporters	0.712 (0.983)	-0.592 (1.036)
Metal exporters	2.236* (1.337)	-0.136 (1.353)
Energy exporters	6.185*** (1.625)	-1.125 (1.252)
GDP per capita	-1.243** (0.523)	-1.114** (0.453)
Resources rents		0.377*** (0.089)
Constant	17.081*** (5.593)	16.017*** (4.818)
Observations	177	177
R-squared	0.292	0.450

Source: World Bank.

Note: Robust standard errors in parentheses. "Agriculture 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. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

TABLE A4.2.3 Effects of fiscal policy volatility on GDP per capita growth

	Dependent variable: GDP per capita growth			
	OLS		IV	
	(1)	(2)	(3)	(4)
Fiscal policy volatility	-0.022 (0.060)	-0.116*** (0.022)	-0.110*** (0.036)	0.079* (0.042)
Government size		0.013 (0.012)	0.020 (0.013)	0.015 (0.012)
Initial GDP per capita		-0.659*** (0.138)	-0.767*** (0.147)	-0.774*** (0.138)
Capital account openness		1.210*** (0.302)	1.230*** (0.314)	0.930*** (0.342)
Investment price		-1.481*** (0.392)	-1.548*** (0.432)	-1.546*** (0.318)
Commodity exporter				-0.734** (0.318)
Constant	1.986*** (0.533)	8.416*** (1.157)	9.202*** (1.332)	9.708*** (1.284)
Observations	177	161	128	128
R-squared	0.006	0.356	0.403	0.433

Source: World Bank.

Note: Robust standard errors in parentheses. 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. Columns (3) and (4) is based on instrumental variables (IV) estimation, with the "political constraints" and "control of corruption" used as instruments. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

ANNEX 4.3 Additional tables

TABLE A4.3.1 List of economies for analysis of fiscal procyclicality and volatility

Commodity exporters				
Agriculture		Metals		Energy
Argentina	New Zealand	Armenia	Algeria	Nigeria
Belize	Nicaragua	Australia	Angola	Norway
Benin	Paraguay	Botswana	Azerbaijan	Oman
Brazil	Rwanda	Central African Republic	Bahrain	Qatar
Burkina Faso	Senegal	Chile	Bolivia	Russian Federation
Burundi	Seychelles	Congo, Dem. Rep.	Brunei Darussalam	Saudi Arabia
Cabo Verde	Solomon Islands	Guinea	Cameroon	Timor-Leste
Chad	Sudan	Kyrgyz Republic	Canada	Trinidad and Tobago
Comoros	Tajikistan	Liberia	Chad	United Arab Emirates
Costa Rica	Tanzania	Mauritania	Colombia	
Côte d'Ivoire	Togo	Mongolia	Ecuador	
Ethiopia	Uganda	Mozambique	Equatorial Guinea	
Fiji	Ukraine	Namibia	Gabon	
Guatemala	Uruguay	Niger	Ghana	
Guinea-Bissau	Uzbekistan	Papua New Guinea	Guyana	
Honduras		Peru	Indonesia	
Iceland		Sierra Leone	Iran, Islamic Rep.	
Kenya		South Africa	Iraq	
Lao PDR		Sudan	Kazakhstan	
Madagascar		Suriname	Kuwait	
Malawi		Tajikistan	Libya	
Mali		Zambia	Myanmar	

Commodity importers				
Albania	Dominica	Italy	Moldova	Spain
Antigua and Barbuda	Dominican	Jamaica	Morocco	Sri Lanka
Austria	Egypt, Arab Rep.	Japan	Nepal	St. Kitts and Nevis
Bahamas, The	El Salvador	Jordan	Netherlands	St. Vincent and the Grenadines
Bangladesh	Eritrea	Kiribati	North Macedonia	Sweden
Barbados	Estonia	Korea, Rep.	Pakistan	Switzerland
Belarus	Eswatini	Latvia	Palau	Syrian Arab Republic
Belgium	Finland	Lebanon	Panama	Taiwan, China
Bhutan	France	Lesotho	Philippines	Thailand
Bosnia and Herzegovina	Georgia	Lithuania	Poland	Tonga
Bulgaria	Germany	Luxembourg	Portugal	Tunisia
Cambodia	Greece	Malaysia	Romania	Türkiye
China	Grenada	Maldives	Samoa	Tuvalu
Croatia	Hong Kong SAR, China	Malta	Serbia	United Kingdom
Cyprus	Hungary	Marshall Islands	Singapore	United States
Czechia	India	Mauritius	Slovak Republic	Vanuatu
Denmark	Ireland	Mexico	Slovenia	Viet Nam
Djibouti	Israel	Micronesia		

Source: World Bank.

Note: Commodity exports of economies can change over time implying the possibility of re-categorization.

TABLE A4.3.2 Variables for analysis of fiscal procyclicality

Variable	Description	Source
Government spending	Real government expenditure.	IMF, <i>World Economic Outlook</i> (WEO)
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 is a shock absorber that tends to minimize revisions of policy when governments change. In low-risk countries, the bureaucracy is somewhat autonomous from political pressure. Index measures the quality of bureaucracy from 0 to 6.	PRS Group (database)
Control of corruption	A measure of corruption within the political system that is 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 to 6.	PRS Group (database)
Government stability	A measure of both the government's ability to carry out its declared program(s) 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 is an assessment of 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 is floating exchange rate regime and 0 is fixed. Classification codes 1-3 in the database have been classified as "0" and codes 4-6 as "1."	Iizetzki, Reinhart, and Rogoff (2021)
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.	www.swfinstitute.org/fund-rankings/sovereign-wealth-fund

Source: World Bank.

TABLE A4.3.3 Variables for analysis of fiscal policy volatility

Variable	Description	Source
General government revenue	Consists of taxes, social contributions, grants receivable, and other revenue.	IMF, <i>World Economic Outlook</i> (WEO)
Primary balance	Primary net lending/borrowing is net lending (+)/borrowing (-) plus net interest payable/paid (interest expense minus interest revenue; percent of GDP)	WEO
Primary expenditure	Obtained by subtracting interest payments from general government total expenditures. Interest payments are calculated as the difference between overall fiscal balance and the primary balance (all in percent of GDP).	WEO 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; excludes government military expenditures that are part of government capital formation.	World Development Indicators (World Bank)
Real GDP; real GDP per capita		WEO
Political constraints	The Political Constraints Index (POLCON) measures the extent to which policy changes are constrained by institutional and political factors.	POLCON data set (Henisz 2000)
Control of corruption	An index measuring corruption within the political system; ranges from 0 to 6.	PRS Group (database)
Government size	General government total expenditure (percent of GDP).	WEO
Investment price	Price level of investment.	Penn World Table
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)
Openness	Sum of exports and imports (percent of GDP).	World Integrated Trade Solution (World Bank)
Resources 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 rules, debt rules, expenditure rules, and revenue rules, applying to the central or general government or the public sector.	Davoodi et al. (2002)
SWF (sovereign wealth fund)	Dummy variable: 0 if a country does not have a SWF and 1 if it has a SWF.	www.swfinstitute.org/fund-rankings/sovereign-wealth-fund

Source: World Bank.

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