INTERNATIONAL MONETARY FUND

IMF Country Report No. 23/289

BRAZIL

SELECTED ISSUES

July 2023

This paper on Brazil was prepared by a staff team of the International Monetary Fund as background documentation for the periodic consultation with the member country. It is based on the information available at the time it was completed on June 30, 2023.

Copies of this report are available to the public from

International Monetary Fund • Publication Services
PO Box 92780 • Washington, D.C. 20090
Telephone: (202) 623-7430 • Fax: (202) 623-7201
E-mail: publications@imf.org Web: http://www.imf.org

International Monetary Fund
Washington, D.C.

INTERNATIONAL MONETARY FUND

BRAZIL

SELECTED ISSUES

June 30, 2023

Approved By
Western Hemisphere Department

Prepared By Dimitris Drakopoulos, Christina Kolerus, and Joana Pereira (all WHD), Chen Chen, Nabil Hamliri, Koralai Kirabaeva, Ian Perry, and Nate Vernon (all FAD), and Mustafa Saiyid (MCM).

CONTENTS

BOX

FIGURE

TABLE

BOXES

ANNEX

BRAZIL'S FISCAL FRAMEWORK: CHALLENGES AND OPTIONS FOR REFORM[1]

A. Introduction

1. **Brazil was an early adopter of fiscal rules, and the fiscal framework has guided fiscal policies for two decades**. The framework helped modernize public financial management and significantly contributed to fiscal sustainability and macroeconomic stability. At the same time, effectiveness has waned in recent periods, partly due to design problems, but also reflecting a weakening of legal provisions in the face of entrenched budget rigidities and the need to respond to shocks. Brazil's fiscal framework has also grown more complex over time.

2. **The new proposed fiscal rule aims at achieving fiscal consolidation by limiting expenditures to grow less than revenues over time**. The rule addresses important political priorities and helps reduce fiscal uncertainty, while providing the opportunity to prepare reforms for a gradual improvement in the primary fiscal balance. Given the rule's design, delivering on fiscal consolidation will require ambitious efforts to increase fiscal revenues over an extended period of time. Current plans envisage a combination of reversing pandemic-related tax cuts, mitigating tax litigation losses, and increasing direct tax collection, including through closing loopholes and reducing tax expenditures.

3. **This paper discusses options to build on the new fiscal rule and enhance the fiscal framework.** The new rule's focus on revenues carries important implementation risks, and more ambitious consolidation is needed to achieve a firmly downward debt path. Building on Brazil's and cross-country experience with fiscal frameworks, this Paper proposes options to build on the new fiscal rule and enhance the fiscal framework.

4. **The paper is organized as follows.** Section I discusses international experience with fiscal rules. Section II describes the evolution of Brazil's fiscal framework. Section III provides an assessment of the new fiscal rule and outlines options to enhance the fiscal framework. The last section concludes.

B. International Experience

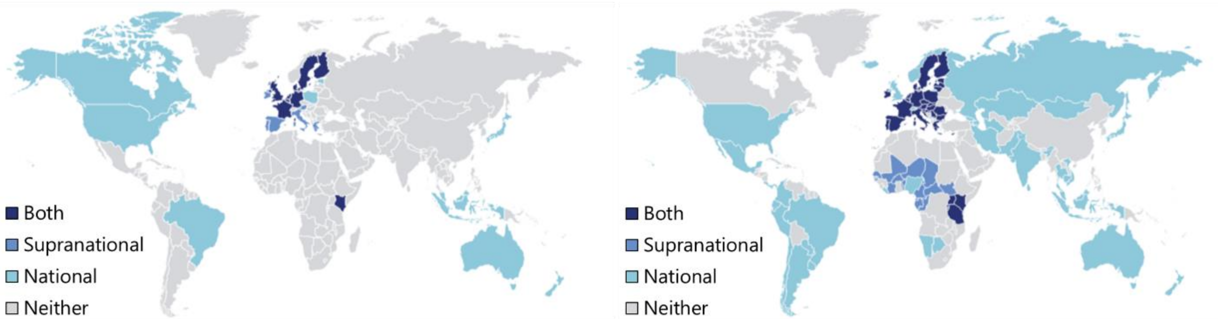
5. **Countries around the world have increasingly adopted fiscal rules, often combining a debt anchor and an operational rule.** Many advanced economies started adopting fiscal rules and fiscal councils to strengthen their frameworks in the early 1990s, also in the wake of the EU accession/Maastricht process, increasingly followed by emerging market and developing economies. Nowadays, countries with fiscal rules generally have more than one, with the most common combination being a debt ceiling or anchor supported by an operational rule, such as budget balance or expenditure rule (IMF, 2021). Overall, there exists a broad spectrum in the design of rules, even though most countries have clear numerical targets. In turn, the new European approach, for

---

[1] Prepared by Christina Kolerus and Joana Pereira (all WHD).

instance, focuses on debt stabilization rather than returning to a fixed numerical threshold once a country exceeds the existing debt target of 60 percent of GDP.

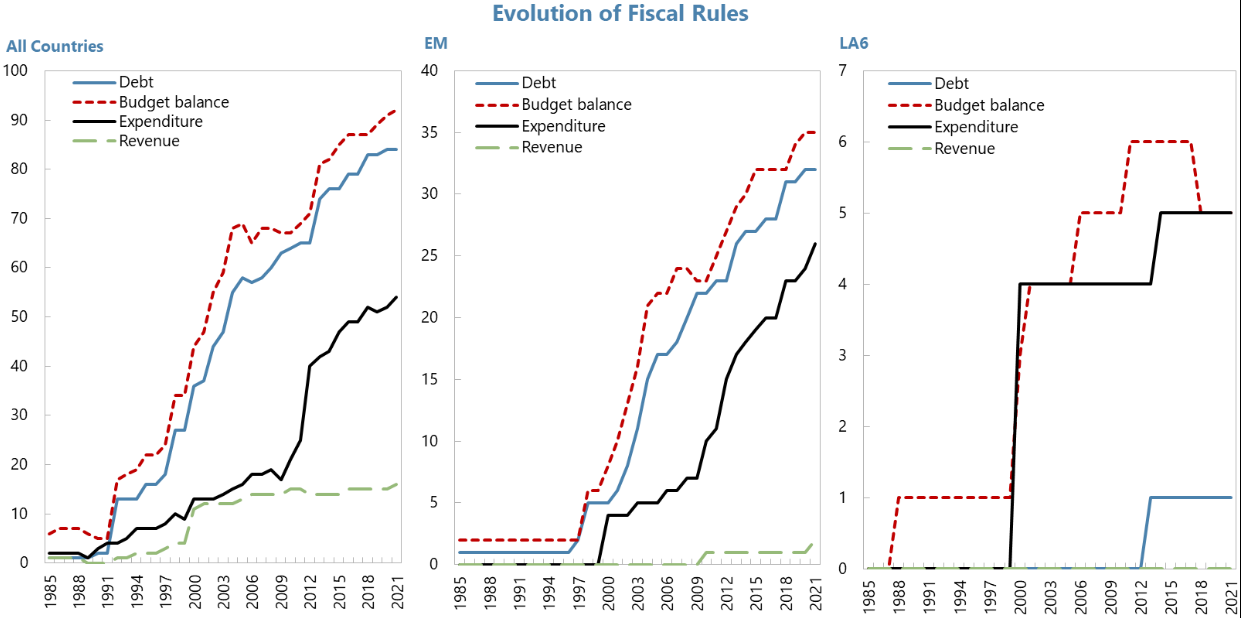
Fiscal Rules in 1998 and 2021



Source: IMF Fiscal Rules Dataset.

6. **Debt rules are less common in Latin America even though more countries have adopted them recently.** The region stands out for having very few debt rules in fiscal frameworks, including compared to emerging market peers. Peru was the only LA6 country with a debt rule up to 2022,[2] when Chile and Colombia introduced debt rules to complement and guide their existing operational rules. The Colombian debt rule measures the distance to the debt target and then determines the spending ceiling accordingly. The Chilean debt ceiling states that the fiscal path should keep debt below the defined prudent threshold.

Evolution of Fiscal Rules



Sources: IMF Fiscal Rules Database; staff calculations.

[2] LA6 countries include Argentina, Brazil, Chile, Colombia, Peru, and Mexico.

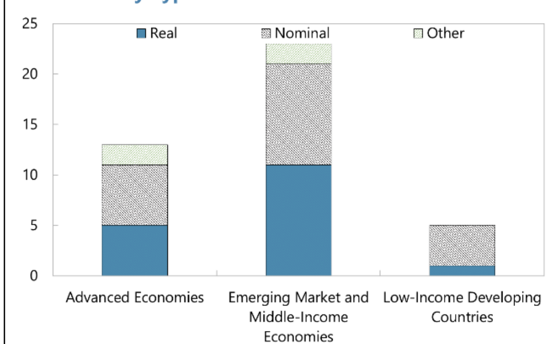
7. Expenditure rules are more prevalent in emerging markets, particularly in Latin America. Expenditure rules have been adopted in particular in the aftermath of the global financial crisis, and mainly by emerging markets. Among LA6 countries, expenditure rules are as frequent as budget balance rules. Across countries, caps on real expenditure growth are the most common, closely followed by caps on nominal spending growth. Exemptions to the ceiling include items not under government control, such as interest payments (e.g., Finland, France, and Japan) and cyclically sensitive items (e.g., Poland, Spain, and the United States). Some countries also exclude capital (e.g., Croatia, Ecuador, and Peru) and security spending (e.g., Israel and Peru), which is, however, not recommended.

8. Empirical evidence suggests that different rules help enforce different aspects of budgetary discipline.

- **Debt rules** have been more effective in helping revert to previous (or lower) debt levels after the economy experienced a shock (IMF, 2021).

- **Budget balance rules** are comparatively better at limiting forecast errors, i.e., the difference between official projections of budget balances and private forecasts (IMF 2021); or minimizing deviations between the limit set forth in the rule and IMF forecasts (Davoodi and others, 2022).

Fiscal Rules by Type



Source: 2022 IMF Fiscal Rules Dataset.

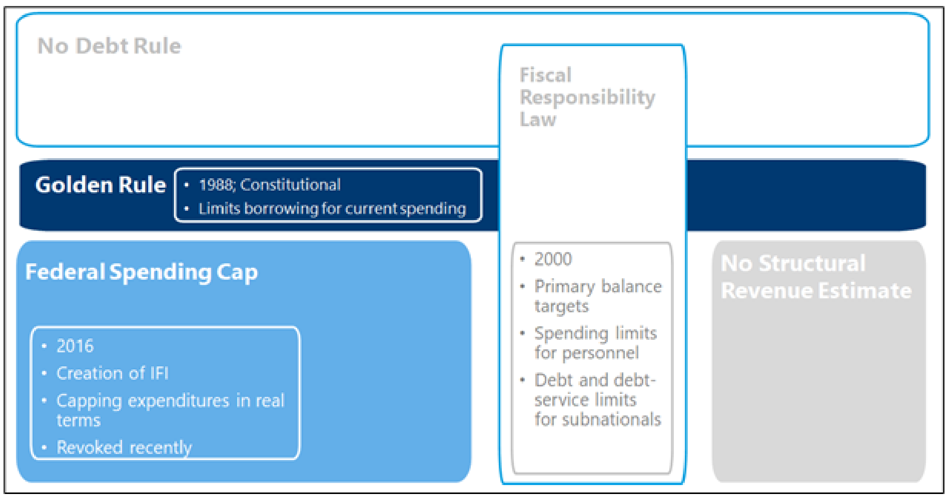
- **Expenditure rules**, designed as real or nominal caps, are found useful in reducing pro-cyclicality, in particular in emerging market economies. Event studies show that investment spending often falls following the implementation of an expenditure rule, in particular in emerging market economies. A well-designed medium-term budgetary framework (MTBF) can help mitigate risks for capital spending be crowded out to comply with expenditure ceilings in the short term (Cordes and others, 2015), notably in the presence of budget rigidities.

9. Strong underlying institutions are needed to foster compliance. Significant deviations from existing rules occurred in the aftermath of the pandemic, with nearly 80 percent of countries suspending or modifying their rules (Davoodi and others, 2022). Many governments, however, envisage a return to fiscal rules to strengthen credibility, offering an opportunity to revisit frameworks (IMF, 2022). An upgraded medium-term fiscal framework (MTFF) that combines more flexible rules and strengthened institutions could provide appropriate guidance to promote sound public finances (IMF, 2022). In this context, strong institutions are needed to forecast fiscal paths and risks, monitor the implementation of MTFFs, and enforce compliance with anchors.

10. Cross-country experience helps distill several principles for the design of fiscal rules. Rules should be simple, transparent, and flexible enough to respond to shocks, while providing operational guidance and accountability. A fiscal framework should also ensure long-term sustainability and economic stabilization, and, when applicable, facilitate coordination across levels of government.

C. Brazil's Fiscal Framework: Past and Present

11. Brazil was among the first emerging market economies to adopt fiscal rules, according to the IMF Fiscal Rules Database. A golden rule was introduced as part of the 1988 constitution. In the wake of the late-1990s fiscal crisis, the country passed a Fiscal Responsibility Law (FRL) in 2000, implementing primary balance targets as the main operational anchor in annual budgets. Following the crisis in the mid-2010s, a federal spending rule was enshrined in the constitution in 2016. Currently, a new fiscal rule is under consideration by Congress after the ceiling was revoked by a constitutional amendment in December 2022.



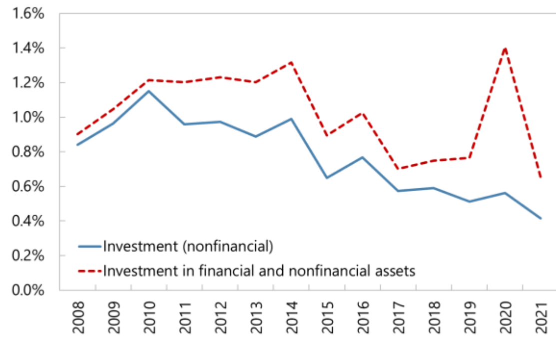
1988 Golden Rule

12. The 1988 golden rule was adopted to safeguard fiscal responsibility and public investment. By restricting new borrowing to finance capital expenditures, it aimed to limit (current) fiscal deficits and reduce public debt, while allowing flexibility to tackle large infrastructure investment needs. The rule applies to each level of government.

13. The definition of capital spending under the Brazilian golden rule is very broad and has allowed *de facto* current deficits, while investment declined. The design of the rule hinges on a definition of capital spending that extends beyond the traditional concept of investment in non-financial assets. New borrowing is bound by the sum of investments in non-financial as well as in financial assets, including debt amortization, government lending, equity purchases, and debt valuation changes due to exchange rate fluctuations. Historically, public financial investment in Brazil has been as large or even larger than investment in physical capital (Barros and others, 2018). Furthermore, financial revenues have been sizable due to the transfer of central bank profits to the treasury and the returns to government assets, notably loans and the large Treasury Single Account. Consequently, the level of current spending that can be sustained while in compliance with the

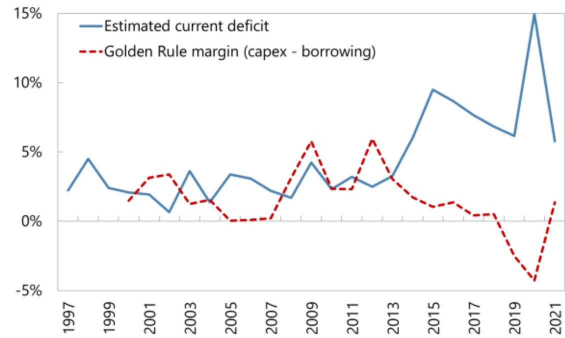
Brazilian golden rule is much higher than envisaged under a strict application of its principle. Indeed, current deficits have been positive in most years since the introduction of the golden rule, despite de jure compliance.[3] The rule has also not been effective in containing the growth of public debt or fostering public investment.

Nonfinancial Investment and Capex
(Percent of GDP)



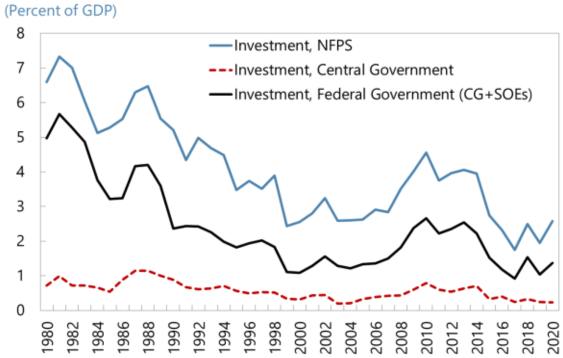
Source: Brazil National Treasury.

Current Deficit, Gold Rule Margin
(Percent of GDP)



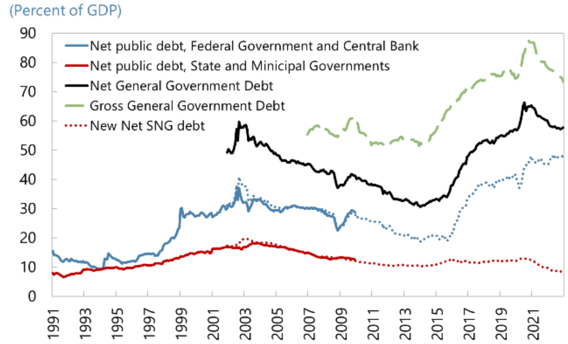
Source: Brazil National Treasury.

Public Investment
(Percent of GDP)



Sources: FGV, Observatório de Política Fiscal.

Public Debt 1/
(Percent of GDP)



Source: Central Bank of Brazil.
1/ Debt concepts differ across series available pre- and post-2001.

2000 Fiscal Responsibility Law

14. The approval of the FRL in 2000 was a key milestone in the post-1990 efforts to preserve fiscal sustainability and improve public financial management in Brazil. Already foreseen in the 1988 constitution, the FRL (a complementary law) consolidated various norms intended to promote fiscal transparency, limit deficit biases, improve budget planning, and define control mechanisms at all levels of government.

15. The FRL established spending limits and institutionalized the setting of annual primary balance targets in the annual budget process. Personnel spending (including pensions) is capped

[3] The Brazilian golden rule can be waived through Congress authorization of 'extraordinary credits', applicable for urgent and unforeseen spending needs. Such waivers were applied from 2019 to 2022. In all remaining years, there was strict legal compliance with the rule.

at 50 (60) percent of net current revenue for the federal (subnational) government(s), with individual limits set for the executive, legislative, and judiciary branches. Spending is further constrained during pre-election periods. Furthermore, permanent spending mandates cannot be created without compensatory revenue increases or spending cuts. The mandatory primary balance target is to be set in the Budget Guidelines Law prior to each fiscal year, along with indicative targets for the two following years. Debt limits (including guarantees) were to be legislated for each level of government. So far these have only been defined for states and municipalities, respectively at 200 percent and 120 percent of net current revenues.

16. To this day, the FRL remains the backbone of Brazil's fiscal framework. There is a longstanding legacy of transparent fiscal reporting that enables public accountability, a culture of rules-based fiscal management, and improved coordination across levels of government. For nearly a decade, the framework supported a steady decline in public debt, at the federal and subnational levels of government, albeit helped by favorable economic conditions. Such success also helped build its credibility.

17. However, challenges have emerged over time, including due to the procyclical nature of rules, the lack of a medium-term anchor, and extensive budget rigidities. The primary balance target is defined in nominal terms,[4] with no consideration for the business cycle, while limits to the wage bill were fixed in percent of revenue. At the same time, mandatory spending provisions render it difficult to reduce or even stabilize spending in good times. Thus, public spending outpaced GDP for much of the first 15 years of the FRL, while the tax burden increased to meet primary balance targets. As economic conditions worsened, compliance with the targets increasingly relied on legislative amendments, non-recurrent revenues, and off-budget operations.[5] The FRL institutionalized some pluriannual budget planning instruments (including for investment), but their use is limited and mostly indicative. Over time, the effectiveness of the FRL has weakened, with structural primary balances turning negative and nonfinancial public sector gross debt trending upward (IMF, 2017).

18. At the subnational level, despite the initial success in driving debt reduction, compliance with FRL debt and spending limits was uneven. This was due to differences in accounting standards and reporting, weak internal and external controls, legal uncertainty over the application of the FRL, and loosening administrative controls on borrowing (IMF, 2020). Subnational governments also faced mounting spending pressures arising from procyclical rules (limits and floors linked either to revenue or GDP) and revenue earmarking.

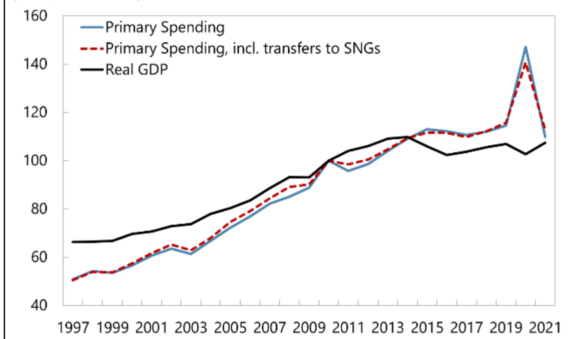
[4] Initially, the target was set in percent of GDP, rendering it even more pro-cyclical.

[5] The scope of the primary balance target, initially set to include the non-financial public sector, was gradually narrowed to exclude large state-owned enterprises (SOEs) (Eletrobras, Petrobas), subnational governments, and some spending categories. Quasi-fiscal costs associated with on-lending through public banks and with price controls were not reflected in the fiscal accounts, and the share of end-year unpaid commitments increased from five in the budget of 2007 to 13 percent in 2014 (IMF, 2017), reaching nearly 4 percent of GDP.

2016 Federal Spending Ceiling

19. The constitutional federal spending ceiling was introduced in the wake of the 2015-16 fiscal crisis to address procyclicality and reverse the secular rise in the federal spending ratio. The rule limited federal primary spending growth to inflation for 20 years, with a possible revision after 10 years. It would therefore induce a reduction in spending ratios over time, and, to the extent that it could sustain primary surpluses, lead to a reduction in public debt. The ceiling had broad coverage with few exceptions.[6] It was accompanied by institutional reforms to strengthen public financial management (e.g., better fiscal risks accounting, more transparent fiscal reporting) and the creation of the Independent Fiscal Institution, with a mandate to provide independent macro-fiscal projections, assess compliance with the fiscal rules, and analyze the budgetary implications of public policies.

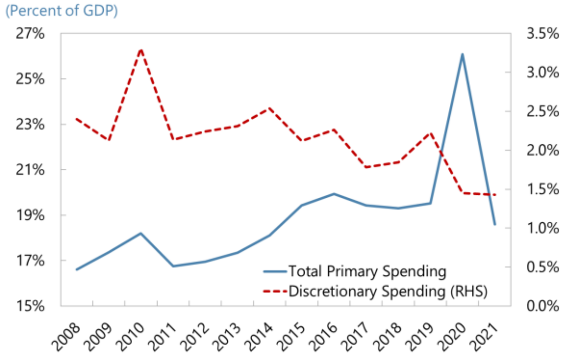
Primary Federal Goverment Spending
(Index, 2010 = 100)



Source: Brazil National Treasury.

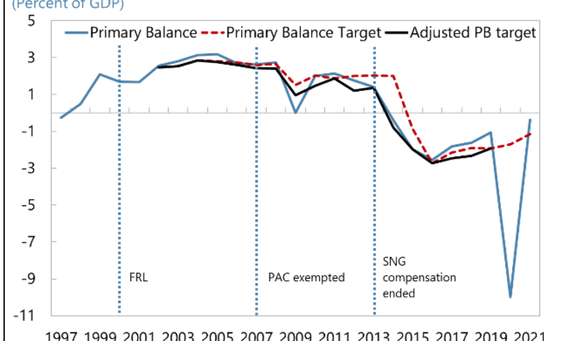
20. The ceiling helped bring credibility to the fiscal framework and contributed to curbing spending growth and improving fiscal primary balances. Although the ceiling did not have a direct link to fiscal sustainability, its adoption signaled renewed commitment to fiscal responsibility under the promise of ensuing spending reforms and helped bring down sovereign risk premia. Its implementation was followed by the 2019 pension reform, which stabilized pension spending of the general pension regime (RGPS), albeit at a relatively high level. The government was also able to restrain civil servant wage increases to inflation.

Federal Total and Discretionary Primary Spending
(Percent of GDP)



Source: Brazil National Treasury.

Federal Primary Balance Targets and Outturn
(Percent of GDP)



Source: Brazil National Treasury.

21. Nevertheless, the bulk of the adjustment was achieved through a retrenchment of discretionary spending and frequent amendments that weakened effectiveness. Given

[6] Exceptions included constitutional transfers to subnational governments, capitalization of SOEs, and extraordinary credits. The latter can be authorized by Congress in the periods of public calamity, war, or after natural disasters.

difficulties in addressing budget rigidities and reprioritizing spending, complying with the spending ceiling required restraining much needed public investment, reaching levels below capital depreciation. The response to the pandemic shock led to a sizable increase in spending in 2020, but this was largely reversed by early 2021.[7] In 2021-22, four constitutional amendments proved necessary to accommodate new spending mandates, including expanded social assistance, growing court ordered payments, health, and public investment.[8] In addition to expanding the spending envelope, these amendments reinforced some of the rule's provisions, but introduced considerable uncertainty over the conduct of public finances. The frequent amendments and the retrenchment of discretionary spending contributed to weaken the effectiveness of the 2016 federal ceiling.

2023 New Proposed Fiscal Rule on Federal Spending

22. The transition constitutional amendment was passed in late 2022 to replace the federal spending ceiling with a new spending rule in 2023. Replacing the constitutional spending ceiling with a rule that grants more room for new government spending priorities was largely expected. With the constitutional spending ceiling lifted in December 2022, the new rule was proposed to Congress as a complementary law in March and informed the preparation of the 2024 Budget Guidelines Law. With a few exceptions, FRL provisions would remain in place.[9]

23. The new proposed rule restricts spending growth below revenue growth to guide fiscal consolidation. The authorities aim to improve the federal primary balance from a deficit of 0.5 percent in 2023 to a surplus of 1 percent of GDP in 2026. The primary balance targets are determined on a yearly basis in the Budget Guidelines Law, while the tolerance band around targets of +/- 0.25 percent of GDP is included in the new rule's draft complementary law. Real federal spending is allowed to grow within a corridor, with a floor of 0.6 percent and a ceiling of 2.5 percent. The actual spending growth is contingent on the previous year's (i) revenue collection and (ii) fiscal performance relative to the primary balance target.

- If the federal primary balance in year t is within the target band, real federal spending growth in t+2 equals real revenue growth in t+1 (mid-year) multiplied by a factor of 0.7

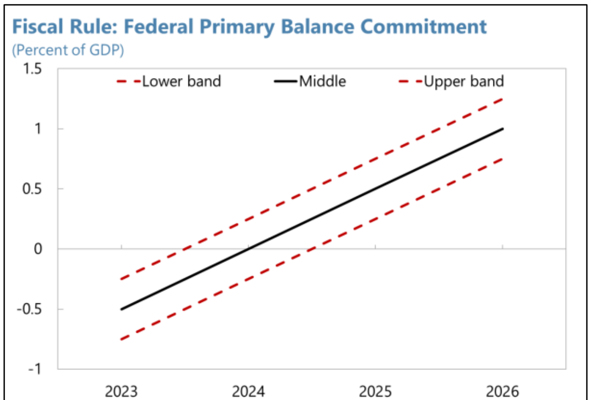
[7] The 2020 fiscal response took the form of a time-bound package (the 'War Budget') implemented under the umbrella of a public calamity decree that allowed for treating the pandemic-related support as extraordinary credits which are outside the expenditure ceiling.

[8] In March 2021, the so-called 'Emergency' constitutional amendment (PEC) allowed for a second round of pandemic-related fiscal support, while freezing public wages/hiring and introducing automatic spending cuts when mandatory spending surpassed 95 percent of total. In December 2021, another PEC changed the spending ceiling calculation formula and imposed a temporary subceiling on parts of government liabilities (judicial claims come due, so-called *precatorios*). A third PEC in mid-2022 exempted social benefit increases from the ceiling to respond to rising inflation and a cost-of-living crisis. The so-called transition PEC of December 2022 expanded the spending envelope to allow for the continuation of social benefits at the 2022 level (not budgeted in the 2023 Budget Guidelines Law), additional child allowances, as well as the expansion of selected health programs and public investments.

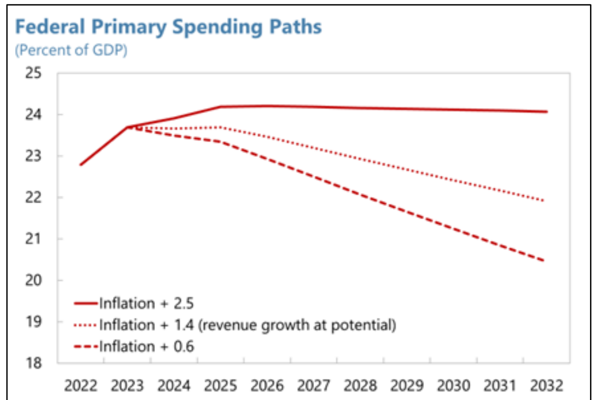
[9] Debt limits for subnational governments and the requirement for new permanent spending mandates to be matched by compensatory (permanent) revenue increases would remain in place. The draft complementary law specifies new sanction mechanisms as well as a limit of 25 percent of total discretionary spending allowed for cuts to meet the primary balance target.

- If the federal primary balance in year t is outside the target band, real federal spending growth in t+2 equals real revenue growth in t+1 (mid-year) multiplied by a factor of 0.5

The rule also introduces a floor on public investment of 0.6 percent of GDP. In case of overperformance relative to the primary balance target, investment spending can be increased up to 70 percent of the overperformance per year, limited to 0.25 percent of the previous year's GDP. The remainder would be saved.



Source: Ministry of Finance.



Source: Fund staff calculations.

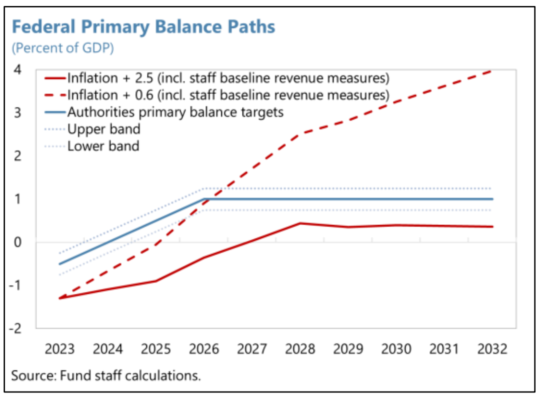
D. Avenues to Enhance the Fiscal Framework

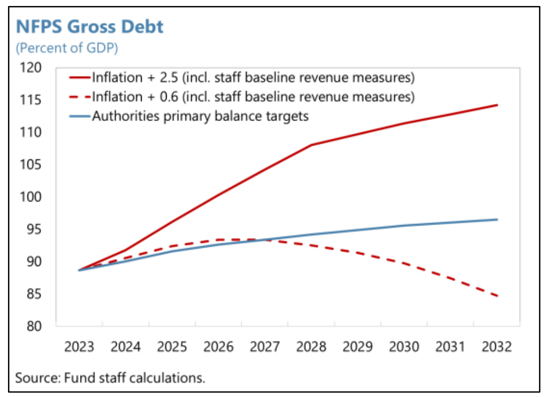
24. Brazil's fiscal framework supported responsible fiscal management but has become relatively complex. The framework comprises a set of rules and norms that could be internally inconsistent (e.g., spending limits while mandatory spending continues to grow) or not connected to one another (e.g., golden rule versus spending limits). Moreover, past exceptions to the rules have increasingly hampered monitoring and accountability. Beyond numerical fiscal rules, the framework comprises a myriad of administrative controls and regulations that have evolved over time.

25. Challenges to advance structural spending reforms, coupled with short-term planning and reduced flexibility, have limited the effectiveness of the fiscal framework. When facing economic shocks or needing to address new spending priorities, amendments to existing rules – even if requiring constitutional majorities – have been common. In contrast, approving structural reforms to open fiscal space for key spending needs has proven much more challenging. The lack of a medium-term horizon in the framework facilitated a short-term bias and the postponement of such reforms.

26. The new proposed fiscal rule addresses important priorities of the new government and offers opportunities for gradual fiscal consolidation over an extended horizon, but important challenges remain.

- **No built-in debt reduction.** Under staff's macroeconomic assumptions, a primary surplus of over 1 percent of GDP over the medium term is needed to stabilize gross NFPS debt, as unfavorable interest rate-growth differentials are expected to lead to a rising debt path in the near future. To put debt on a firmly declining path, staff estimates a total fiscal effort of around 4-4½ percent of GDP would be required over the medium to longer term. Such consolidation path would be feasible under the new rule if real federal spending growth remains at the floor of the corridor (see "Inflation+0.6" scenario[10]), and a sustained increase in the revenue-to-GDP ratio of 2 percent of GDP is achieved (in line with staff's baseline scenario on revenues). However, with real spending growth at the upper limit of the corridor of 2.5 percent, which would be allowed by the rule given the underlying strong revenue growth, NFPS gross debt would reach around 110 percent of GDP by 2028.





- **Consolidation through higher revenues.** Compliance with the primary balance target band until 2026 requires increases in revenue collection of around 2½ percent of GDP from the 2023 budget. This carries implementation risks, given slowing cyclical conditions and a high revenue ratio on a structural basis. Closing loopholes and eliminating tax expenditures would help mitigate the negative impact on GDP, but given the already high tax burden of around 35 percent of GDP, a further sizable expansion of the tax base could dampen economic growth (Alesina, Favero, and Giavazzi, 2019).

- **Procyclical bias.** By linking spending growth to the previous year's revenue growth, the rule entails a procyclical bias. The bias is stronger during economic booms (i.e., real spending growth is higher in good times, even if capped at 2.5 percent) (Box 1).

- **Increased budget rigidities and complexity.** Floors on both real spending growth and investment add to already entrenched budget rigidities (see accompanying Selected Issues Paper). Moreover, several provisions of the new rule are potentially conflicting, such as the combination of spending floors, within-year correction mechanisms for spending when the

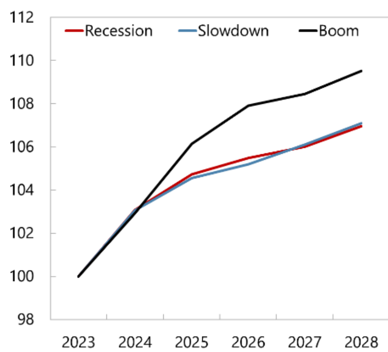
[10] See text charts, red solid line "Inflation +0.6". Assuming an increase in the revenue ratio of 2 percent of GDP, as under staff's baseline, spending growth would remain close to the floor and the spending ratio would decline by 1¾ of GDP by 2028 and 3 percent of GDP over the longer term. The authorities' proposed primary balance target path, depicted in blue, is assumed to remain constant at 1 percent of GDP given the required re-definition of parameters in 2027.

primary balance target is at risk,[11] and the limitation of expenditure cuts to 25 percent of discretionary spending, which could pose challenges in communication as well as compliance.

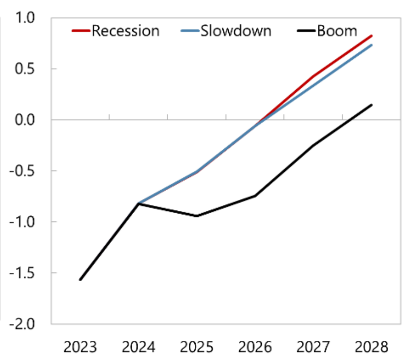
Box 1. The New Proposed Rule Under Alternative Growth and Revenue Scenarios

Following the new proposed fiscal rule, this box presents fiscal paths under three illustrative growth scenarios: (i) ‘recession’, corresponding to a decline in real GDP growth similar to the 2015-16 crisis; (ii) ‘slowdown’, with low but positive growth (around ½ percent in three consecutive years); and (iii) ‘boom’, akin to the GDP growth spurt before the global financial crisis. Revenue measures of 1 percent of GDP are assumed to be implemented in 2024, prior to the cyclical swings in each scenario. The scenarios assume no further measures in the subsequent years, deviating from current projections in staff’s baseline scenario to capture possible challenges in securing a sizable increase in tax revenues during challenging economic conditions in the recession and slowdown scenarios, and strong revenue growth in the boom scenario, which would alleviate the need for additional revenue measures to meet the primary target path.[1]

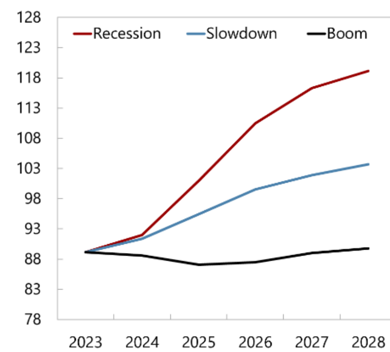
Real Federal Primary Spending Paths
(Index)



Federal Cyclically Adjusted Primary Balance
(Percent of potential GDP)



NFPS Gross Debt
(Percent of GDP)



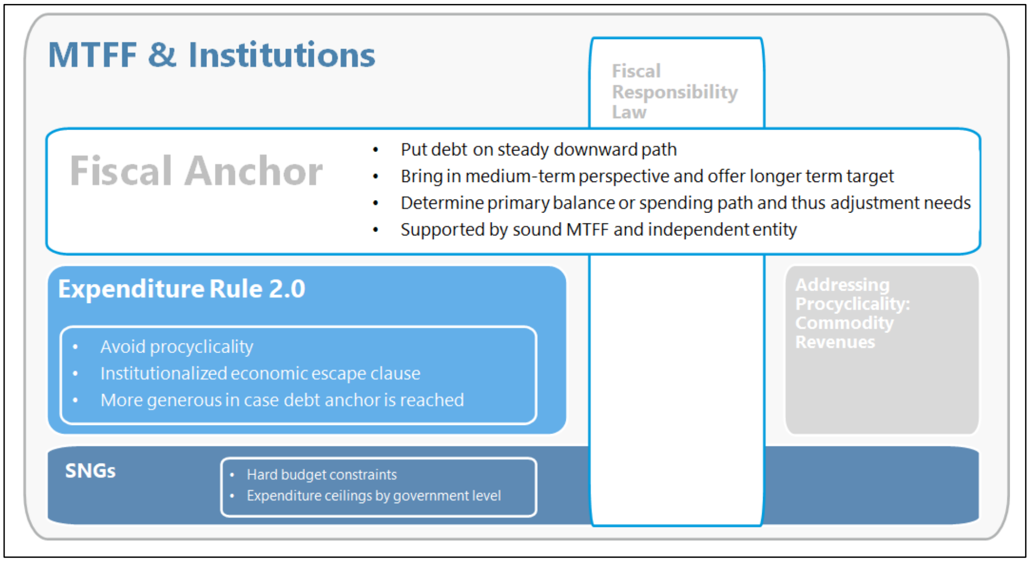
The real spending path is very similar during slowdowns and recessions (guided by the spending floor), but trends strongly upwards in a boom (guided by the spending ceiling). In a slowdown and recession, the new fiscal rule would offer some increase in the spending envelope, thanks to the spending floor that allows real spending to grow more than real GDP.[2] However, the resulting fiscal stance is somewhat contractionary (and pro-cyclical). Moreover, missing the primary balance target during the downturn implies that spending growth is lowest in the year(s) following the trough and accelerates in the economic recovery, without recovering fiscal buffers. During economic booms, real spending follows a strong upward path, with spending growth at the maximum of the corridor, turning the fiscal stance expansionary (and also pro-cyclical).

Debt increases in recessions, mainly due to declining GDP, but also in slowdowns with still positive economic growth, stabilizing over a long horizon. In such cases, staff would expect the authorities to take measures to prevent a sharp increase in debt and maintain debt sustainability. During boom times, debt ratios decline initially, thanks to the larger denominator effect and higher cyclical revenues, but high lagged spending growth allows debt to rise again in the outer years, absent a sustained increase in revenues.

[1] The scenarios consider a revenue elasticity of around 1.1 percent, in line with the literature.
[2] The floor on real spending growth of 0.6 percent applies even when primary balances are not within the band, or revenues are declining.

[11] Spending would be corrected through bans on: new hiring, increases in public wages, new mandatory spending, or increases in assistance policies or tax benefits.

27. There is scope to build on the proposed new fiscal rule and enhance the fiscal framework. The rest of this section discusses options for: (i) Refining the New Fiscal Rule; (ii) Addressing Procyclicality; (iii) Securing Debt Sustainability Through a Fiscal Anchor; (iv) Hardening Subnational Budget Constraints; and (v) Empowering Fiscal Institutions and Strengthening Medium-term Fiscal Planning.



Refining the New Fiscal Rule

28. The new spending rule could be enhanced by refining the spending corridor. The corridor could be calibrated to ensure consistency between spending paths and the primary balance targets, including for 2027 and beyond. Exercising discretion to remain below the ceiling of 2.5 percent real federal spending growth could be incentivized, in particular during good times. In turn, spending cuts must be possible to deal with shocks if needed. Differentiated rules on current and capital spending within the corridor could be harmonized to mitigate risks of misclassification and safeguard public investment. Continuing to transparently report on fiscal developments and projections within the fiscal year would further support consistency and transparency.

29. Binding multi-year targets and transparent medium-term expenditure paths embedded in the rule would improve accountability and consistency. As per FRL provisions, a primary balance target becomes binding for the upcoming fiscal year once determined in the Budget Guidelines Law. Making a multi-year target path more binding could help guide the budget process over a longer horizon and improve consistency. Medium-term budget forecasts, including five-year projections of expenditure components, would also help ensure consistency with targets over time.

Addressing Procyclicality

30. Linking federal spending growth to sustained increases in the structural revenue-to-GDP ratio could help address procyclicality within the new proposed rule. Acknowledging volatility in non-recurring revenues, the new spending rule excludes *other revenues* such as dividends, concessions, and royalties (mainly from commodities) from the revenue base used to derive spending growth. While this is welcome, *tax revenues* remain exposed to both economic and commodity cycles.[12] Considering a structural definition of revenues (rather than revenue growth) as the base for spending growth could help strip off broader one-off revenues as well as cyclical fluctuations in tax collection.

31. Mechanisms to smooth commodity cycles could further prevent translating transitory windfall gains into spending increases and promote additional savings when commodity prices are high. In general, a comprehensive expenditure ceiling and a binding primary balance path would channel windfall gains into government savings, unless these gains are offset by lowering tax rates. Procyclicality from commodity windfalls could be addressed through computing and publishing cyclical and structural components of revenues, or non-commodity fiscal balances, to raise awareness. Guidelines on smoothing consumption of surprise proceeds over several years could ensure establishing a proper understanding of structural and cyclical movements before the proceeds are consumed.

32. Introducing an economic escape clause would provide useful guidance for dealing with major economic shocks. As successfully proven during the COVID-19 pandemic, the FRL's provision on extraordinary credits is a valuable option for countercyclical crisis response, triggered by the declaration of a state of calamity. Institutionalizing this response would help define the beginning, the end, and the return path to 'normal times'. An escape clause would contain a limited and clearly defined set of events triggering the operation of the clause, if possible, quantitatively defined,[13] including severe economic downturns, large natural disasters, and states of emergency. The clause would have a designated activating authority and a pre-defined correction mechanism with timeline and procedures to return to a normal, non-crisis path.

Securing Debt Sustainability Through a Fiscal Anchor

33. In line with recent developments in the region, Brazil's fiscal framework would benefit from a fiscal anchor that puts put debt on a firm downward path within a medium-term perspective. A public debt anchor – as foreseen by the FRL – would guide the calibration of primary balance targets and thus any fiscal adjustment needs. It could be derived from a Debt Sustainability Analysis (DSA), taking into account appropriate risk buffers. Alternatively, the anchor could be a fixed target over the medium term. While the former regularly adjusts to risks and financing conditions, the latter would be easier to communicate and could be periodically revisited. Overall, the more dependent the anchor on models and inputs, such as the DSA, the more important underlying institutions and their checks and balances, such as an MTFF and independent scrutiny from a fiscal council. A third possibility would be to anchor the framework on a multi-year primary balance path, building on the proposed rule, albeit with pre-announced, binding primary balance

[12] Corporate income taxes and social security contributions from the commodity sector amounted to around 1 ½ percent of GDP in 2022, about ½ percent above past averages.

[13] E.g.: expected impact on growth or fiscal balances.

targets over medium term that underlie budget preparation and are synchronized with consolidation needs.

34. The choice of an appropriate anchor is challenging given uncertainties around debt thresholds, but can be informed by various approaches. Several considerations could be helpful:

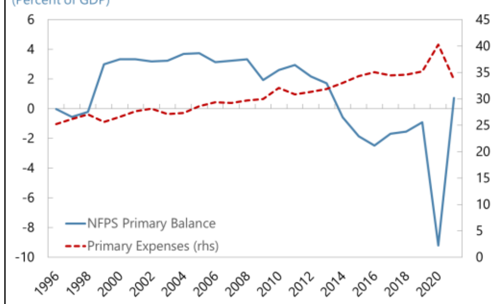
- **Defining a maximum limit for times of stress**. A debt limit should reflect the level of debt where the risk of distress is too high. This limit could be derived in various ways.

    - A simple first step would be to analyze the **fiscal effort** needed to sustain a certain level of debt during time of stress. The highest (NFPS) primary balance achieved in Brazil was around 4 percent in the early 2000s, on the back of strong commodity revenues and supported by a much lower spending ratio. Brazil's interest rate-growth differential at times of stress reached around 4-5 percent during the crises of 2002-04 and 2015-16. As a rule of thumb, dividing the highest historical primary balance (4 percent of GDP) by an interest-rate growth differential under stress of 4.5 percent would indicate the maximum debt level that could be sustained during crises times from a fiscal effort's perspective. For Brazil, the limit would be around 90 percent of GDP for gross NFPS debt.

    - Looking at **historical debt levels**, notably before and during crisis episodes, can further inform judgement about the limit. Compared with recent debt ratios, Brazil's gross NFPS debt has indeed reached similarly high levels before, yet only during times of stress.

    - A more sophisticated approach to determine a debt limit would be through the lens of a **DSA framework**. The IMF (SRDSF) threshold for debt at risk of distress, computed for Brazil, would be around 90 percent of GDP in 2022, holding everything else constant and considering (i) the width of the fanchart, (ii) the probability of debt not stabilizing, and (iii) terminal debt level adjusted for institutions. It is important to note that there are considerable mitigating factors in Brazil, including large cash buffers by the public sector, and an overwhelmingly domestic investor base.

Fiscal Balance and Government Size
(Percent of GDP)

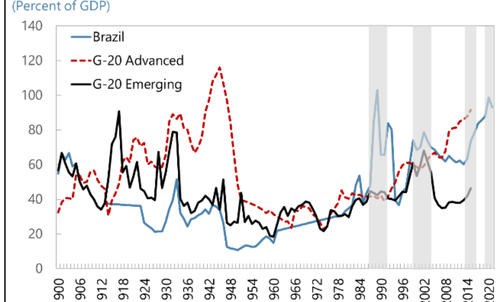


Source: Fund staff calculations.

Implied r-g Based on Focus Survey

Sources: BCB; Fund staff calculations.

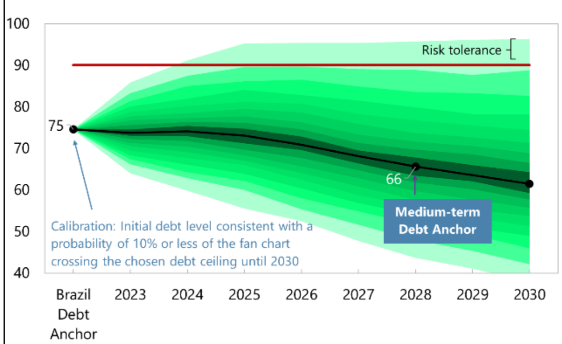
Historical Debt Paths and Crises
(Percent of GDP)



Source: IMF.

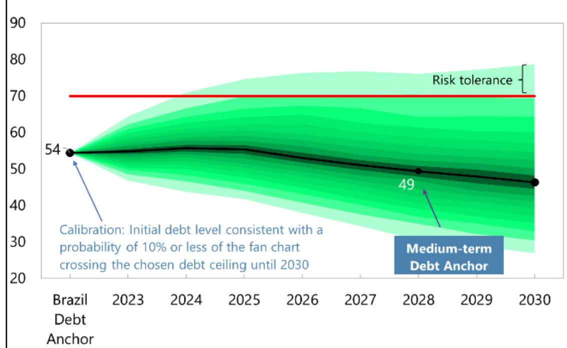
- **Factoring in a buffer.** Depending on risk tolerance, a buffer between the debt limit and the anchor should be considered. This buffer could be calibrated to avoid crossing the debt limit with a 90 percent probability in the medium term, for instance, corresponding to around 15-25 percent of GDP depending on the time horizon.

Gross NFPS Debt Anchor



Source: Fund staff calculations.

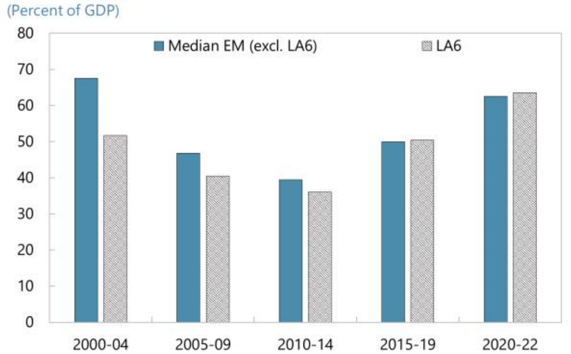
Net GG Debt Anchor



Source: Fund staff calculations.

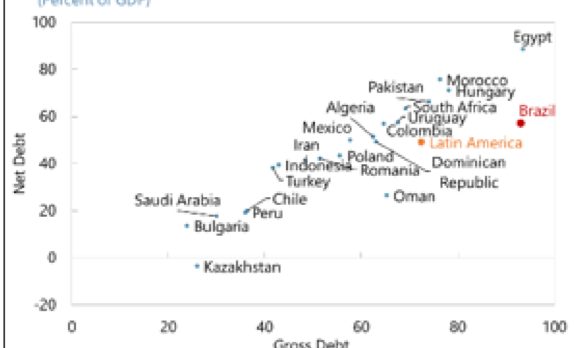
- **Deriving the anchor.** Given the debt limit and buffer as derived above, a desirable longer term debt anchor for Brazil could be around 50-55 percent of GDP for net general government debt, or around 80 percent of GDP for NFPS gross debt, taking into account liquid cash buffers, which are broadly 10 percent of GDP.[14] As an additional benchmark, both the EM median and the LA6 average debt levels hovered around 40-60 percent of GDP for gross NFPS debt since the early 2000s.

Debt Averages
(Percent of GDP)



Sources: Fund staff calculations.

GG Debt: Gross vs Net
(Percent of GDP)

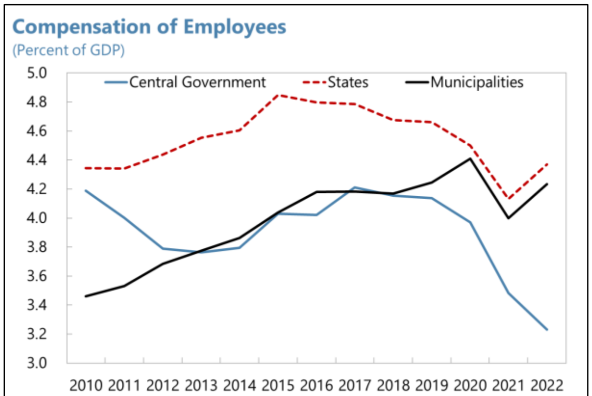


Sources: IMF staff estimates and projections

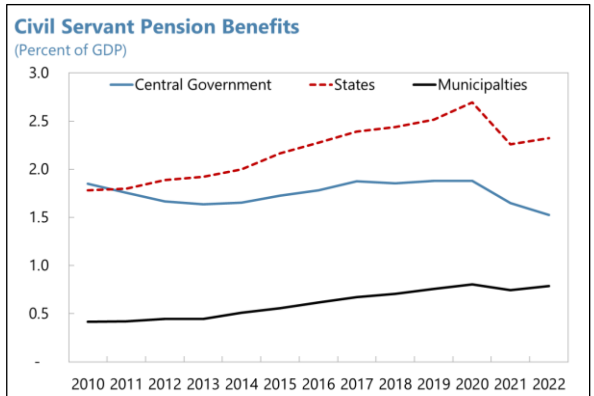
[14] For a discussion on the pros and cons of different debt metrics see accompanying Selected Issues Paper.

Hardening Subnational Budget Constraints

35. Expenditure ceilings for states and municipalities would more fairly distribute the fiscal effort to reduce the overall debt burden. Subnational governments' mandatory spending has been growing as much as the central government's up to 2016. While moderation has been achieved at the federal level and for some expenditure items also at the state level, municipalities' spending is decoupling, notably on the wage bill. Existing subnational fiscal rules could be strengthened, including by addressing legal uncertainty over the application of the FRL, mainly attributed to courts granting temporary injunctions that prevent the enforcement of sanctions. Data quality, in particular for municipalities, could be further improved and accounting standards harmonized to facilitate monitoring (Medas, Perrelli, and Gonzales, 2020).



Sources: Treasury; Fund staff calculations.



Sources: Treasury; Fund staff calculations.

Empowering Fiscal Institutions and Strengthening Medium-term Fiscal Planning

36. Strong fiscal institutions are needed to provide an effective control mechanism. The existing IFI could be leveraged to perform tasks more akin to an independent fiscal watch dog, with adequate resources and bolstered independence. The tasks could include: monitoring the activation and implementation of escape clauses; running the DSA as an input to fiscal management when applicable (with independent macro assumptions); performing reality checks on the feasibility and stability of budget plans; and presenting opinions on federal and subnational fiscal paths and rules. In addition, a good communication strategy is key, including the publication of a credible medium-term fiscal strategy to anchor expectations.

E. Conclusion

37. Brazil was a pioneer in adopting fiscal rules and its fiscal framework has adapted to new challenges and policy priorities over time. The fiscal framework supported responsible fiscal management, but it has become increasingly complex over time. Challenges to advance spending structural reforms, coupled with a short-term policy horizon and reduced flexibility, have undermined the effectiveness of the fiscal framework, and increased the need to amend it. While the new proposed rule addresses important political priorities and offers opportunities for gradual consolidation over an extended horizon, several challenges and implementation risks remain.

38. There is scope to shape a more comprehensive and integrated fiscal framework, leveraging specific advantages of rules. Further considerations to refine the proposed new fiscal rule include ensuring consistency of the spending rule and the primary balance targets, while making the latter more binding. The existing fiscal framework would also benefit from a strong fiscal anchor that puts debt on a firmly declining path, rebuilds buffers, and embeds a medium-term perspective. Further options to strengthen the framework include addressing the procyclical bias, coupled with institutionalizing the escape clause and considering a mechanism to smooth commodity revenues, and hardening budget constraints for subnational governments. Strengthening the MTFF and fiscal institutions would support the greater flexibility granted by the framework.

References

Alesina, A., C. Favero, and F. Giavazzi 2019, "Austerity: When It Works and When It Doesn't," Princeton University Press 2019.

Barros, G., Couri, D., Salto, F., Orair, R., 2018, "Regra do Ouro no Brazil: Balanço e Desafios," Special Study 5/2018, Instituiçao Fiscal Independente.

Cordes, T., T Kinda, P Muthoora, A. Weber, 2015, "Expenditure Rules: Effective Tools for Sound Fiscal Policy?," IMF Working Paper No. 2015/029 (Washington: International Monetary Fund).

Davoodi, H., P Elger, A Fotiou, D Garcia-Macia, X Han, A Lagerbor, W Lam, P Medas. 2022, "Fiscal Rules and Fiscal Councils Recent Trends and Performance during the COVID-19 Pandemic," IMF Working Paper No. 2022/011 (Washington: International Monetary Fund).

International Monetary Fund, 2017, "Brazil: Fiscal Transparency Evaluation", IMF Country Report No. 17/104 (Washington).

International Monetary Fund, 2021, "Strengthening the Credibility of Public Finances," October 2021 Fiscal Monitor (Washington).

International Monetary Fund, 2022, "The Return to Fiscal Rules," October 2022 Staff Discussion Note No. 2022/002 (Washington).

Medas, P., R. Perrelli, and F. Gonzalez, 2020, "Brazil, Strengthening Fiscal Responsibility at the Subnational Level," July 2020 Technical Assistance Report (Washington: International Monetary Fund).

REVENUE AND SPENDING MEASURES FOR INCLUSION AND FISCAL SUSTAINABILITY[1]

The authorities aim to improve Brazil's fiscal position to stabilize public debt and support disinflation efforts. This paper takes stock the authorities' planned fiscal efforts and provides insights for the design of revenue and spending measures to foster inclusion and fiscal sustainability.

A. Introduction

1. **The authorities aim to improve Brazil's fiscal position to stabilize public debt and support disinflation efforts.** Acknowledging the need for fiscal consolidation to reduce risks to public debt sustainability and support monetary policy's disinflation efforts, the authorities aim to improve the federal primary balance from a projected deficit of 2.1 percent of GDP in the 2023 budget to a deficit of 0.5 percent of GDP in 2023 and a surplus of 1 percent of GDP by 2026, within a narrow tolerance band as guided by the new proposed fiscal rule.

2. **The new proposed fiscal rule establishes that spending increases must be preceded by revenue increases.** The government's key revenue priorities include: (i) recovering the country's pre-pandemic tax base; (ii) approving the indirect tax reform, which would boost potential output; (iii) fostering redistribution and increasing revenues through the direct tax reform; and (iv) streamlining inefficient tax expenditures. Given the new rule's design, the authorities' strategy would require increasing revenues by about 2.5 percent of GDP in the near to medium term compared to the 2023 budget. Measures announced so far include the reversal of selected tax cuts and tax credits, the elimination of selected tax expenditures such as tax exemptions for close-end funds, and measures aimed at limiting tax disputes (see Staff Report)[2].

3. **The authorities are also placing emphasis on improving spending efficiency and strengthening medium-term budgeting.** The government plans to roll out spending reviews to improve the efficiency of high-spending programs. The authorities also aim to strengthen the effectiveness of the existing top-down medium-term fiscal framework (MTFF) by introducing a medium-term budget framework (MTBF) that would include bottom-up multi-year expenditure forecasts and support strategic spending allocation.

4. **To put debt on a firmly downward path, staff recommended a more ambitious fiscal effort supported by both revenue mobilization and spending reforms.** If implemented, contemplated revenue measures and the indirect tax reform would support fiscal consolidation while increasing potential growth. However, aiming for a sizable and rapid increase in revenues alone to deliver fiscal consolidation carries implementation risks. While recognizing their complexity,

[1] Prepared by Nabil Hamliri (FAD), Dimitris Drakopoulos, and Christina Kolerus (all WHD).

[2] According to the authorities' estimates, measures already adopted in 2023 would generate up to 1 percent of GDP, requiring an additional revenue effort of about 1.5 percent of GDP.

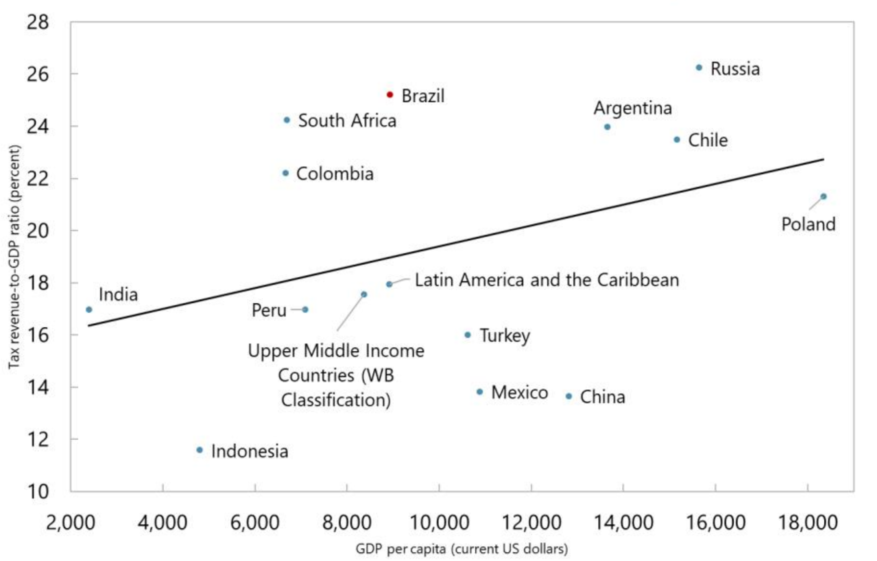
spending reforms are needed to put spending growth on a sustainable path, increase flexibility and resilience to shocks, and create space for priority programs.

5. This paper takes stock of the authorities' planned fiscal efforts and provides insights for the design of revenue and spending measures. Section I analyzes revenue measures, focused on indirect and direct tax reform, and tax expenditures rationalization. Section II identifies possible spending measures to secure a firmly downward path of the non-financial public sector (NFPS) gross debt, as recommended by staff, and outlines elements of good practices for public financial management (PFM) tools in support of spending reforms and fiscal efforts. The final section concludes.

B. Revenue Measures

6. Brazil's tax revenue ratio is high compared to peers. At about 25 percent of GDP in 2022, Brazil has one of the highest tax revenue ratios among peers. The tax system includes several layers of cumulative indirect taxes and large tax expenditures, which entail high costs for compliance, productivity, and potential GDP growth. Tax disputes, either taken to the judiciary system or to the tax court (CARF) are also sizable and create large fiscal risks.[3]

Income Level and Tax Revenue-to-GDP Ratio, 2022



Sources: IMF (2021); Fund staff calculations.

7. Indirect taxes account for a high share of total collection, making the system only moderately redistributive. In focusing heavily on indirect taxes and relying less on progressive direct taxes, the system is only moderately redistributive despite high overall tax collection. According to some studies, redistribution, measured as the relative burden of the highest earners to

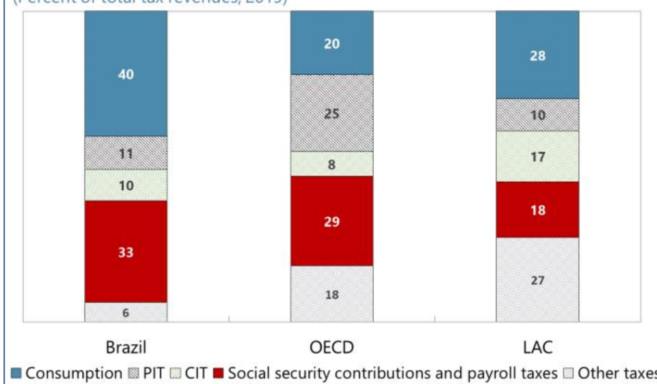
[3] The stock of unsettled tax disputes currently at tax court CARF (*Conselho Administrativo de Recursos Fiscais*) amounted to 10 percent of GDP in 2022.

that of the lowest ones, has decreased since the mid-1990s, both due to low effective income tax rates for the rich and the low share of direct taxes (Coelho, 2021). Social transfers have a positive redistributive impact, partly offsetting the regressivity of the tax system.

8. The authorities plan to increase revenues and undertake an in-depth reform the tax system. The announced revenue mobilization effort gives priority in the short term to recovering the tax base that was eroded during pandemic-related tax cuts (see Staff Report). The authorities are also advancing the long overdue reform of indirect taxation, which could be approved in the coming months. The reform of direct taxes could follow in the second half of the year, focused on increasing progressivity and mobilizing revenues. The authorities also aim to streamline inefficient tax expenditures. While the indirect tax reform is designed to be revenue neutral, additional measures in the areas of direct tax reform and tax expenditures rationalization outlined in this section could yield about 1-2 percent of GDP in additional revenues and support fiscal consolidation efforts.

Composition of Tax Revenues

(Percent of total tax revenues, 2019)



Sources: IMF (2021) and Fund staff calculations.

Indirect Tax Reform

9. The indirect tax reform aims at instating an integrated VAT in line with international good practices and is expected to boost potential output. The integration of the five existing federal and subnational consumption taxes into a national or dual VAT would considerably simplify the tax system, make compliance less costly, and mitigate risks from judiciary claims. The proposal follows international good practices, including destination-based domestic taxation and no taxation of intermediate goods and exports. It would also eliminate differentiated subnational exemptions on the state-level ICMS and the municipal ISS.[4] The elimination of origin-based cumulative taxation will improve resource allocation. Estimates point at a positive impact on potential GDP of 12 to 20 percent in 15 years, driven mainly by an increase in TFP and private investment.[5]

10. While the VAT rates have not been determined yet, the reform proposal is intended to be revenue neutral. According to some estimates, current consumption tax revenues are equivalent to a VAT rate of 26.9 percent. Discussions are ongoing on a compensation mechanism for states and municipalities that would temporarily lose revenue from the reform.

[4] According to some estimates, state-level ICMS exemptions could add up to as much as 1.2 percent of GDP (see Coelho, 2021).

[5] For a summary of economic impact estimates, see da Silva Nunes, Carvalho Araujo, and Moreira de Oliveira (2023)

11. The following considerations would help secure the full benefits of the reform:

- **Limiting differentiated rates and exemptions.** The authorities aim to minimize exemptions, which would help lock in the productivity and simplification gains brought by the mechanical elimination of differentiated preferential rates and exemptions across existing taxes.

- **Targeting consumption support to lower-income households.** Direct cash transfers or VAT credits, leveraging the poverty cadaster, are preferable to lower rates on basic products. Exemptions for basic food should be streamlined to minimize regressive impacts.[6] A system of refundable credits or smart cards could be effective in reducing inequality.[7]

- **Favoring investment support to subnational governments rather than tax policy flexibility.** The authorities are considering compensating a share foregone revenue of subnational governments through federal funding for investments, which could help reduce regional disparities and increase the share of public investment in subnational budgets. Investment funding should support pre-identified and carefully planned projects that are in line with national development priorities to maximize spending efficiency.

Direct Tax Reform

12. The share of direct tax revenues coming from corporate and personal income taxes is 22 percent lower than in the region and 37 percent lower than in the OECD. The low level of personal income tax (PIT) revenues is driven by a high personal exemption threshold, low statutory rates compared to peers, and significant deductions and exemptions. Corporate income tax (CIT) revenue remains low (half the LAC average), even though the headline rate is high, partly due to the reliance of many companies on SIMPLES.[8] The planned direct tax reform will be key to generate additional revenues to secure fiscal consolidation, eliminate inefficient tax expenditures, and increase progressivity.

13. The reform should focus on progressing towards a dual income tax model that promotes a neutral tax treatment across sources of income, while fostering progressivity and aligning Brazil with comparable countries.

- **On PIT:** The recent increase in the personal exemption threshold could usefully be compensated with an increase in the marginal PIT rates for higher incomes and a phasing out or capping of

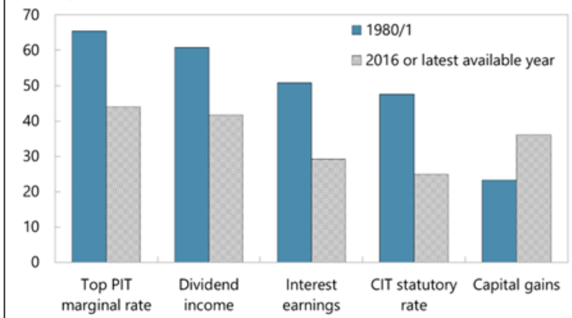
[6] The basic food basket (*cesta básica*) is insufficiently targeted towards low-income households and includes luxury goods (see Coelho, 2021). As a result, existing tax relief for consumption of basic food items (*desoneração da cesta básica*) benefits upper-income households 4 times more than the lower-income households.

[7] Paiva and others (2021) estimate the impact of such measures on the Gini coefficient at 7 points, with potential to virtually eliminate extreme poverty.

[8] SIMPLES is a streamlined corporate income tax regime applicable to smaller enterprises that merges various taxes into a unified tax on turnover.

deductions for health and education.[9] The extension of capital income taxation to unrealized gains (e.g., in closed-end funds) and the alignment of capital income taxation rates with those applicable to labor income would include rich households' predominant source of income in the tax base. A concomitant reform of SIMPLES would discourage PIT avoidance through incorporation.

Top Income Tax Rates, OECD Averages
(Percent)

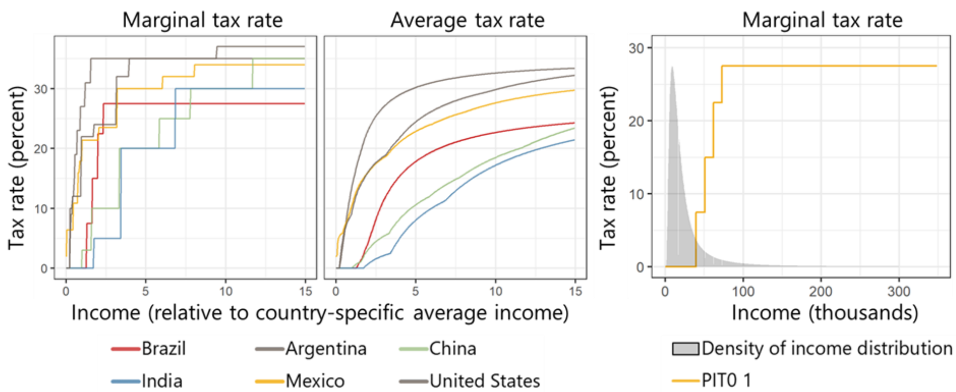


Source: Fiscal Monitor, April 2021. Data: Carey, Chouraqui and Hagemann (1993); and Harding and Marten (2018).

- **On CIT:** The introduction of dividend taxation would align Brazil with good international practices and should be combined with the replacement of the interest on net equity (*Juros sobre Capital Próprio,* JCP) by a proper allowance on corporate equity that reduces the debt bias and fosters investment. High statutory rates can be reduced closer to the top PIT rate to partly offset the introduction of dividend taxation.[10] A lower CIT rate would also encourage graduation away from SIMPLES. Capital income taxation at the corporate level should follow the same guiding principles as those applied to personal capital gains.

14. Strengthening property taxes is also a promising avenue for revenue generation and redistribution. The current tax system already includes taxes on property and on wealth transmission that could be strengthened and harmonized across levels of government.[11] Revenue from property taxes could be increased by improving valuations and streamlining exemptions.

Tax Rate Schedules



Source: Fund staff calculations.

[9] Alternatively, the replacement of the threshold with a scheme comparable to the US Earned Income Tax Credit would specifically target the poor and encourage formalization (see IMF, 2021).

[10] The current CIT rate of 34 percent is 50 percent higher than the OECD average of 21 percent.

[11] Existing taxes include a municipal property tax (IPTU), a tax on transfer on immovable property (ITBI), a tax on donations, gifts, and inheritances (ITCMD), a tax on auto vehicles (IPVA), and a tax on rural property (ITR).

Tax Expenditure Rationalization

15. Estimates suggest tax expenditures amount to over 5 percent of GDP, placing Brazil on the high range of comparable countries. The latest budget documents report over 200 categories of tax expenditures and estimate foregone revenue at 4.2 percent of GDP for the federal government. This estimate does not include tax expenditures granted by subnational governments,[12] or other measures that could be considered as tax expenditures, such as preferential allowances and rates. Tax expenditures have typically been designed to meet economic and social policy goals. Although they mainly consist of programs supporting businesses, some studies suggest they have had limited effectiveness in promoting productivity, investment, and employment.[13]

16. The most noteworthy tax expenditures include:

- **SIMPLES:** The regime has a high maximum turnover ceiling of about US$1 million per year, compared to a recommendable level estimated at about US$200,000 per year (see Coelho, 2021). Nearly 65 percent of formal firms in the country were registered in SIMPLES as of 2020 (OECD, 2020). The annual cost is estimated at about 1.1 percent of GDP at federal level in 2023, without accounting for subnational tax exemptions (Coelho, 2021).

- **Payroll tax exemptions** (*desoneração da folha*): These exemptions were introduced in 2011 to promote formal job creation. They have amounted to about 0.4 percent of GDP in foregone revenue at their peak of 2015, and now amount to about 0.1 percent of GDP.

- **Presumptive CIT profit regime** (*regime de lucro presumido*): The regime allows small firms (below US$15 million in turnover) to determine taxable profits based on an assumed profit margin, simplifying tax accounting. It is economically akin to SIMPLES but is considered part of the benchmark system and not a tax expenditure in budget documents. Its cost is estimated at 0.2 percent of GDP at least.

- **PIT deductions and exemptions:** Foregone revenues due to exemptions and deductions sum up to about 1 percent of GDP. Existing deductions from the PIT include mostly education and health expenditures, with health expenditures being uncapped. They add up to an already generous PIT exemption threshold,[14] and a preferential treatment for unrealized capital gains (including in closed-end funds) and pensions for pensioners above 65 years old.

- **CIT exemptions:** The deductibility of a 15 percent interest on net equity (JCP) for corporate entities results in foregone revenue estimated at 0.2 percent of GDP. Combined with no

---

[12] Some states' budget documents also include an inventory of tax expenditures but estimates of foregone revenues are not systematic and do not follow a unified methodology.

[13] See World Bank, 2017.

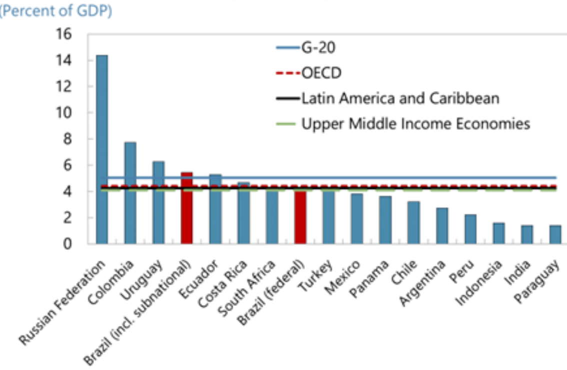
[14] The PIT exemption threshold represents 52 percent of GDP per capita, above the OECD average of 30 percent. It was recently raised from 1.8 times the minimum wage to 2 times the minimum wage. The current threshold exonerates about 80 percent of the population from PIT.

dividend taxation, the deductibility has effectively allowed companies to distribute dividends with limited taxation.

17. Efforts to streamline tax expenditures have accelerated recently. Since 2019, each annual federal Budget Guidelines Law has required that any new tax expenditures have an expiration date of 5 years and be associated with (i) compensatory measures; and (ii) proper monitoring of progress towards stated objectives. Moreover, a constitutional amendment adopted in 2020 aims to reduce federal tax expenditures by 2 percent of GDP by 2029. The amendment excludes SIMPLES, Manaus Free Trade Zones, basic food exoneration, and other selected programs, essentially requiring the elimination of most other tax expenditures. Several measures are currently under discussion, including reforming the taxation of closed-end funds, following the recently adopted taxation of offshore financial revenues and of transfer pricing.

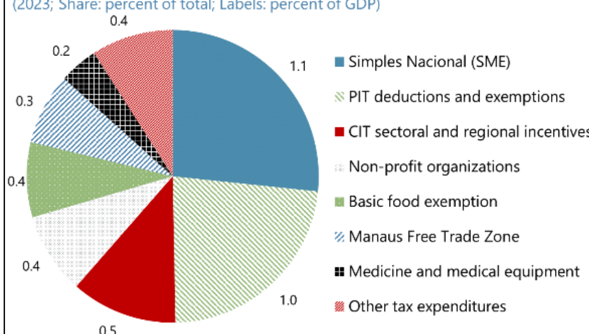
18. The upcoming indirect and direct tax reforms also provide opportunity to eliminate inefficient tax expenditures. Most existing consumption tax expenditures would be automatically phased out by the indirect tax reform, provided they are not replaced with new tax expenditures. The direct tax reform should aim at eliminating PIT and CIT deductions and exemptions to increase revenues and redistribution. It would also be advisable to broaden the scope of efforts to rationalize tax expenditures by (i) reforming SIMPLES;[15] (ii) gradually phasing out the presumptive CIT regime;[16] and (iii) replacing payroll tax exemptions with targeted incentives for formal job creation.

Revenue Forgone through Tax Expenditures
(Percent of GDP)



Source: Council on Economic Policies Global Tax Expenditures Database.

Share of Federal Tax Expenditures by Program Category
(2023; Share: percent of total; Labels: percent of GDP)



Sources: Projeto de Lei de Diretrizes Orçamentárias (PLDO) 2024; Ministry of Economy; Fund staff calculations.

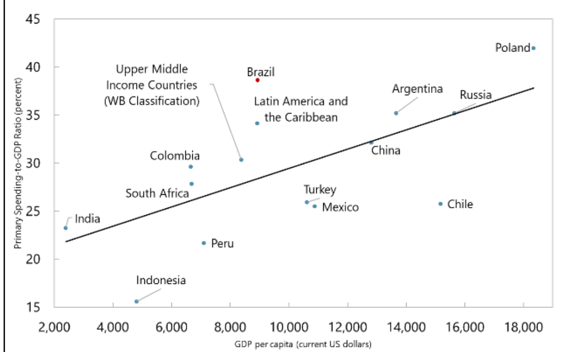
[15] For instance, reducing the threshold eligibility for SIMPLES to BRL 1 million would only affect 10 percent of registered taxpayers that contribute two-thirds of total tax collection, and considerably reduce foregone revenue (Coelho, 2021).

[16] Less generous conditions on SIMPLES would bring it closer to the presumptive tax regime and therefore reduce the need for the latter. The simplification of the tax regime brought about by the direct and indirect tax reforms would also reduce the need for a simplified regime.

C. Spending Measures

19. General government spending in Brazil is high compared to peers, while public investment is low. Total general government spending reached 46 percent of GDP in 2022 (5 percent of GDP above the OECD average). At about 38 percent of GDP, primary general government spending is the second highest in a group of comparable countries. The wage bill (12 percent of GDP) and gross pension spending (12 percent of GDP) account for the bulk of primary general government spending. In turn, gross public investment spending is comparatively low, amounting to 1.5 percent of GDP versus about 3 percent on average in the OECD.

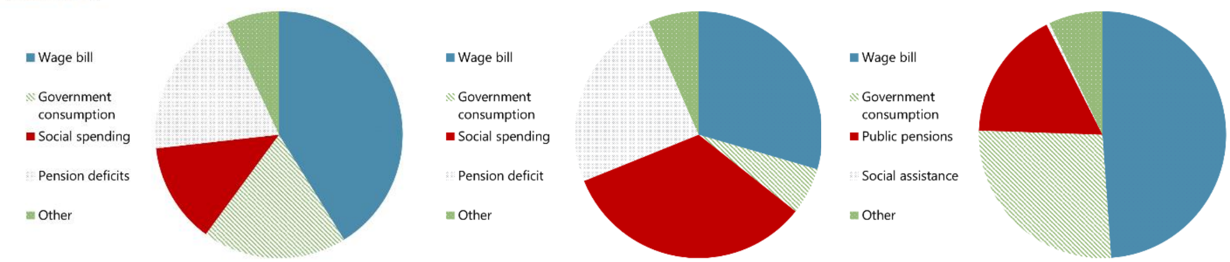
Income Level and General Government Primary Spending-to-GDP Ratio, 2022



Sources: WEO, IMF staff calculations.

Breakdown of Primary Current Spending in 2022

General Government (Percent of GDP) | **Central Government** (Percent of GDP) | **Subnational Governments** (Percent of GDP)

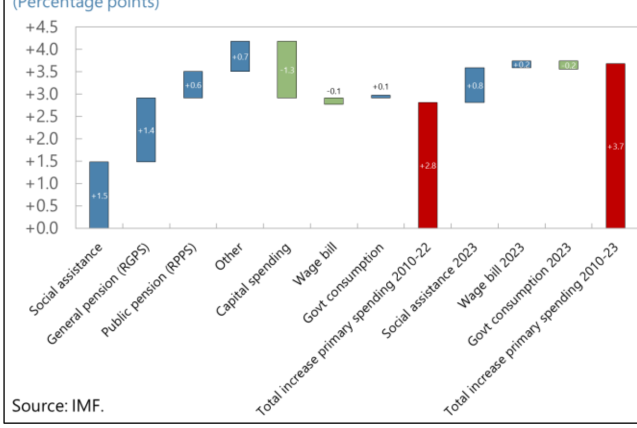


Source: IMF. Source: IMF. Source: IMF.

Note: Pension deficits are net of pension contributions (earmarked by constitution to pension spending).

20. A large share of general government spending in Brazil is legally mandated, earmarked, or indexed, constraining flexibility to respond to new priorities and shocks. Rigidities embed a procyclical bias to fiscal policy and have enabled rising spending during booms that was difficult to undo afterwards. They have also made the budget process more complex and constrained flexibility for re-allocating spending to new priorities and responding to shocks. Mandates have also provided weak incentives to improve spending efficiency.

2010-2023 Increase/Decrease in Spending
(Percentage points)

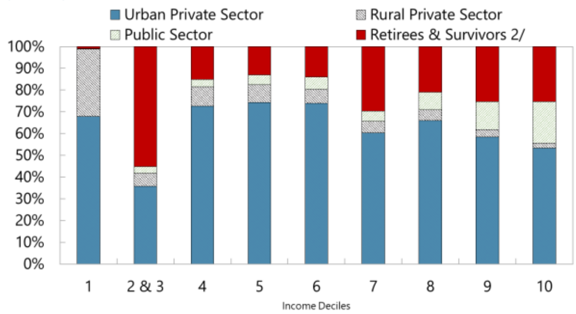


Source: IMF.

21. An important share of general government spending accrues to upper-income households. About 60 percent of general government primary current spending (net of pension contributions) goes to public sector salaries and public and private pensions, mostly benefiting upper-income deciles, while 13 percent is allocated to social assistance/targeted transfers. As a result, some studies suggest that, when considering all taxes and transfers, Brazil's fiscal policy reduces inequality by 19 percent, compared with about 30 percent in Europe on average (World Bank, 2017).

Distribution of Earnings 1/

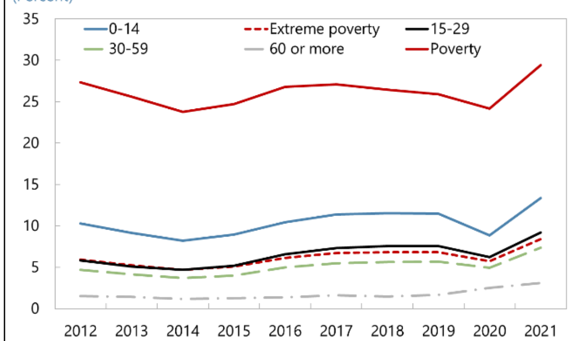
(Percent)



Sources: PNADc; and Fund staff calculations.
1/ All earnings (from labor or pension) of workers (formal or informal) ages 18 and above.
2/ Individuals receiving pensions (those who work and those who are retired).

Extremy Poverty Levels by Age Group

(Percent)



Source: IBGE.

22. While the authorities' strategy gives priority to revenue measures, spending reforms are important to support inclusion and fiscal sustainability, while increasing flexibility. While recognizing that spending reforms require a favorable political economy and careful preparation at this juncture, this section analyzes measures that could support fiscal consolidation efforts, foster inclusion, and provide flexibility to respond to spending priorities and shocks. These measures could generate savings of about 2-3 percent of GDP materializing over time and include:

- Pension reform
- Public administration reform
- Reforms to budget rigidities
- Efficiency gains and PFM tools

Pension Reform

23. The 2019 pension reform introduced some good practices and helped stabilize the general pension regime (RGPS) deficits until 2030. The 2019 reform introduced a minimum retirement age and linked replacement rates to years of contribution for RGPS, stabilizing RGPS deficits at around 2.5 percent of GDP until 2030. The reform also aligned the public sector regime (RPPS) for the federal government with the RGPS, stabilizing federal RPPS deficits and setting a benchmark for future RPPS reforms.

24. However, pension deficits still account for a high and increasing share of total general government spending. The combined deficits of the RGPS and RPPS reached 5.7 percent of GDP in 2022, or 20 percent of general government spending. The RPPS deficit is equivalent to the RGPS deficit, even though RGPS covers 10 times as many pensioners as the RPPS. RGPS deficits are expected to resume their upward trend from 2030 onwards and reach 6 percent of GDP by 2060, reflecting unfavorable demographic trends.[17] Staff estimates the net present value (NPV) of RGPS pension deficits at 70 percent of 2023 GDP.[18]

25. High pension deficits are driven by generous replacement rates and low contribution rates, as well as indexation practices. At over 90 percent, replacement rates are very high on aggregate, although this figure is partly driven by a high share of minimum wage pensions.[19] The indexation of minimum pensions on a steadily increasing minimum wage mechanically increased pension spending.[20] Contribution rates (9.5 percent of wages on average) are also relatively low compared to other OECD countries. RPPS deficits reflect particularly generous pension benefits granted to civil servants, with Brazil having one of the highest civil service pension spending levels in the world and low contribution rates relative to pension benefits.[21] RPPS deficits are set to continue increasing, given demographics.

26. Pension spending in its current structure is highly regressive. According to World Bank estimates, 35 percent of pension deficits benefit the richest 20 percent of the population, while only 4 percent of deficits benefit the bottom 20 percent. The targeting of non-contributory pensions could also be improved since over 70 percent of beneficiaries of both programs do not belong to the poorest 40 percent of the population.

27. Further RGPS reforms are needed to close the deficit. Measures to be considered include:

- (i) Reduced replacement rates for both newcomers and existing pensioners. This can be achieved through a gradual alignment of accrual rates for the first 15 to 20 years of service with the

[17] A combination of falling fertility rates and rising life expectancy should steadily increase the old-age dependency ratio, and the critical ratio of 1-1 would be reached by 2047. People aged over 65 years old now represent 8 percent of total population, a 2 percent increase vs. 2010, and are projected to reach 36 percent of the population in 2050 according to IBGE projections, in line with high-income countries.

[18] Discounted at current interest rates. The NPV of RGPS pension deficits becomes 118 percent of GDP when discounted at staff's estimate of the neutral interest rate.

[19] Over 60 percent of RGPS pensioners have a minimum wage pension. Non-contributory and *de facto* non-contributory pensions (respectively BPC and rural pensions) are also set at a minimum wage and represent about 20 percent of pension expenditures.

[20] Staff estimates that an increase of 5 percent of the minimum wage increases the RGPS deficit by 0.15 percent.

[21] Average civil servant pensions are 5 times as high as private sector pensions. Deficits per pensioner is 7 times higher for civil servants than for private sector employees. As of today, the average civil servant contribution, including employer contribution, only covers about half the average civil servant pension. RPPS deficits are covered through a combination of imputed contributions and the general government deficit

2 percent per year that is earned after the minimum years of contribution, a cap on pension indexation, and/or a de-linking of pension growth from minimum wage growth;

- (ii) Increases in the effective retirement age, notably by closing any early retirement loopholes;
- (iii) Higher contribution rates that would move Brazil closer to the OECD average, while avoiding unintended effects on formalization;
- (iv) The elimination of the partial PIT exemption for pensioners above 65 years old,[22] which would be equivalent to a reduction in replacement rates; and
- (v) A coordination of non-contributory regimes with other social programs to avoid duplication of benefits and improve targeting, and a potential de-linking from the minimum wage.

28. In the medium term, the RGPS could dynamically adjust to demographic trends through automatic adjustment mechanisms. Such mechanisms are already in place in many OECD countries and include for instance automatic adjustments to the retirement age and minimum contribution periods based on the evolution of life expectancy after 65 years old.[23]

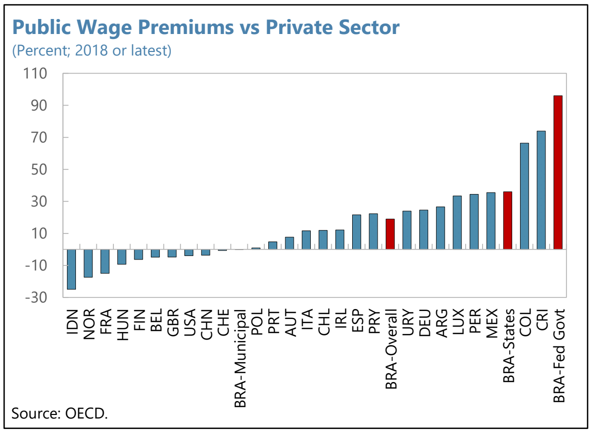
29. Subnational RPPS reforms should build on the success of the federal RPPS reform. The federal government has the ability to require full or partial pension reforms as part of the fiscal recovery programs followed by heavily indebted states. Encouraging full convergence of all RPPS to the federal RGPS, along with acceptable transition periods, would support the sustainability of the pension system and the fiscal accounts. Capping the share of pension spending in subnational budgets could encourage RPPS convergence.

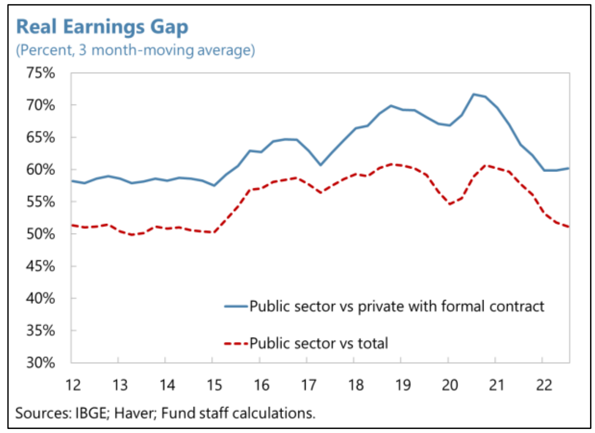
Public Administration Reform

30. Brazil's wage bill stands substantially above peers. At 12 percent of GDP, the wage bill is substantially above that of comparators, including advanced economies (10 percent of GDP), emerging market economies (about 9 percent of GDP), and Latin American economies (about 8 percent of GDP). The gap is mainly driven by higher pay levels, as the share of civil servants is broadly comparable (at about 9 percent of the working age population). Controlling for observable characteristics, including age, education, and gender, public pay is about 30 percent higher than pay in the formal private sector on average (Karpowicz and Soto, 2018).

[22] Individuals 65 or older are eligible for double the standard personal exemption on the PIT. Individuals above 65 years old represent most retirees.

[23] According to IMF research, minimum retirement ages should be raised by 1 year every 10 years at least to accommodate ageing and lower fertility.





31. Headcount and salary freezes at the federal level have reduced the federal wage bill by 0.9 percent of GDP in five years. As a result, after peaking at 13.2 percent of GDP in 2017, the wage bill returned to its 2010 level of 12 percent of GDP in 2021, supported by a decline of the wage bill at the federal level. However, the wage bill at the subnational level has been growing as a share of GDP. The fiscal framework for subnational governments also allows for a high proportion of wages in total spending, and the wage bill in most states hovers around the ceiling of 60 percent of net revenues set in the Fiscal Responsibility Law.

32. The wage bill is highly inertial. The constitution provides job stability to government workers after three years of service and prohibits nominal cuts in government salaries. Therefore, reducing the headcount can only be achieved through attrition and pay adjustments can only be made by limiting wage increases (Karpowicz and Soto, 2018). Relatedly, a meaningful adjustment would also require breaking with automatic seniority adjustments that happen even in the absence of negotiated salary increases. For example, in some states, career progressions are granted every two years and salary readjustments have exceeded 30 percent (World Bank, 2019). As a result, some careers reach the top salary band very quickly and well before retirement.

33. Achieving fiscal savings in the medium term requires action in the near term to:

- **Reduce wage premia between public and private sectors:** This could be done through a review of the compensation structure that better aligns entry salaries with the private sector, increases the interval for progressions, reduces automatic seniority salary increases, merges allowances into the base wage, and allows for a transition towards merit-based remuneration.[24] These types of changes should aim to cap wage growth closer to inflation.

- **Replace fewer workers than those retiring in targeted areas:** This could entail hiring freezes combined with smart headcount reduction in overstaffed sectors through attrition and incentives for workforce flexibility within the public sector.

[24] According to World Bank estimates halving the wage premium between the federal and the private sector would reduce the federal wage bill by up to 0.9 percent of GDP (World Bank, 2017).

34. Public administration reforms could enable total savings of up to 1 percent of GDP. Adjusting wage growth below nominal GDP (e.g., by IPCA) and implementing targeted attrition policies could save up to 1 percent of GDP, while additional savings can be achieved by revamping career progression and service structure and changing salary structures.[25] A public administration reform will also support RPPS reforms by limiting the mechanical link between growth in the wage bill and pensions.

Reforms of Budget Rigidities

35. Budget formulation is constrained by extensive legal and constitutional rigidities. These include:

- **Automatic indexation.** The indexation of minimum contributory and non-contributory pensions to the minimum wage creates automatic spending increases every year. By constitution, the minimum wage cannot decline in real terms and should be adjusted by inflation every year. Up until 2020, there was also a legal requirement to increase the minimum wage by lagged real GDP growth, on top of inflation adjustment. A draft law to reinstate this requirement under a modified form is currently under discussion. In addition, many spending items must grow by inflation by law.

- **Revenue earmarking.** Over 400 rules (30 of which are set in the constitution) automatically channel shares of certain revenues to spending items. Almost 80 percent of total federal revenue is earmarked, including to public wages, transfers to subnational governments, and health and education spending.[26]

- **Mandatory spending.** Most major spending items cannot be modified without legal or constitutional changes. Mandatory spending exceeds 90 percent of total primary spending.

36. Reducing budget rigidities would support the implementation of the new fiscal rule, improve spending efficiency, and foster flexibility to respond to shocks and new priorities. Reducing rigidities would increase the discretionary portion of the budget, support compliance with the new fiscal rule, help reduce procyclicality, foster efficiency gains in some sectors (including health and education), and free up resources to respond to shocks and new priorities.

Efficiency Gains and PFM Tools

37. The authorities' program puts strong emphasis on shielding social assistance spending. The transitional constitutional amendment of 2022 increased social assistance spending to about 2.5 percent of GDP, slightly above the average of 2 percent of GDP in emerging and LA6

[25] According to IMF estimates, freezing average remuneration in nominal terms and halting new hiring for the next five years would reduce the federal wage bill by about 0.5 percent of GDP and the subnational wage bill by another 0.5 percent of GDP (Karpowicz and Soto, 2018).

[26] By constitution, at least 18 percent of tax revenues should be allocated to education at the federal level and 25 percent at the subnational level. At least 15 percent of federal spending should be dedicated to health.

countries.[27] Efforts are ongoing to improve the targeting of social assistance and maximize the redistributive impact of higher social spending. The integration of the poverty and family cadasters has enabled the identification of non-eligible beneficiaries. Going forward, efforts could be combined with the linking of stipends to individuals rather than households, as well as the reintroduction of means testing to better target support to families below the poverty line (see World Bank, 2023a). Introducing a stronger link to training, education, employability, and formality would improve households' chances to graduate from social assistance and be beneficial for labor supply and productivity.

38. The authorities also aim to recover federal investment capacity and deliver growth-enhancing projects. Public investment declined dramatically in recent years from already low levels, while investment needs are high. Low and uncertain public investment budgets have led to insufficient medium-term investment planning at the central level and high reliance on State-Owned Enterprises (SOEs) and Public-Private Partnerships (PPPs). The new fiscal rule sets a floor on investment, helping to provide medium-term visibility on the available spending envelope, but also adding to budget rigidities.

39. Enhancing public investment management will be essential to ensure value for money in upcoming investment budgets. Efforts are needed on (see IMF, 2018):

- **Strategic prioritization:** Develop a broad high-level national investment strategy to set priorities, guide investment planning across all levels of the public sector, focus attention on major projects, and require ministries to align sectoral strategies with the national strategy.
- **Project selection and appraisal:** Strengthen and standardize procedures for project preparation, appraisal, and selection, and develop central guidelines for project development.
- **Project execution:** Enhance project management capabilities and accountability, and modernize public procurement (increase competition and lower barriers to foreign participation).
- **Coordination across levels of government**: Develop a national investment project pipeline (proposals already in Congress), improve capacity at subnational level for public investment management, and improve coordination between the federal government, subnational governments, SOEs, and public banks, and develop a program-based approach to regional transfers for capital spending.
- **Investment needs to adapt to climate change:**[28] Make investment planning climate-aware and consistent with the country's climate objectives, provide centralized guidance to include climate

[27] LA6 countries comprise Brazil, Chile, Colombia, Mexico, Perú, and Uruguay.

[28] Yearly infrastructure investment needed for climate action has been estimated at 1.2 percent of GDP beyond current investments (World Bank, 2023).

in project prioritization and selection, and develop a disaster risk management strategy to manage climate risks faced by public assets.

40. There is also scope to seek efficiency gains in public procurement through centralized procurement planning and strategy. The implementation of centralized purchasing strategies, diversification of suppliers, minimization of seasonality effects, demand management, waste reduction and standardization of procurement processes, would allow for economies of scale and could yield up to 0.2 percent of GDP in savings, according to World Bank estimates (World Bank, 2017).

41. The authorities are in the process of implementing PFM tools that would increase spending control, enhance efficiency, and support fiscal consolidation efforts:

- **MTBF:** The authorities aim to complement the MTFF with the introduction of an MTBF in the 2025 budget law. Also called medium-term expenditure framework, the MTBF refers to the institutional process by which annual budgeting is guided by (i) reliable granular multi-year expenditure projections (including consistent expenditure baselines and costing of new measures); and (ii) prioritization of competing spending priorities for the whole government by institution and item based on the limits set in the MTFF. The process typically involves cabinet decision-making and strategic reform decisions to reflect multi-year spending ceilings in annual budget formulation and execution. The introduction of an MTBF in Brazil could build on the examples of France or South Africa.

- **Spending reviews:** This institutional process involves periodic reviews of major spending programs to monitor their cost-effectiveness and alignment with stated objectives and identify efficiency gains. Reviews can be either led by line ministries (e.g., when ministries are asked to comply with a savings target, or "efficiency dividend") or by a central agency for larger exercises. Many countries have implemented rolling spending reviews. In the UK, comprehensive spending reviews take place every 2-3 years (and achieved a reduction of 5 percent of GDP in spending in 5 years). In France, budget appropriations include multi-year commitment authorization ceilings. Spending reviews can be linked to the MTBF (as is the case in the UK) and the annual budget process to inform spending rationalization objectives. The potential for spending reviews is considerable in Brazil and savings could be unleashed by (i) launching a comprehensive central agency-led spending review process, including reviewing key spending items and budget rigidities; and (ii) introduce in parallel a rolling program of spending reviews for large and fast-growing programs and efficiency dividends on ministries' operational expenses to generate savings in the short term.

D. Conclusion

42. Improving Brazil's fiscal position calls for revenue and spending measures. The indirect tax reform plan would streamline the tax regime and boost potential growth, while the direct tax reform and the elimination of inefficient tax expenditures will be key to generate additional revenues and increase progressivity. However, aiming for a sizable and rapid increase in revenues carries implementation risks, given slowing cyclical conditions in the near term and an already significant revenue ratio on a structural basis, and could be harmful for growth.

43. While recognizing their complexity, spending reforms are needed to put spending growth on a sustainable path and create space for priority programs. Reforms of pensions and public administration would support consolidation and increase progressivity. Revisiting budget rigidities would provide flexibility and additional room to respond to shocks. Recognizing that spending reforms require careful design and communication, preparatory work to lay the ground for such reforms could start as soon as feasible. Finally, there is room for efficiency gains in social spending and public procurement. Public investment management reforms would maximize value-for-money from the upcoming public investment floor. Spending initiatives will usefully be supported by the swift implementation of MTBFs and spending reviews.

References

Coelho, M.D., 2021, "Brazil: Tax Expenditure Rationalization within Broader Tax Reform," IMF Working Paper No. 2021/240 (Washington: International Monetary Fund).

International Monetary Fund, 2018, "Brazil: Technical Assistance Report - Public Investment Management Assessment," IMF Country Report No. 18/249 (Washington).

International Monetary Fund, 2021, Regional Economic Outlook, Western Hemisphere: A Long and Winding Road to Recovery (Washington).

Karpowicz, I. and M. Soto, 2018, "Rightsizing Brazil's Public-Sector Wage Bill," IMF Working Paper No. 2018/225 (Washington: International Monetary Fund).

da Silva Nunes, F., J.E. Carvalho Araujo, and M.A. Moreira de Oliveira, 2023, "Reforma Tributária," Consultoria Legislativa.

OECD, 2020, "SME and Entrepreneurship Policy in Brazil," OECD Studies on SMEs and Entrepreneurship (Paris: OECD Publishing).

OECD and others, 2022, Revenue Statistics in Latin America and the Caribbean 2022 (Paris: OECD Publishing).

Paiva, L.H, L. Bartholo, P.H.G. Ferreira de Souza, and R.O. Orair, 2021, "A Reformulação das Transferências de Renda no Brasil: Simulações e Desafios," IPEA Texto para Discussão (Brasília: Instituto de Pesquisa Econômica Aplicada).

World Bank, 2017, "A Fair Adjustment: Efficiency and Equity of Public Spending in Brazil" (Washington).

World Bank, 2019, "Gestão de Pessoas e Folha de Pagamentos no Setor Público Brasileiro: o qué os dados dizem?" (Washington).

World Bank, 2023, "Brazil: Country Climate and Development Report" (Washington).

World Bank, 2023a, "Opportunities for All: Brazil Policy Notes 2022" (Washington).

PUBLIC DEBT MEASURES AND THE FINANCIAL RELATIONSHIP WITH THE CENTRAL BANK[1]

The financial relationship between the Central Bank of Brazil (BCB) and the National Treasury (NT) has several distinctive features that influence government debt measures. The current setup has served Brazil well over the years and has supported macroeconomic stability. This chapter analyzes the properties of different debt measures and suggests considerations that could help further enhance transparency and comparability, building on the comprehensive amount of data already published by the Brazilian authorities. All debt measures discussed have pros and cons and bring a useful perspective depending on the focus of policy analysis. The chapter also discusses incremental changes in BCB's financial autonomy that can reduce the influence of non-fiscal factors on public debt without compromising the efficiency of public debt and monetary policy operations.

A. Introduction

1. **The financial relationship between the BCB and the NT has several distinctive features that influence debt measures.** In principle, a government debt measure should capture the most important debt obligations of the government, and its dynamics should be influenced primarily by fiscal policy. In practice, the rules that govern the BCB/NT financial relationship and their interactions with monetary and exchange rate operations can impact the level and dynamics of government debt figures.

2. **Assessing the impact of fiscal policy on debt requires accounting for some specific aspects of the financial relationship.** The stock of repurchase agreements (repos), holdings of Federal Securities (FS) by the BCB, and the Treasury Single Account (TSA) stand out vs. peers.[2] Properly taking stock of changes in these items, while considering their statistical treatment, is important to assess the impact of fiscal policy and the actual debt servicing needs of the government.

3. **Brazil has been conducting efficient public debt and monetary policy operations, so any changes in the BCB/NT financial relationship should build on past success.** As discussed in IMF (2019), the current setup was designed to prevent past policy missteps and has helped overcome macroeconomic instability. Over recent decades, Brazil has been successful in conducting large sterilization, public financing, and exchange rate operations in an efficient manner even under challenging market conditions. Any changes to the financial relationship should build on past success without undermining policy effectiveness.

4. **This paper is organized as follows**. Section B discusses different debt measures, and their pros and cons. Section C discusses the financial relationship of the NT and the BCB. Section D

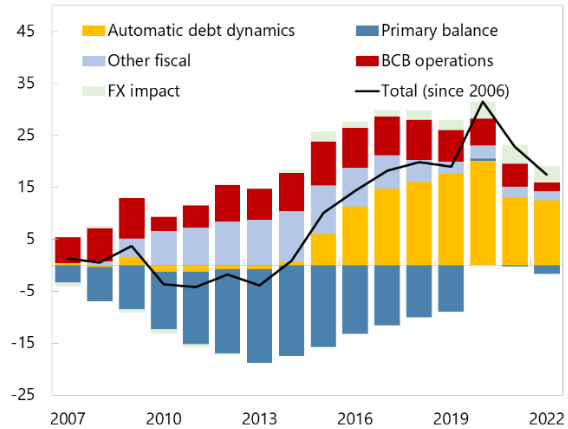
[1] Prepared by Dimitris Drakopoulos.

[2] For simplicity, repurchase operations are referred as "repos" in this paper. For the BCB, these are "reverse repos" given that the BCB "sells" securities to the financial sector with an agreement to repurchase them back later.

concludes and offers considerations that could help further enhance transparency and comparability and discusses possible future reforms of the BCB/NT financial relationship.

Gross Debt Drivers and LA5 Central Bank Balance Sheets

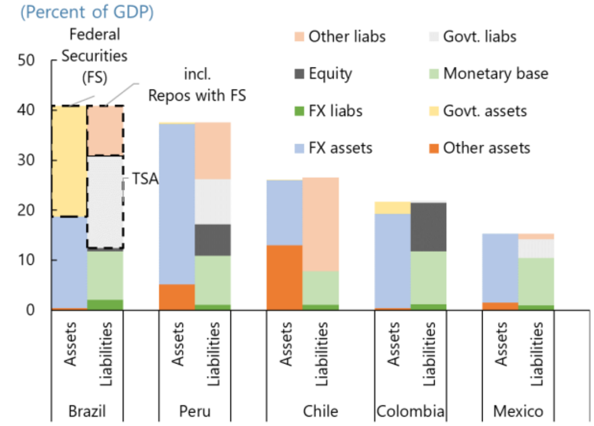
Brazil's Gross Debt Drivers
(Percent of GDP)



Source: BCB

Note: BCB operations include FX swaps, repos, FX sales/purchases, changes in reserve requirements, changes in voluntary deposits. Other fiscal includes among others treasury operations with public banks.

LA 5 Central Bank Balance Sheets
(Percent of GDP)



Source: IFS

Note: The data are based on the monetary statistics published in the IMF's International Financial Statistics (IFS). National definitions can differ. For example, the monetary base as reported by the BCB was 4.2 percent of GDP in 2022. LA5 comprises Brazil, Chile, Colombia, Mexico, and Peru.

B. Public Debt Measures

5. The BCB's fiscal statistics consider the BCB to be part of the non-financial public sector. This reflects the specificities of Brazil's institutional arrangement, which will not always be in accordance with the foreseen international standards (see BCB, 2019), as is the case in other countries. For example, the Fiscal Responsibility Law (FRL) considers the BCB's personnel and administrative expenditures as part of federal expenditure, which is set in the Annual Budgetary Law and approved by congress. In turn, a more common international practice is to consider the central bank a public financial institution.[3]

6. Public debt indicators also have several unique features in Brazil:

- **Federal Public Debt (FPD).** The FS held by the BCB are consolidated as debt held between government institutions. FPD held by the public includes domestic debt (DFPD) and external debt (EFPD) based on its currency of denomination. More than 90 percent of the FPD is in four types of marketable securities held by the public (NTN-F, NTN-B, LTN, and LFT).

- **General Government Gross Debt (GGGD-authorities):** Besides the federal government, this measure also includes the regional governments. The consolidation items between federal and regional governments are substantial given that close to 6 percent of GDP of regional debt is

[3] From a debt sustainability analysis perspective, central bank consolidation (see IMF, 2022) can be appropriate in cases where the central bank has a large negative capital position and/or is providing significant direct monetary financing.

owed to the federal government. In 2008, the authorities made some key methodological changes for disseminating GGGD:

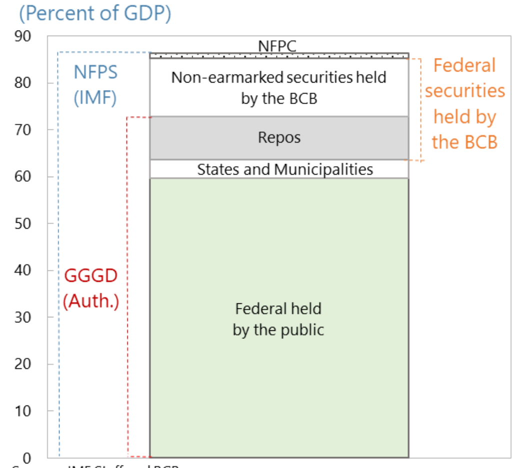
- **Excluding the FS held by the BCB**. This was due to the properties of these securities that minimize refinancing risks. In particular, the FRL allows the BCB to obtain securities exclusively for the purpose of rolling over those that are maturing. The FRL also specifies that the BCB can rollover the principal and the "monetary updating". The "monetary updating" is calculated as the change in a price index during the term of a maturing security. This rollover process implies that the NT needs to finance only the "real interest" for the securities held by the BCB.

- **Including the BCB's repos**. These are BCB liabilities against the financial sector. The rationale for their inclusion is that repos can be seen as an alternative to FS for the public and, over time, they are absorbed by FS issuance. For example, if the NT increases its rollover ratio of FS held by the public above 100 percent, this will decrease sterilization needs through repos. As a result, the public will hold less FS indirectly as collateral.

- **General Government Gross Debt (GGGD-IMF):** The Fund utilizes the pre-2008 GGGD measure. As a result, BCB's repos are not counted as GGGD liabilities, and all FS held by the BCB are part of GGGD irrespective of whether they are used as collateral for repo operations or not.

Gross Debt Measures 2022

(Percent of GDP)



Sources: IMF Staff and BCB

- **Non-Financial Public Sector Debt (NFPS–IMF).** The IMF's debt sustainability analysis aims to include the most comprehensive gross measure available by incorporating the liabilities of nonfinancial public corporations (NFPCs). The size of these liabilities as of end 2022 is quite small – around 1 percent of GDP. It's worth noting that in 2009 and 2010 the two largest NFPCs at the time (Petrobras and Eletrobras) were removed from the reporting perimeter. The objective was to allow the companies more flexibility to conduct their large investment plans (FTE, 2017). Eletrobras was later privatized in 2022.

- **General Government Net Debt (GGND):** This measure deducts from GGGD-IMF the financial assets of the general government, such as the TSA held at the BCB and the worker assistance fund (FAT). GGND includes all FS held at the BCB like GGGD-IMF.

- **Public Sector Net Debt (PSND):** Historically, PSND was the main debt indicator used by the government. Compared to GGND, it includes BCB's assets and liabilities, such as repos, international reserves, the monetary base, and deposits of financial institutions, as well as the net debt of NFPCs. Another key difference between the PSND and the GGND is that the key balance sheet items between the BCB and the federal government (FS held at the BCB and the TSA) are consolidated since both institutions are part of the public sector.

Net Debt Measures as of End-2022

(Percent of GDP)

A=B+C	**General Government Net Debt**	**57**	D=A+E+F+G	**Public Sector Net Debt**	**57**
B	**General Government Gross Debt (IMF)**	**85**	E	**BCB Assets**	- 38
	out of which:			out of which:	
	Federal Securities Held at the BCB	22		Federal Securities Held at the BCB	-22
				International Reserves	-16
C	**General Government Assets**	- 28	F	**BCB Liabilities**	37
	out of which:			out of which:	
	Treasury Single Account at the BCB	- 18		Treasury Single Account at the BCB	18
	Worker Assistance Fund (FAT)	- 4		Repo Operations	9
	Investment in funds	- 3		Deposits	6
	Investments in the banking system (states)	- 2		Monetary Base	4
	Other	- 1			
			G	**NFPCs Net Debt**	1

Sources: BCB and IMF staff.

Debt Dynamics of FS held by the BCB and Repos

7. **The key difference between gross measures is the inclusion of either a) FS earmarked for repo operations or b) all FS.** These items generate materially different stock-flow adjustments, and their dynamics are a key component of debt projections.

8. **Fiscal, monetary, exchange rate policies drive changes in the stock of repos.** For example:

- **2006-12:** Since end-2005, the repo stock increased by 9 percent of GDP, pushing up the GGGD-authorities. The large international reserve accumulation prompted the BCB to sterilize inflows by almost 15 percent of GDP through repos. In 2010, the increase in reserve requirements led to a large reduction in the repo stock. Fiscal policy had a slightly contractionary impact on liquidity, as primary surpluses were offset by rollover ratios below 100 percent.

- **2018-22:** Since end-2017, the repo stock declined by 7 percent GDP, pushing down the GGGD-authorities. During this same period, the cumulative impact of liquidity enhancing primary deficits was offset by other fiscal factors, such as rollover ratios above 100 percent and repayments of BNDES loans. Besides interest rate and nominal GDP effects, the bulk of the reduction in the GGGD-authorities measure came from monetary factors, such as the sale of FX reserves during the early stages of the pandemic, the use of FX repos, and the introduction of voluntary deposits as a sterilization tool in 2021. Losses in FX swaps due to currency depreciation during the pandemic led to an increase in sterilization needs.

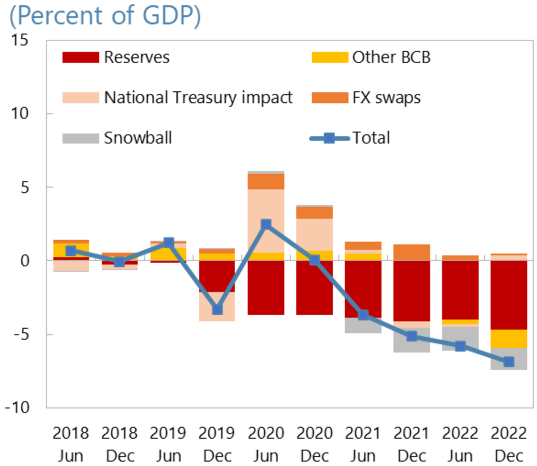
Repo Conditioning Factors and Examples

Conditioning Factors	Examples that Increase the Stock as Percent of GDP
Public debt operations	Net redemptions to the public, TSA declines
Federal primary result	Expenses exceed revenues, TSA declines
Other operations	Increase in financial expenses, TSA declines
International reserves	Purchase of spot reserves increases the monetary base
FX swaps cash results	Currency depreciation generates losses to the BCB
Compulsory deposits	Decrease in rates, increases credit in the economy
Voluntary deposits	Banks switch out from deposits to repos
Snowball effect	Repo interest rate>Nominal GDP growth

Source: IMF staff.

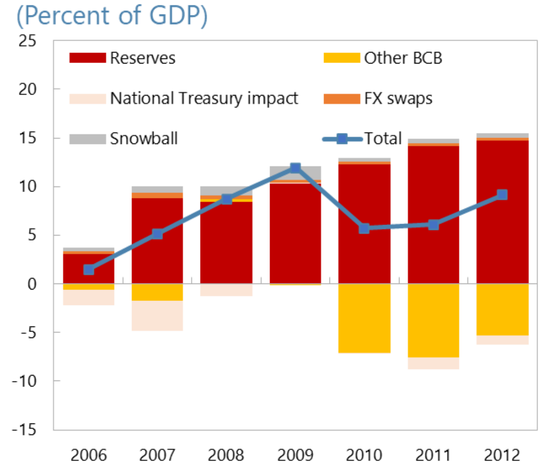
BCB's Repos

Conditioning Factors since 2018
(Percent of GDP)



Source: Fund staff calculations and BCB

Conditioning Factors 2006-12
(Percent of GDP)



Sources: Fund staff calculations and BCB.

9. FS drivers are highly dependent on the rules that govern the financial relationship of the NT with the BCB.

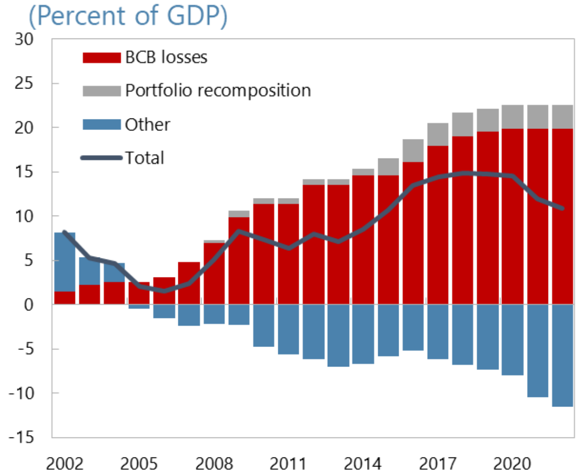
- **Negative financial results of the BCB:** The bulk of FS held by the BCB were created to cover past "exchange equalization" losses. Prior to the 2019 reform, all negative results of the BCB were covered with FS. Post 2019, "exchange equalization" profits flow into an accounting reserve of the BCB. This reserve can be used to cover future losses (see Box 1 for more details).

- **Depletion of non-earmarked FS:** Depending on sterilization needs, the BCB's portfolio of FS may be fully earmarked for repo operations. A 2009 ordinance determined that the NT should issue securities in favor of the BCB whenever its portfolio of non-earmarked bonds reaches a volume of less than R$20 billion. The 2019 law improved this rule by creating an automatic mechanism for the transfer of FS when the non-earmarked portfolio declined to 4 percent of the total portfolio.

- **Snowball dynamics**: The rollover properties of FS imply that their stock tends to rise proportionally to the price index used to calculate the inflation accrual.[4] Given that the price index tends to be lower than nominal GDP growth, the stock of FS tends to decline as a percent of GDP. For transparency purposes, it's worth noting that the actual financing cost for these FS is not readily available in debt statistics. Consequently, estimates of historical and projected debt servicing costs for GGGD-IMF can inflate the actual borrowing needs, while calculations using GGGD-authorities can underestimate it.

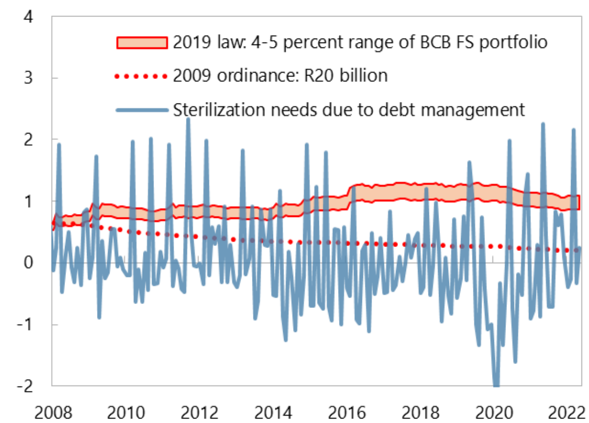
BCB's FS Portfolio

FS Portfolio Conditioning Factors
(Percent of GDP)



Sources: Fund staff calculations and BCB.

Sterilization and BCB's FS Buffer
(Percent of GDP)



Sources: Fund staff calculations and National Treasury.

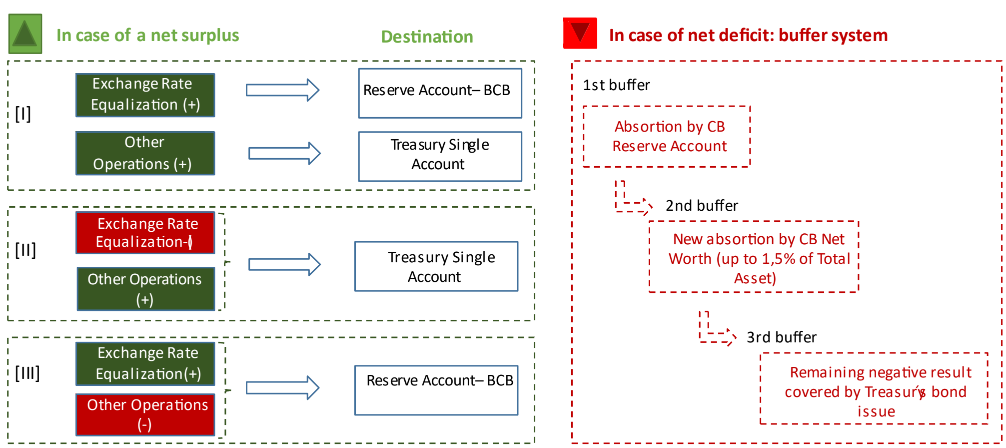
[4] This price index historically was the IGP-M and the IPCA after 2020. The index used is defined in the Budgetary Guidelines Law every year.

Box 1. The 2019 Reform of the BCB/NT Financial Relationship

The institutional setup governing the financial relationship between fiscal and monetary authorities has gone through several iterations over the years. (See Mendes (2016) for a discussion of previous arrangements).

The 2019 reform (Law 13.820/2019) redesigned the BCB/NT financial relationship and brought it closer to international practices, especially regarding the treatment of unrealized gains and losses. Key changes included:

- "Exchange equalization" profits, which include unrealized valuation gains from international reserves and realized gains from FX swaps, are no longer transferred to the TSA. Instead, they are transferred into an accounting reserve of the BCB. This reserve can be used to cover future central bank losses. In case the reserve is insufficient, the remainder will be covered by the BCB's net worth, until this reaches 1.5 percent of its assets. If this mechanism still leaves a loss to be covered, the NT will issue FS to the BCB.
- An automatic mechanism was created for the transfer of FS to the BCB. When the unused FS decline to 4 percent of the total portfolio, the Treasury will automatically issue new securities, so that the unused portfolio reaches 5 percent of the total portfolio. The law also created another mechanism through which the BCB can attain FS. The NT must place bonds whenever BCB's net worth is lower than 0.25 percent of its assets.
- The law also allowed the cancellation the bonds that originated through direct issuances without financial counterpart. In addition, the BCB's equity may not be lower than 1.5 percent of its total assets due to the bond's cancellation.



Source: National Treasury.

Pros and Cons of Different Measures

10. **Standard debt management practices such as the use of the TSA are neutralized in the GGGD-authorities measures.** From the perspective of a public debt manager with significant cash buffers as in Brazil, this is a desirable feature. For example, if the debt manager due to market conditions chooses to reduce the TSA to repay market debt, liquidity in the system will increase, necessitating an increase of repos by the BCB. In general, every time the TSA is used, the GGGD-

authorities measure will remain unchanged. In contrast, GGGD-IMF will change through a stock-flow adjustment to reflect the repayment or the accumulation of debt. Relatedly this also means that the GGGD-IMF measure is not immediately affected by the primary balance in the same way as GGGD-authorities. For example, the impact of a primary surplus is an immediate reduction of GGGD-authorities due to the change in the repo stock. In contrast, the GGGD-IMF will reflect the primary surplus only if and when it is used to redeem debt in the market.

11. The GGGD-authorities measure can be influenced by non-fiscal factors. Given the authorities objectives to strengthen the fiscal position and preserve debt sustainability, using a debt metric that is influenced by non-fiscal factors can create some communication and accountability challenges. [5] Additionally, some BCB operations can have transitory effects that can influence the reported debt ratio on key dates for budgetary purposes. For example, in December 2022, FX repos increased by 0.5 percent of GDP, due to year-end FX liquidity support by the BCB to banks, leading to an equivalent decrease in the year end debt ratio. By early 2023, FX market conditions normalized, and these operations were reversed.

12. Following the 2019 reform, the GGGD-IMF measure is less affected by non-fiscal factors. A common driver behind the increase in BCB's FS portfolio was the need to recapitalize the BCB due exchange equalization losses. Post the 2019 reform, these recapitalizations are less frequent given that BCB can utilize its reserves before relying on FS to rebuild its net worth. That said, the stock of FS can also change for other monetary related reasons (e.g., BCB needs additional FS to sterilize reserve accumulation).

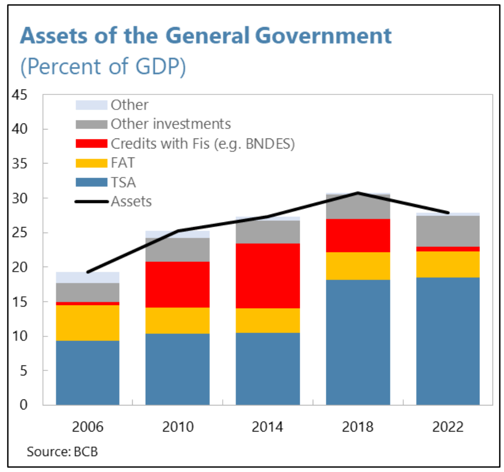
13. Given Brazil's significant buffers, net debt measures provide a relevant and useful view to assess debt risks and vulnerabilities. If financial assets can be liquidated in a timely manner to cover liabilities, then a net measure would be more relevant from the perspective of fiscal sustainability. Additionally, netting out items such as changes in cash deposits can better match changes in the debt ratio with the primary balance. At the same time, net measures in general also have some cons, for example:

- **Some assets are not available for debt repayments.** In Brazil's case, some federal assets such as the FAT are used to fund BNDES and hence are not freely usable for debt payments. Additionally, out of the 18 percent of TSA assets as of end 2022, around one third is linked to bodies and programs or are earmarked by law (e.g., for education). The remaining two thirds, which still comprise a substantial buffer, including in international perspective, are available for debt payments and are labelled as "liquidity reserve" in statistical releases.[6]

[5] For example, it might lead to market perceptions that the BCB would be willing to use less efficient sterilization tools that don't influence GGGD-authorities and/or that FX reserve accumulation would not be supported by the government given its impact on GGGD-authorities even if warranted for non-fiscal reasons. In this regard, the 2021 BCB autonomy law was a crucial step that mitigates such concerns.

[6] The "liquidity reserve" includes the public debt subaccount as well as revenues in the national treasury subaccount that are earmarked for debt payment such as past BCB profits. Some of these resources can also be assigned to cover budget expenditures.

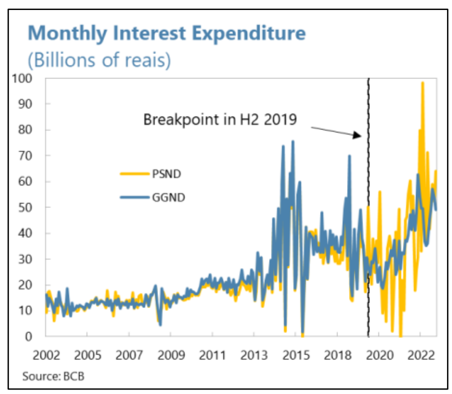
- **Net measures can conceal the build-up of fiscal risks**. In Brazil's case, the past accumulation of riskier assets at below market rates due to the recapitalization of public banks did not affect net debt measures, despite higher risks to fiscal sustainability. Nowadays, the bulk of this debt has been repaid to the NT ahead of time, and the remaining government assets are renumerated at similar rates with government liabilities (e.g., the TSA and FAT). Therefore, the interest rate on GGND as well as the debt stabilizing primary balance are easier to estimate and closer to gross debt measures.



- **Sensitivity to exchange rate valuations:**

  - **PSND:** Prior to 2019, exchange equalization profits were automatically transferred to the TSA. For example, an increase in the valuation of international reserves would lead to a) a decrease in federal debt held by the public and b) an increase in repos for sterilization.[7] These two items would cancel each other but the PSND would decrease given the favorable revaluation of BCB assets. Post 2019, the profits are transferred to a reserve account that doesn't influence debt metrics, but PSND still decreases due to the revaluation of BCB assets.

  - **GGND:** The different treatment of the exchange equalization in the 2019 reform has created a structural break on the impact of exchange equalization on GGND compared to PSND. Prior to 2019, exchange equalization profits were automatically transferred to the TSA and partially recorded as nominal interest.[8] Under the new framework, the profits remain in the BCB's reserve account hence they don't affect GGND.



14. **The table below summarizes the main considerations discussed above.** All debt measures have pros and cons, depending on the focus of policy analysis. The GGGD-authorities measure has been used for nearly 15 years and is now a well-understood concept by market participants and rating agencies. However, it can be influenced by monetary and exchange rate policies that do not have a direct impact on fiscal solvency. The 2019 reform helpfully reduced the influence of factors exogenous to fiscal policy on the GGGD-IMF and GGND measures. At the same

---

[7] If the profits instead were used to increase the TSA rather than repay debt, then the PSND would decrease by the amount of FX revaluation.

[8] Not all exchange equalization was recorded as interest. For example, the effect of the currency exchange variation on international reserves is treated as a methodological adjustment.

time, GGGD-IMF only reflects the primary balance only if and when a surplus is used to redeem debt in the market or when government bonds are issued to finance a deficit, a common feature among gross debt measures. The GGGD-authorities measure has the distinctive feature and merit of immediately reflecting the primary balance due to the impact of repos. Finally, the reduction of assets with lower returns and liquidity have made the GGND measure a useful complementary measure to GGGD that allows international comparability and underscores Brazil's significant liquidity buffers.

Features of Debt Measures

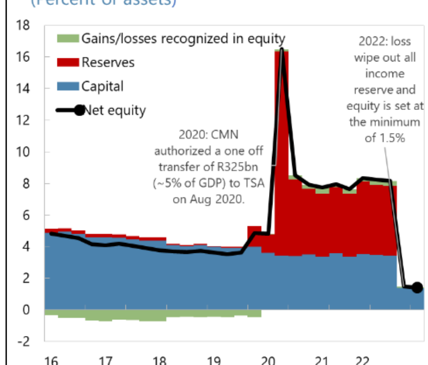
	GGGD-authorities	GGGD-IMF	GGND	PSND
Less influence from BCB operations*		✓	✓	
Less influence from FX reserve valuations	✓	✓	✓	
Less influence from use of TSA	✓		✓	✓
Changes due to accumulation of financial assets**	✓	✓		
Better allows for international comparability		✓	✓	
Referenced in budget documents	✓			✓

*Such as FX swaps, sale of FX reserves, use of voluntary deposits, changes in reserve requirements.
** Accumulation of assets can be monitored in timely manner through BCB's monthly debt statistics
Note: See main text for the capacity of GGGD-IMF to reflect the primary balance. Also see Salviano and others (2022) for an analysis on this issue.
Source: IMF staff.

C. NT Financial Relationship with the BCB

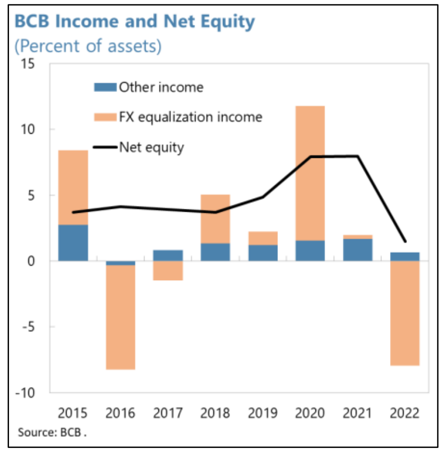
15. The 2019 reform led to a significant increase in BCB's net worth in 2020-21, although part was depleted by a one-off transfer. Large exchange equalization gains in H1 2020 helped build a large reserve buffer. The government reduced this buffer by almost 70 percent through an exceptional transfer of R$325 billion from BCB's reserve in August 2020. This transfer was in line with the 2019 law that states that the reserve buffer may be used to upon a decision of the National Monetary Council (CMN) to repay federal debt during stress market conditions. Despite this one-off transfer, the equity-to-assets ratio remained stable around 8 percent in 2020-21, compared to 4 percent in 2014-19.

BCB Net Equity
(Percent of assets)

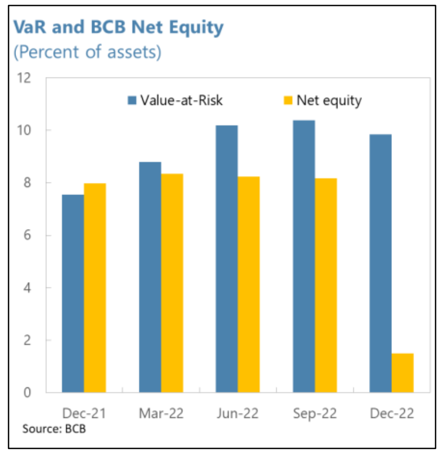


Sources: BCB and IMF staff.

16. In 2022, the BCB experienced large valuation losses triggering the need of recapitalization with FS. The losses were primarily driven by valuation declines in FX reserves, with exchange equalization income at -R327bn while other operations contributed R28 bn. In line with the 2019 reform, the negative net income of 2022 was covered by the reserve of R179bn, a reduction of equity worth R83bn, as well as a credit from the NT of R37bn to maintain BCB's net worth at the minimum legal limit of 1.5 percent of assets. The credit from the NT will be settled through the transfer of FS.



17. BCB's balance sheet risks increased in 2022, while its net worth declined to the legal minimum of 1.5 percent. The main balance sheet risks relate to exchange rate reserves and currency swaps. A simple sensitivity analysis shows that a currency appreciation of 4 percent or an increase in foreign interest rates of 100 basis points would be enough to generate losses close to the minimum level set by law (1.5 percent of assets). A more complex risk measure that considers the interdependence between exchange rates and interest rates also shows that annualized VaR increased from R324 billion in 2021 to R404 billion in 2022.[9] This was largely driven by the increased volatility in foreign exchange and interest rates in 2022, as well as the higher daily renumeration in BCB accounts due to past rate hikes.



International Context

18. Central banks use different profit distribution rules that allow for varying degrees of flexibility. There is no single best practice, given that central banks rely on different legal frameworks and are exposed to different risks. In principle, rules should provide some flexibility regarding the determination of profit transfers and risk buffers to ensure that central banks are able to deal with changing circumstances (Bunea and others 2016). In that regard, rules should incorporate some dynamic elements that allow the central bank to maintain reserve buffers at sufficient levels under different scenarios. Two common approaches with varying degrees of flexibility are:

- **Fixed or contingent distributions:** Under this approach, central banks can retain part of their profits to build reserves to absorb future losses. The buildup of reserves is done by either retaining a fixed percentage of annual profits or a variable percentage depending on various

[9] This is a value at risk estimate from the BCB in terms of annualized losses with a confidence level of 95 percent. Losses above this level are estimated to occur with a probability of 5 percent.

target ratios (e.g., equity to assets). The target ratios can also be revised by the central bank based on potential losses.

- **Discretionary risk buffers:** Under this approach, central banks explicitly allow the creation of discretionary reserve buffers.[10] For example, the Bundesbank since 2020 has increased its general risk provisions due to the pandemic and has not distributed any profits. The level of provisions was determined using model-based approaches (VaR, expected shortfall) and considered exchange rate, interest, and credit risks.

Central Bank Income Recognition and Distribution Rules

Approach	Decription
Full transfers	Any income in excess of expenses is automatically transferred. Building buffers may be explicitly prohibited.
Fixed or contingent	Contingent distributions can a) allow future surpluses to be retained, to cover losses and/or rebuild equity or b) allow retentions to build buffers towards a target level.
Discretionary risk buffers	General or specific risk buffers (built in some cases before P&L is calculated). Can be at central bank discretion or subject to joint decision with government.
Distribution smoothing	Decouples volatility from distributions, making transfers to fiscal authority more predictable.

Source: IMF staff. Based on Bell and others (2023).

19. Some flexibility regarding the determination of buffers could enhance BCB's financial strength and reduce its reliance on FS.[11] The 2019 law doesn't offer flexibility on the constitution of risk buffers. Reserves can only be reduced upon a CMN decision to repay public debt when the NT faces significant refinancing risks. This means that in some scenarios, the BCB can hold too many reserves leading to lower government revenues and potentially tighter fiscal policy, or too little reserves making BCB more reliant on recapitalizations with FS. Future reforms could consider providing the BCB with some discretion to determine its needs for reserves. For example, the BCB could consider its current and future total income, its existing risk buffers, and estimates of balance sheet exposures before determining its profit distribution.

20. Future reforms could also consider past losses when distributing profits. The 2019 reform made recapitalizations less likely, but it did not address the high stock of existing FS due to past losses. A good practice highlighted by Bunea and others (2016) is that profits are distributed only in the absence of accumulated past losses. Although many countries use government securities for recapitalization purposes, these securities in many cases are redeemed from the profits of following years. In contrast, in Brazil, the 2019 reform removed a provision that prioritized the

[10] According to Archer and Moser-Boehm (2013), central banks that can do discretionary provisions include Germany, India, Malaysia, Singapore, Slovakia, South Africa, and Turkey.

[11] Stella (2008) defines financial strength as "the extent to which an entity is constrained by its financial situation in pursuing its strategic goals or policies." A common proxy of financial strength is "equity to assets ratio," where equity includes paid-in capital, reserves, other retained earnings, revaluation reserves and undistributed profit.

repayment of BCB held federal securities from central bank profits.[12] This provision is quite relevant for Brazil given the high reliance on FS as capital for the BCB, as well as the influence of these securities in debt measures.[13] A future reform could consider further simplifying the relationship between the NT and the BCB by prioritizing the repayment of these securities from BCB profits before any allocation to reserves or profit distribution. Under all scenarios, the BCB should maintain timely and adequate access to efficient sterilization tools to ensure its operational autonomy.

21. Any changes to the financial relationship should not undermine existing efficient liquidity and debt management practices. Despite differing from international practices, the current institutional arrangement has some advantages from an efficiency perspective and has worked well for several decades. For example: a) the rules that govern the BCB's accumulation for FS is designed in a way that limits any negative financing implications for NT; while ensuring that FS are priced at competitive rates; and b) debt issuance patterns are aligned with interest rate futures to enhance liquidity in Brazil's deep derivative market. In this respect regard, Brazil has highly concentrated redemptions a few times a year, which can necessitate significant sterilization operations by the BCB.

D. Conclusion

22. The current institutional setup has served Brazil well over the years. Despite differing from international practices, the current setup has its own advantages and has allowed Brazil to conduct sterilization, public financing, and exchange rate operations in an efficient manner even under challenging market conditions.

23. This Paper offered some considerations that could help further enhance transparency and comparability, building on past success and the comprehensive data already published by the authorities. To a large extent, statistical differences with international practices arise from considering the BCB as part of the non-financial public sector (see FTE, 2017). In the absence of a different statistical treatment of the BCB, consideration can be given to further enhance fiscal transparency by eventually publishing:

- The actual debt servicing needs of FS held by the BCB. Besides the financing of the real interest rate component, FS securities are rolled over by the BCB and do not create a financing need for NT. Thus, actual historical and future financing needs are lower than those estimated by calculating the amortizations of FS.

- Projections of GGND in the main fiscal planning instruments (Multiyear Plan, Budget Guidelines Law, Annual Budget Law) to complement the GGGD-authorities and PSND measures.

[12] The 2019 law only requires that income transfers are exclusively used to repay FS. This provides little incentive to NT to reduce the stock of BCB held securities given they pose negligible refinancing risk.

[13] Archer and Moser-Boehm (2013) notes that for government securities to provide financial strength they need to bear market interest rates and be saleable to the market.

- Information on the impact of BCB operations on the repo stock and GGGD (authorities) in the same monthly frequency as other debt reports. Currently the BCB provides a decomposition of conditioning factors on a semiannual basis with a 5-month lag. Relatedly, BCB operations included in the interest bill could be decomposed as memo items in the monthly debt statistics to facilitate the understanding of the impact of different non-fiscal factors.

24. Incremental improvements in the BCB's financial autonomy can help reduce the influence of non-fiscal factors on debt measures and better align the institutional setup with other successful central banks. The 2019 reform of the BCB/NT relationship was a welcome step, as it brought profit distribution rules closer to international practices, while enhancing monetary policy execution and debt management. Future reforms could consider the fact that the BCB is generally better placed to assess its risk exposures and evaluate the merits of allowing the BCB to determine the size and type of buffers needed to fulfill its mandate. Reforms could consider in the future:

- Increasing the BCB's flexibility in setting risk buffers. This could further reduce the frequency of recapitalizations that affects debt measures, as well as provide the government with more revenues in years were balance sheet exposures decline.

- Facilitating a reduction of FS held by the BCB, which would also positively influence some debt measures (GGGD-IMF and GGND). BCB profits could be used primarily to pay down FS debt accumulated for previous losses while ensuring that the BCB has adequate and efficient tools to conduct monetary policy.

References

Archer, David and Paul Moser-Boehm, 2013, "Central Bank Finances," BIS Papers, No. 71 (April).

Banco Central do Brasil, 2019, "Patrimônio Financeiro Líquido do Governo Geral," Nota Técnica do BCB 50, Brasilia.

Bell, Sarah, Michael Chui, Tamara Gomes, Paul Moser-Boehm, and Albert Pierres Tejada, 2023, "Why are Central Banks Reporting Losses? Does it matter?," BIS Bulletins 68.

Bunea, Daniela, Polychronis Karakitsos, Niall Merriman, and Werner Studener, 2016, "Profit Distribution and Loss Coverage Rules for Central Banks," ECB Occasional Paper Series, No. 169, (April).

International Monetary Fund, 2017, "Brazil: Fiscal Transparency Evaluation," IMF Country Report No. 17/104 (Washington: International Monetary Fund).

International Monetary Fund, 2019, "Liquidity Management and Public Debt: Institutions, Unforeseen Consequences, and Recent Reforms," IMF Country Report No. 19/243 (Washington: International Monetary Fund).

International Monetary Fund, 2022, "Staff Guidance Note on the Sovereign Risk and Debt Sustainability Framework for Market Access Countries," IMF Policy Paper No. 2022/039 (Washington: International Monetary Fund).

Mendes, Marcos, 2016, "A Lei 11.803/2008 e a Relação Financeira Tesouro - Banco Central," Texto para Discussão nº 32, Publicado em IEPE/CdG (Rio de Janeiro).

Salviano, Cecilia de Souza, Daniel Carvalho Cunha, Flavia Fernandes Rodrigues Barbosa, Luiz Fernado Alves, Mario Augusto Gouvea de Almeida, Rafael Perez Marcos, Seiji Kumon Fetter, and Thais Riether Vizioli, 2022, "Reforming the Brazilian Fiscal framework: Strengthening the Expenditure Limit and Fiscal Planning," Texto para Discussão, n. 35.

Stella, Peter, 2008, "Central Bank Financial Strength, Policy Constraints and Inflation?," IMF Working Paper 09/49 (Washington: International Monetary Fund).

PIX: BRAZIL'S SUCCESSFUL INSTANT PAYMENT SYSTEM[1]

This paper discusses the key design features of Brazil's instant payment system (Pix) that have contributed to its success and compares some of its features with those of instant payment systems in other countries. The paper also outlines some remaining challenges in the implementation of Pix.

A. Background and Design Features Contributing to the Success

Recent Developments

1. In November 2020, the Central Bank of Brazil (BCB) launched an electronic payment scheme called Pix. The authorities' objective was to reduce reliance on cash for transactions, increase financial inclusion, strengthen competition in a relatively concentrated banking system, and modernize the payment system for faster and more secure transactions. The ability of the new system to track payments and economic activity by geographical region, user characteristics, and transaction types, has turned out to be a highly useful benefit, though one which was not explicitly stated as an objective.

2. Pix has greatly exceeded usage expectations and fostered financial inclusion (Figure 1). In the two and a half years since its launch, the Pix system has been used by more than 140 million individuals (about 80 percent of the adult population) and 13 million firms, according to BCB statistics as of May 2023.[2] There are now more than 3 billion transactions taking place each month, with an average ticket size of about US$88. Pix has also supported financial inclusion by facilitating transactions by 71.5 million individuals (as of December 2022) who had not made any electronic credit transfers over a one-year period prior to the launch of Pix and are Pix users now. Payment volumes for Pix are now almost five times greater than those for debit and credit cards combined. In comparison with electronic payment systems globally, including with advanced economies, Brazil has had the fastest adoption rate in terms of transactions per capita gained since implementation.[3]

3. Pix has also helped to strengthen competition in the financial sector. It has led to the growth of several payment services institutions, which have established banking subsidiaries, increasing competition for deposits with big banks. The open sharing of transaction information on Pix users has helped to strengthen competition in the sales of banking products and services, including for better and cheaper payment services, among various institutions.

---

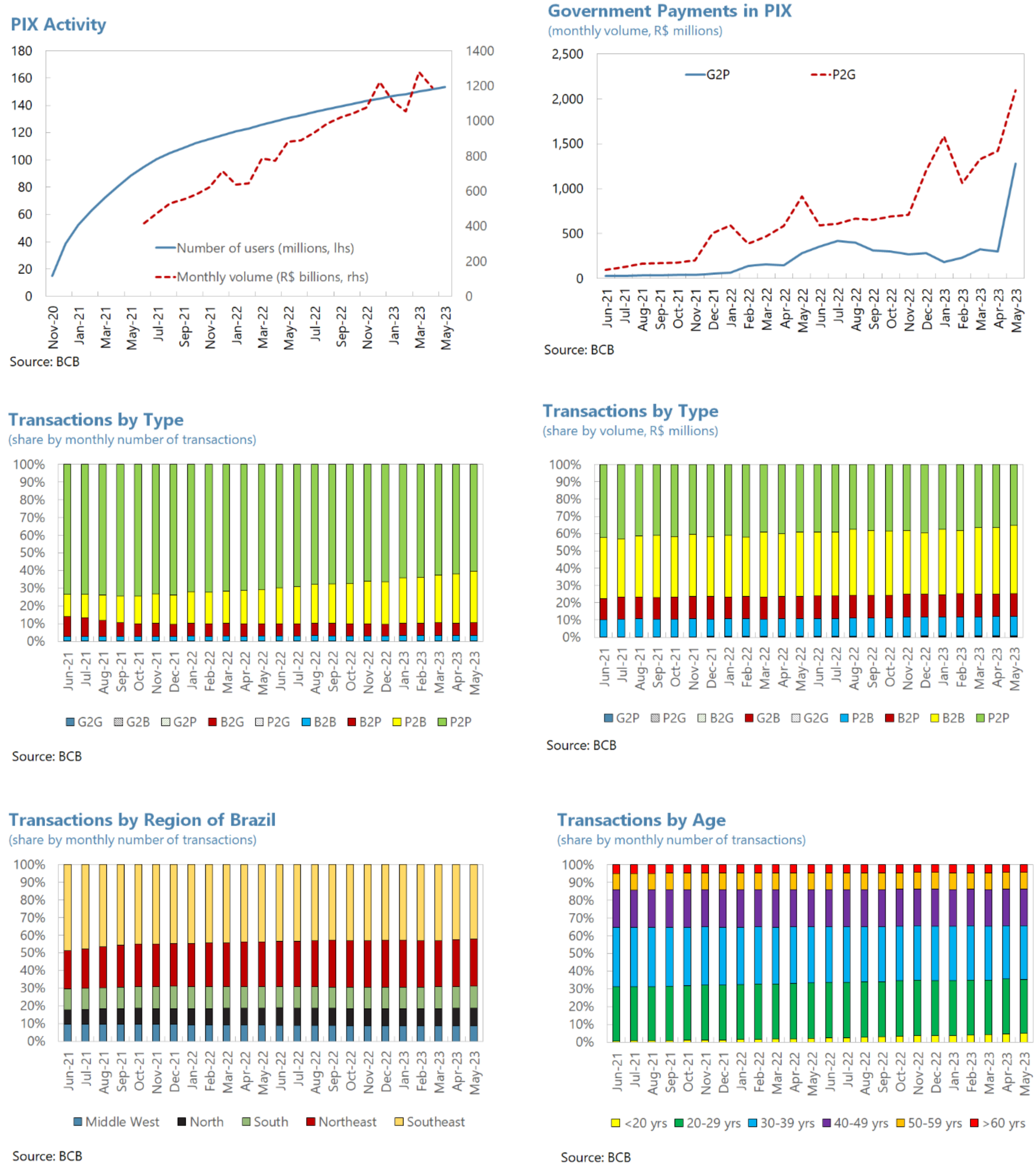
[1] Prepared by Mustafa Saiyid.

[2] See: Pix Statistics (bcb.gov.br). There may be some duplication of individuals and firms due to different identifiers.

[3] Source: BCB Pix Seminar; Bech and Hanock et al (2,3).

Figure 1. Pix Activity Indicators

(May 2023 or Latest Available)

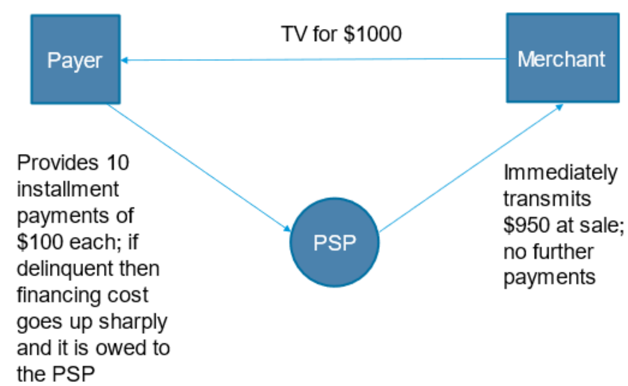


Note: P2P - Person to Person, B2B - Business to Business, P2B - Person to Business, B2P - Business to Person, P2G – Person to Government, B2G - Business to Government.

How Pix Works

5. The Pix technology allows the provision of payment services. These are delivered by certain designated financial and payment institutions called "participants" or "payment services providers (PSPs)" to a wide variety of "users," which include individuals, firms, and government entities. Pix has the following features:

Illustration of One Model of Installment Credit



- The BCB is the owner of the payment scheme. It manages and operates a real-time settlement infrastructure (SPI), as well as a user address database (DICT). The latter contains identifying information on the users, including aliases, such as phone numbers, email addresses or randomly generated IDs, used for access to the Pix system and to prevent fraud.

- Payment services may include instant or scheduled payments and transfers, cash withdrawals, and payment invoices.

- Users may also incur short-term borrowing via Pix. This occurs, for example, between retail users and merchants operating via a PSP. The merchant could offer a user (payer) to pay for goods (or services) in installments, to be made to the PSP, though the merchant would receive immediate payment at a discount to the product sale price from the PSP.[4]

The authorities are now able to track monthly payment and related economic activity on a granular basis by geographical location, types of transactions, and borrowers, including by age group.

6. Participants in the system are subject to BCB regulatory requirements. They include institutions regulated by the BCB as well as other institutions that technically fall outside the regulatory perimeter but become subject to certain regulatory requirements and supervision (as discussed below) if they are allowed to participate in Pix. While Pix activity is mostly carried out via domestic and foreign banks (about 57 percent of the annual volume of transactions), payment institutions and fintech entities are not far behind (39 percent), and the remainder is mostly comprised of credit unions (about 4 percent). Utility companies are not included as they are considered end users. Regulated participants with more than five hundred thousand accounts are required to participate in the system ("mandatory participants"); others may participate voluntarily. As of end-May 2023, there were 799 active participants, of which 34 were mandatory.

[4] There is no specific functionality for credit in Pix ("Pix Credit"), though some PSPs combine Pix with a credit line. There are models in which PSPs charge interest and fees from the payer only, and others where PSPs charge both the payer and the merchant (payee).

- Participants that fall outside the regulatory perimeter may still provide payment services but only indirectly by going through a regulated institution. They must still satisfy certain requirements established by the BCB, which include (i) a signed contract with an existing direct participant; (ii) the technical and operational capacity to operate within the Pix system; and (ii) equity of at least BRL 1 million.

- All participants are subject to proportional risk-based supervision by the BCB and basic regulation for liquidity risk management, cybersecurity, data usage, and AML/CFT procedures. The BCB also sets some standards for participants to provide users with simple and intuitive access to the Pix system, which includes registration, transactions, and user authentication.

7. The BCB monitors system liquidity carefully. The BCB now remunerates the balances of all direct participants' accounts in SPI, recognizing that by reducing the opportunity cost of funding there is an increase in liquidity provision for SPI Accounts. It provides liquidity lines to participants that have direct access to the SPI. It also allows a 30-minute window after the normal operating hours of the BCB's Reserve Transfer System (STR) (6.30pm-6.30pm Monday through Friday) for transfer of Reserve Requirements and Electronic Currency balances to SPI Accounts. Banking participants may carry out short-term reverse repos of government securities with the BCB in exchange for liquidity to be used outside of normal business hours.

Design Features Contributing to the Success of Pix

8. Several design features have contributed to the success of Pix. The following features are noteworthy:

- **Pix transactions take place almost instantaneously**. A Pix payment settles in 3 seconds on average versus 2 days for debit cards and 28 days for credit cards.

- **There is no limit on the size of a transaction set by the authorities; however, participants may impose limits on users based on their risk profile**. According to the authorities, this provides flexibility to the system, allowing it to handle different types of users, encompassing both households and corporates, which would have different operating sizes for normal transactions. The authorities also note that the real-time availability of both payment and credit information on users makes it possible for participants to set these limits.

- **Transaction costs are low**. The authorities have set a requirement on Pix to be free for individuals, and the cost of a payment transaction for firms/merchants is only 0.33 percent of the transaction amount, versus 1.13 percent for debit cards and 2.34 percent for credit cards.

- **Participation by big banks is mandatory.** The biggest banks in the system worked together to overcome interoperability challenges and developed an effective network from the start.

- **The BCB is the infrastructure provider and regulator**. This has prevented some big technology companies from quickly gaining market share and extracting fees from participants.

- **Rules for governance and technical standards were defined at an early stage**. Key rules were decided via public consultation, and Pix participants must follow a procedural "manual." There is also Pix forum, which allows for dialogue between public and private stakeholders, including the government, banks, press, business associations, and law firms.

- **There is an emphasis on network security**. The authorities have put in mechanisms to ensure appropriate user identification and compliance with KYC rules. Participants are required to flag suspicious transactions and to assign transactional limits according to the risk profile of a user. The Pix rulebook allows extra time for settlement of suspicious transactions. There is also a centralized fraud database (DICT), a precautionary block and a special refund mechanism, which draws on technology to trace through transactions, even though these have been set up as irrevocable.

- **The user interface and experience are standardized.** This has made it easy for users to switch between providers. Regardless of the PSP, individuals experience a standardized journey on the apps, and companies use a standardized API to link Pix with their systems. Pix has been developed as a brand with a logo.

Features in the Pipeline

9. Several new features are under development. These include:

- **Functionality for recurrent payments.** These would include, for example, regular payments on a mortgage, subscription services, or utility bills to take place automatically. This feature would enhance interoperability with other BCB projects (e.g., Open Finance and the Digital Real platform). An ultimate end goal would be to allow customers to access financial services from different financial institutions using either Pix or Digital Real wallets.

- **Pix international.** Cross-border transactions are not enabled yet, but Pix international would permit cross-border payments with currency conversion. In this context, the authorities are discussing the possible integration of Pix with the instant payment schemes of other jurisdictions, including the BIS Nexus system.

- **Security-related improvements.** These would be aimed at making the centralized antifraud database more robust and adding new features to the special refund mechanism.

B. Cross-Country Comparison

10. Cross-country differences in the design of instant payment systems reflect local factors, policy choices, and emphasis.

- In some countries, there is a separation of the payment system operator from the regulator and supervisor of that system. This happens to be the case in India and China, whereas in Brazil, these separate functions are all handled within the BCB (though by different departments).

- It is also noteworthy that there are centrally imposed limits on the size of transactions in India and China, while in Brazil, participants set this limit for users (Table 1). In India, the transaction size limit is around US$2000, while it is significantly higher in China. These differences may be due to the absence or availability of appropriate credit information on users, which could allow banks to make that determination. They could also reflect differences in the perception of risks, including those related to participant liquidity, which could arise from very large transactions, or perhaps even due to fraudulent transactions, which could be difficult to reverse.

- Transactions are revocable in both India and China, but they are typically irrevocable in Brazil. Some mechanisms in Brazil do allow refunds to take place in certain situations (e.g., in case of fraud or operational failure).

- There are some cross-country differences in the settlement process for transactions. In Brazil, transactions are settled in real-time, whereas in India and China, these are netted out on a deferred basis a few times a day. The latter approach reduces the volatility of liquidity fluctuations in the system.

- Another difference relates to the use of identifying information on users or aliases. Brazil allows a great variety of different aliases, including phone numbers, taxpayer IDs, email addresses, and randomly generated strings. India also allows multiple aliases, but China only allows mobile phone numbers. While multiple aliases increase flexibility for the creation of accounts, they could also increase risks of ML/TF and fraud.

- Unlike India and China, Brazil's instant payment system, stores user information centrally. This allows the BCB to track transactions by types of users and geography providing valuable insights on economic activity (Figure 1).

Table 1. Selected Country Comparison of Instant Payment Systems

	Instant Payment System	Owner	Operator	Regulator	Supervisor	Participants	Fees for Persons
Brazil	PIX	BCB	BCB	BCB	BCB	Banks, Non-Banks	None
India	IMPS	NPCI	NPCI	RBI	RBI	Banks, Non-Banks	
	UPI	NPCI	NPCI	RBI	RBI	Banks, Non-Banks	
China	IBPS	PBoC	CNCC	PBoC	PBoC	Banks only	None

	Instant Payment System	User Info	Alias	Transaction Limit	Settlement	Liquidity	Payment Finality
Brazil	PIX	Centralized	Multiple	None	Real-time	BCB lines	Irrevocable
India	IMPS	Decentralized	Multiple	~$2K	Deferred net; 4x / day	NPCI SGF	Revocable
	UPI	Decentralized	Multiple	~$2K	Deferred net; 4x / day	NPCI SGF	Revocable
China	IBPS	Decentralized	Mobile	~$150K	Deferred net; 6x / day	PBoC	Revocable

P=persons, B=businesses, G=governments

Notes: BCB: Banco Central do Brasil; CNCC: China National Clearing Center; IBPS: Internet Banking Payments System; IMPS: Immediate Payment System; NPCI: National Payment Corporation of India; PBoC: People's Bank of China; RBI: Reserve Bank of India; SGF: Settlement Guarantee Fund: UPI: Unified Payments Interface.
Sources: World Bank Project FASTT, and Fund staff.

C. Some Implementation Challenges and Related Measures

11. Even with a highly successful instant payment system, the Brazilian authorities face some implementation challenges, which are shared with other countries. Some of these challenges, along with measures taken by the authorities in response, include:

- **Appropriate supervision of real-time activity**. The challenge arises from the sheer volume of transactions taking place (two thousand per second and over 90 million per day). The authorities have put in place technologies to monitor compliance with regulations in real-time (RegTech) and to monitor participant activity (SupTech), and they also apply proportional risk-based supervision to all participants in the system.

- **Assurance of sufficient liquidity for participants**. There are some timing issues, as the BCB's STR liquidity transfer mechanism is closed at nights and on holidays and weekends, and participants must handle any liquidity shortages via the interbank market. The authorities note that the settlement SPI accounts of non-banks are now remunerated, as has been the case with banks. Correspondingly, all participants can now conservatively fund their settlement accounts without facing an opportunity cost, which helps to minimize liquidity risk on nights and weekends.[5]

- **Consistent capital regulations**. As noted earlier, the Pix payment system fostered significant growth in the assets of some payment institutions, which subsequently established banking subsidiaries. An issue that occurred at the outset was that the regulatory capital requirement of each financial conglomerate was set up on the assumption that a bank would be its apex institution. Initially, conglomerates with a payment institution at the apex would then face lower capital requirements, which contributed to their competitive advantage versus large banks. Recently, the authorities have addressed this issue by establishing commensurate capital regulations among these two types of conglomerate models.

- **Testing of crisis management arrangements**. While capital requirements are a first line of defense for direct and indirect participants, there may be scope to carry out an operational test of crisis arrangements, which could involve simulating the failure of one or more institutions. The authorities do not expect potential failures of one or more participants to trigger contagion in Pix, and correspondingly do not classify it as a systemically important payment system under Brazilian regulation. They consider that customers of failing participants could be affected, but they would have access to other means of payments, including credit cards, debit cards, and credit transfers, to fulfill their obligations.

- **Mitigation of AML/CFT risks**. The Pix system also elevates risks of fraudulent and ML/TF activity. Banking sector interlocutors indicate that the ease of account creation can lead to

[5] They also note that STR's liquidity provision, which exceeds US$6 billion per day, reflects the high availability of resources in SPI, especially after its normal working hours when Reserve Requirements and Electronic Currency balances can be freely transferred to SPI Accounts.

individuals creating dummy accounts with payment institutions, which can then be used for cash transfers. There are also cases reported of individuals with an account blocked for fraud at one institution being able to open an account at another institution. The authorities do not have a separate policy or procedures relating to AML/CFT for the instant payment system. However, they note that every Pix participant, including both banks and non-banks, must comply with Brazil's AML/CFT rules, under BCB's supervision. The authorities also note ongoing improvements to the centralized database of accounts and aliases to prevent the issue of dummy account creation and minimize related fraud. PSPs already obtain key information on user transactions, which include the date an account was opened, the historical volume of transactions carried by that account, as well as fraud and scam warnings related to the Pix alias and its owner. Going forward, they will receive additional information regarding the number of times a particular user alias has been flagged as a risk by other participants and the number of accounts associated with that alias.

D. Conclusion

12. The Pix system is highly successful. The authorities designed the PIX system after careful and deliberate study of instant payment systems in a number of countries. Several carefully selected design features, including speed, cost, flexibility to cover multiple use cases, ease of access for individuals, interface standardization, and mandatory participation by major banks, have all contributed to rapid adoption of the high-tech payment system in a country where there is wide dispersion in financial literacy.

13. The authorities' ongoing focus on remaining challenges will serve to cement Brazil's global leadership in instant payment systems.

- While Pix does not have a credit functionality, the widespread adoption of Pix has supported the rapid growth of payment institutions, which have then fostered the growth of risky credit to households in other lines of business. Given the powerful functionalities that are already available to users in Pix and others that are being developed, the authorities' ongoing financial literacy initiatives will be important to ensure that these features are used safely by households.

- The authorities are also appropriately strengthening the monitoring of account creation at PSPs and could consider whether reducing the number of possible aliases for accounts could also help to reduce the risk of fraud.

- There may be a case for carrying out simulations and drills of procedures to support confidence in case of one or more potential participant failures, even though these may not be systemic in nature.

References

Bakker, Bas B., and others, 2023, "The Rise and Impact of Fintech in Latin America," Fintech Notes No 2023/003 (Washington: International Monetary Fund).

Banco Central do Brasil, 2020, Pix Liquidity—Discretionary Term Liquidity Line, BCB Resolution 4, 781, (February). Available via the Internet: Resolution 4, 781.

Banco Central do Brasil, 2020, Pix Payment Scheme and Regulation, BCB Resolution 1 (August). Available via the Internet: Resolution 1.

Banco Central do Brasil, 2020, Pix Fees, BCB Resolution 19 (October). Available via the Internet: Resolution 19.

Banco Central do Brasil, 2020, Pix Liquidity—Rediscount Line to Financial Institutions, BCB Resolution 20 (October). Available via the Internet: Resolution 20.

Banco Central do Brasil, 2022, BCB Pix Seminar (November), Conference Slides.

Bech, Morton, and Jenny Hancock, 2020, "Innovations in Payments," BIS Quarterly Review (March), pp. 21-36.

Dobler, Marc, and others, 2021, "E-Money: Prudential Supervision, Oversight and User Protection," DP/2021/027 (Washington: International Monetary Fund).

Duarte, Angelo, and others, 2022, "Central Banks, The Monetary System and Public Payment Infrastructures: Lessons from Brazil's PIX," BIS (March).

Falavina, Domingos, and others, 2022, "PIX Credit - Comparing Different Models and Assessing Risks," JP Morgan, Brazilian Financials (March).

Garrido, Jose, and Jan Nolte, 2021, "Making Electronic Money Safer in the Digital Age," IMF Blog.

Hussain, Monsur, and others, 2022, "Open Banking and Fintech Have Mixed Effects for LatAm Banking Systems," Fitch (November).

World Bank, 2023, Project FASTT, Global Tracker (Washington). Available via the Internet: https://fastpayments.worldbank.org/resources.

POLICY OPTIONS TO ADDRESS CLIMATE VULNERABILITIES AND GREEN THE ECONOMY[1]

The authorities' climate strategies encompass a broad spectrum of policies to steer the ecological transformation. This Selected Issues Paper describes the Ministry of Finance's strategy and the Central Bank of Brazil's (BCB) Sustainability Agenda and discusses policy options informed by cross-country experiences. In particular, the Paper covers policies aiming to: (i) boost the Amazon's resilience; (ii) invest in climate-smart agriculture and insurance; (iii) diversify power generation sources; and (iii) leverage green growth opportunities.

A. Introduction

1. **Changing climate conditions are already affecting Brazil's economy.** Rising temperatures in Brazil (between +1°C and +5°C by the end of the century) and temperature variability have increased both present occurrences and the future likelihood of extreme weather events. The most common extreme events in Brazil are floods, which have more than doubled relative to the 1980s-90s and often result in physical and human capital losses, particularly if linked to landslides. They mostly occur in the form of flash floods or riverine floods and can cause temporary productivity losses and disruptions in infrastructure,[2] significant fiscal costs, and sometimes durable output scarring. Second most frequent, yet costliest climate hazards are droughts, which impact agricultural output and electricity prices (BCB, 2023a), and extreme heat waves, which mainly occur in urban areas. The World Bank estimates that extreme weather events have generated yearly output losses of 0.13 percent of GDP on average over the past 20 years (World Bank CCDR, 2023). In addition, current patterns of land-use amplify climate change risks by profoundly affecting water cycles.

2. **Agriculture and power generation are key sectors at risk, with potential repercussions for the financial sector**. Increasing frequency and length of dry seasons raises drought risks for agricultural production in both the Northern and Southern regions of Brazil.[3] The impact, however, is more severe in the Northeast as the region's small-scale agriculture is rainfed, with limited irrigation systems in place, and significantly lower insurance coverage.[4] Droughts have further diminished the Amazon and Cerrado biomes' resilience against shocks, and, aided by deforestation, increased the likelihood of reaching a tipping point that would durably disrupt water cycles. Some estimates quantify the output loss of reaching the Amazon tipping point for Brazil alone at 10 percent of 2022 GDP through 2050 (World Bank CCDR, 2023). Hydropower generation is being affected by lower

[1] Prepared by Christina Kolerus (WHD), and Chen Chen, Nabil Hamliri, Koralai Kirabaeva, Ian Perry, and Nate Vernon (all FAD).

[2] More than 5 percent of Brazil's road and railway infrastructure is exposed to flood risks (World Bank CCDR, 2023).

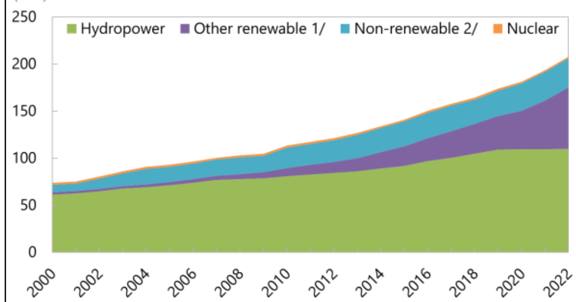
[3] Agriculture is estimated to lose 1 percent of its sectoral GDP per year due to extreme weather events (World Bank CCDR, 2023).

[4] Only about 20 percent of farming activity is covered by insurance, mainly concentrated in Southern regions (Superintendência de Seguros Privados (SUSEP), Brazil's supervisory body for private insurers).

water availability and changing rainfall patterns, lowering the system's overall capacity to store energy. About 20 percent of the financial sector's credit portfolio is exposed to sectors vulnerable to climate change, with the share of agriculture (businesses and rural households) increasing to around 12 percent of total bank loans over the past decade (BCB, 2022).

3. **Brazil is in a unique position to green its economy and boost potential growth**. Building on Brazil's very green energy mix and world-wide leading biodiversity, Brazil can boost economic potential without facing a tradeoff between energy use, emissions, and growth. Opportunities for the private sector include energy export or export-oriented manufacturing to seize growing demand for green goods and services. Plans to complement the voluntary carbon market with a mandatory trading system would further help green Brazil's economy from a regulatory perspective.

Installed Electricity Capacity by Technology
(GW)



Source: International Renewable Energy Agency.
1/ Includes solar, wind, marine energy, biofuels, renewable waste and biogas.
2/ Includes coal, peat, oil, natural gas and other non-renewable energy.

4. **This Selected Issues Paper summarizes the authorities' climate strategies and discusses macro policy options building on cross-country experience.** In particular, the Paper covers policies to (i) boost the Amazon's resilience; (ii) invest in climate-smart agriculture and insurance; (iii) diversify energy sources; and (iv) leverage opportunities for green growth.

B. The Authorities' Climate Strategies

5. **The Ministry of Finance's sustainability strategy aims to steer the ecological transformation by enhancing technology and productivity in a green and equitable way, while decarbonizing the economy.** The strategy comprises six pillars and is being implemented in close cooperation with other ministries:

- Promoting **green finance** by establishing a mandatory Emissions Trading System (ETS) by end-2023, a green taxonomy, regular issuances of green bonds, and green financial regulation;
- Enhancing **productivity** through green R&D and its transformation into businesses, including by leveraging funds from the oil sector for the transition and incentivizing credit allocation;
- Shaping a "**bio economy**" via integrating agricultural production with forest protection including through ecotourism, biotechnologies, and payment for environmental services;
- Accelerating the **energy transition** by becoming an exporter of energy with green hydrogen, building on Brazil's success in using ethanol in the transport sector, including from biomass, and investing in energy storage;
- Leveraging the **circular economy** by using waste and sewage systems to produce electricity; and

- Building **resilient infrastructure** to deal with climate shocks and restore **climate justice** for poorer households.

6. The BCB Sustainability Agenda is well-advanced, covering regulation, supervision, policy design as well as internal measures and research. The agenda aims to incentivize the financial system through appropriate targets and metrics to offer more favorable conditions to participants with sustainable characteristics, while maintaining the focus on financial stability and resilience. Recent studies show that regulatory changes are bearing fruit, with larger lenders starting to reallocate their portfolio to less environmentally exposed sectors (Faruk, Pedraza, and Ruiz-Ortega, 2023). The Agenda comprises:

- **Regulation**. Following the Network for Greening the Financial System's recommendations, the BCB has been working on incorporating sustainability aspects into prudential regulation. In a first step, inspired by recommendations of the Task Force on Climate-related Financial Disclosures, financial institutions were asked to disclose qualitative aspects related to governance, strategy, and risk management. In a second step, from end-2023 onwards, disclosure will be expanded to quantitative aspects, including metrics and targets, mapping exposures to climate-related transition risk and voluntary decarbonization targets by financial institutions. Further steps will be implemented after the publication of the new Basel Committee on Banking Supervision Pillar 3 standards. Also in the prudential regulations, the BCB issued a set of enhancements in the risk assessment regulation, inserting social, environmental, and climate-related financial risk into a financial institution's integrated management framework, embracing, for the latest, both physical and transitional drivers. All the requirements already in place to traditional financial risks, like stress testing, risk appetite statement, board involvement and so on, should also be applied to social, environmental, and climate-related risks. In addition, BCB issued rules related to the Social, Environmental and Climate Responsibility Policy (PRSAC, in Portuguese) that must be established by institutions, as well as actions to ensure the effectiveness of the PRSAC. Among other requirements, PRSAC must cover climate-related aspects, defined as "the positive contribution of the institution to the adjustment towards a low-carbon economy, in which the emission of greenhouse gases is reduced or compensated, and natural carbon sinks are preserved." Actions must be continuously monitored and evaluated in terms of their contribution to the PRSAC's effectiveness. The institution must establish clear, objective, and verifiable criteria for such evaluation.

- **Sustainable Rural Credit Bureau**. The BCB established a green credit bureau (Sicor) for agribusiness to register rural credit operations (about 2 million per year and R$300 billion). The Bureau enables beneficiaries of rural credit to make their registered information available to any interested party without the need of intermediation by financial agents. It also allows to effectively monitor projects and thus help enforce social and environmental regulations, including by preventing farming credit operations in protected lands. Considerations could also be given to further incorporating sustainability criteria in credit provision.

- **Supervision**. Information collection on climate risks is being enhanced with the objective of a broad mapping of social, environmental, and climate aspects associated with credit and securities operations recorded on the balance sheet of financial institutions. The exposure to physical risks was assessed through sensitivity analyses of the credit portfolio with respect to extreme drought (BCB, 2022) and heavy rainfalls (BCB, 2023b).

- **Central Bank Operations**. The BCB further pursues ongoing initiatives on greening their own balance sheet by including sustainability criteria in the selection of counterparties. The BCB is also considering a liquidity facility that would offer preferential conditions to bonds based on Environmental, Social, and Governance (ESG) criteria. The Real Digital initiative could also offer opportunities to further develop financial instruments that support the Sustainability Agenda, for instance by encouraging the tokenization of ESG financial assets.

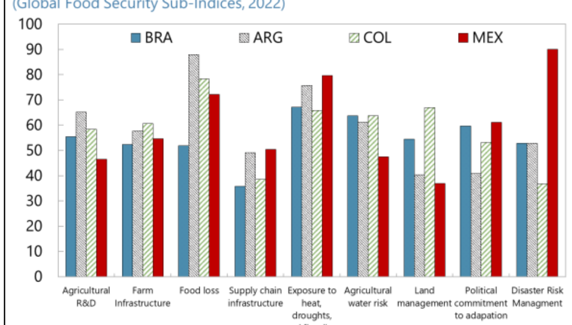
C. Policy Options to Support the Authorities' Agenda

7. **The following policy options build on cross-country experiences that could support the authorities' intentions and strategies**. Policy options focus on (i) boosting the Amazon's resilience; (ii) investing in climate-smart agriculture and insurance; (iii) diversifying power sources; and (ii) leveraging opportunities for green growth.

Boosting the Amazon's Resilience

8. **Fiscal incentives could contribute to forest protection and boost the Amazon's resilience to climate shocks.** To meet the new government's pledges to eliminate illegal deforestation by 2030 and restore 12 million hectares of forests, a revenue-neutral feebate scheme could provide comprehensive incentives for forest protection.[5] The scheme would cover large landowners at the forestry/agriculture border, with fees on landowners converting forest land and subsidies for putting farmland into conservation. Incentives could be linked to carbon sequestration (building off monitoring capacity being developed under the REDD+ Readiness Program[6]) and local ecological benefits. Prerequisites for establishing a feebate program include secure property rights for covered farms and capacity for monitoring environmental indicators and applying incentives.

Selected Indicators on Agriculture Adapatation
(Global Food Security Sub-Indices, 2022)



Source: Corteva, Global Food Security Index
Note: Higher values correspond to less vulnerability.

9. **For the nearer term, options include redirecting some farm support funding to establishing a Payment for Environmental Services Program.** Under this scheme, landowners bid for contracts paying them for habitat preservation projects. Costa Rica has

[5] Feebates are revenue-neutral instruments that apply a sliding scale of subsidies and taxes to producers based on their emissions intensity of production, creating an incentive to reduce missions without a budgetary cost. See, for example, Parry (2020).

[6] The REDD initiative, administered by the World Bank, is a cross-country program to **R**educe **E**missions from **D**eforestation and forest **D**egradation, and foster conservation, sustainable management of forests, and enhancement of forest carbon stocks.

pioneered this approach (Box 1), though some refinements could be considered if a similar scheme were to be introduced in Brazil, such as contract renewals, coverage of small farms, and targeting of high-priority lands (Carter, 2020). Other measures might include land tax/production subsidy schemes, or other incentives, to enhance livestock productivity and reduce farmland per unit of output. Establishing an index for valuing habitat for different land parcels at the forestry/agricultural border would help to target conservation incentives where ecological benefits are greatest.

Box 1. Costa Rica's Payments for Environmental Service Program

Costa Rica has pioneered Payments for Environmental Service over the last 20 years where the program provides, on a project-by-project basis, cash payments per hectare to private landowners for five- or ten-year contracts. These payments compensate landowners for:

- carbon sequestration;
- protection of water catchment areas for urban, rural, and hydroelectric plant use;
- protection of biodiversity (for ecosystem preservation, scientific research, the pharmaceutical industry); and
- protection of natural landscapes (for tourism and scientific purposes). The Program has been predominantly financed by a 3.5 percent sales tax on fuel use, though the objective is that beneficiaries of environmental services (for example, water users) eventually pay for the services they receive.

Sources: www.fonafifo.go.cr/en; and Carter (2020).

10. Scaling up private sector policies such as Zero-Deforestation Commitments (ZDCs) could further shape incentives for forest protection. Private sector policies like ZDCs involve barring suppliers who produce goods on recently deforested areas. For example, the 2009 G4 Agreement by the four largest international meat-packing companies in Brazil established deforestation cut-off dates for their suppliers after which new deforestation results in exclusion from their supply chains. Studies suggest a reduction in cattle-driven deforestation by an estimated 15 percent in the Amazon between 2010 and 2018 (Levy and others, 2023). There are limits on the effectiveness of ZDCs, however. For example, they do not cover small-scale packagers, indirect suppliers, or much of the production for domestic consumption. They also do not provide incentives for reforestation. Still, ZDCs could be scaled up through more comprehensive monitoring of cattle farms and assistance for farmers to shift to legal, deforestation-free production.

11. Carefully opening up the Amazon Fund to private sector participants could support reforestation efforts. In 2023, the Amazon Fund resumed projects stopped in 2019, focusing on control and command policies to halt illegal deforestation. A new action plan,[7] which includes advanced technologies such as satellite imaging to counter land grabbing as well as investment in the bioeconomy to develop the Amazon region, will guide the Fund's projects in the coming four years. Fundraising is linked to both Brazil's current emissions and commitments to halt

[7] Action Plan for Deforestation Prevention and Control in the Legal Amazon (PPCDAm).

deforestation, and donors' participations are mapped to 'avoided emissions'. Granting access to private sector participants could further boost the Fund's firepower and create private sector buy-in.

Investing in Climate-Smart Agriculture and Strengthening Insurance

12. Strengthening adaptation capacity in agriculture would increase productivity and contribute to food security. Brazil has a long history of regional programs to promote climate-smart agriculture (e.g., Adapta Sertao, MAIS, and ABC CERRADO). However, Brazil's agricultural sector lags regional peers in certain aspects of adaptation capacity, in particular regarding food loss, farm infrastructure, and supply chains (ND-GAIN, Food Security Index). Scaling up existing good practices in agriculture would require targeted and better-structured support and investment. Adaptation policies could focus on:

- **Agricultural infrastructure**, through investments in irrigation systems; soil and water resource management; and food loss reduction.
- **Technology and innovation,** through investments in R&D targeted to climate change impacts; and knowledge management and information-sharing system, especially for small- and medium-scale farmers.

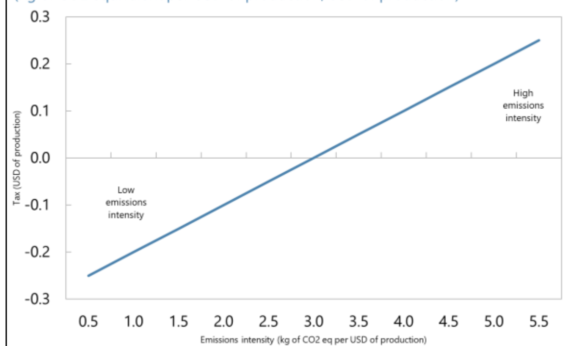
13. To accelerate the adoption of climate-smart infrastructure and technologies in agriculture, policies focused on insurance would be helpful. Insuring on-farm investments for innovative environmental practices, complemented by existing social safety nets, could shield (smaller) farmers' income effectively and protect against catastrophic shocks during the 12 to 24-month adoption period. As a significant share of support to farmers is currently in the form of credit subsidies, consideration could be given to re-directing public funds from credit to insurance and complementing existing programs (e.g., ABC+ or Climate-smart Ag. Subsidies) with insurance products. Recently launched climate-indexed insurance schemes for farmers are welcome and should be promoted throughout Brazil's rural insurance market, together with other market-based instruments that foster competition and expand Brazil's lower-than-peers insurance coverage.[8] Linking agricultural loans to a broader set of sustainability criteria could further help with adaptation and transition. Climate-smart agriculture would also have important co-benefits beyond sectoral productivity and resilience. Improvements in agricultural productivity would reduce deforestation pressures associated with the expansion of agricultural land. Utilizing agricultural land in a more sustainable and efficient manner would further contribute to lowering emissions.

14. Fiscal incentives could further help promote sustainable farming. A policy option to green the agricultural sector is the application of a revenue-neutral feebate for large farmers, providing incentives to reduce emissions efficiently, while protecting competitiveness. The feebate could rely on emissions measured using a proxy approach based on a farm's inputs, potentially similar to that under IPCC reporting standards (Parry and others, 2022). It could complement the

[8] Estimates for the mid-2000s suggest that insurance coverage is about 40 percent in India and close to 70 percent in China (and about 90 percent in the United States), against Brazil's 15-20 percent. China's rural insurance program, for instance, is based mainly on an agricultural insurance premium subsidy (Souza and Assuncao, 2020).

existing ABC+ program that provides concessionary finance for agricultural emission reduction investments. New Zealand is progressing legislation of a similar scheme. The design of a feebate scheme would consider differences in emissions-intensity. Agricultural emissions vary substantially across products in Brazil. A pure feebate that covers all agricultural products and links fees/subsidies directly to emissions-intensity would provide the strongest incentivize to reduce emissions but result in redistribution from high to low emitting products. Alternatively, feebates could be applied at the product-level or taxes could be applied to the entire sector, with subsidies provided to all producers taking actions to reduce emissions, which is more in line with New Zealand's proposed approach.

Average Emissions Intensity and Feebate Level
(Kg of CO2 equivalent per USD of production; USD of production)

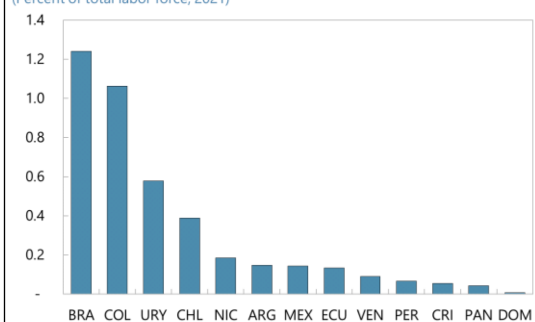


Sources: OECD; Fund staff calculations.

Diversifying Power Generation Sources

15. Solar and wind electricity production has rapidly expanded in the past years. Brazil's energy mix is one of the greenest worldwide, with almost 90 percent of electricity generated by renewables in 2022. Hydropower is the largest energy source, but solar and wind have expanded rapidly, now representing, together with biomass, about 20 percent of total electricity generation, from close to zero 20 years ago. The expansion in solar and wind capacity has almost exclusively been financed through private investments, reflecting highly advantageous capacity factors. In line with these developments, jobs created in Brazil's renewable sector outpaced regional peers, though remain relatively low skilled.

Jobs in Renewable Energy Sectors
(Percent of total labor force, 2021)



Sources: IRENA; Fund staff calculations.

16. Changinging climate conditions will affect hydropower generation, leading to higher volatility and reduced output, while power demand is increasing. Past deviations from mean temperatures by +0.1C have led to a lower capacity utilization of 2-3 percent, estimated by staff, implying significant volatility already at current climate conditions.[9] Slow-moving temperature increase and precipitation changes would further intensify the disruption to hydropower supply, lowering dispatchable hydro capacities[10] by approximately 9 to 28 percent from 2030 to 2050 under

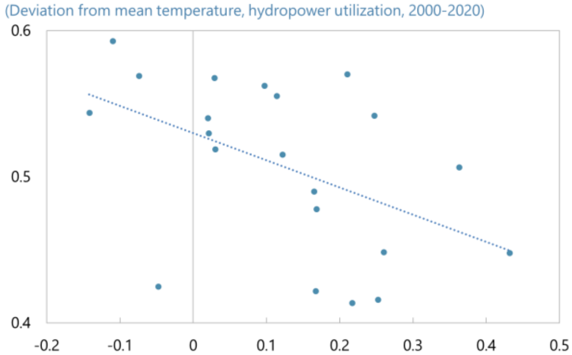
---

[9] A drop in hydropower generation pushes up energy costs as (more costly) thermal power plants will be switched on to fill the gap.

[10] Dispatchable capacity refers to the sources of electric power that can be programmed on demand and dispatched immediately when needed.

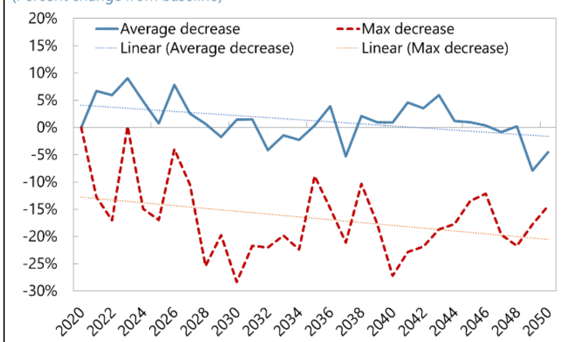
a high emission scenario that closely mirrors current trends (Annex I).[11] Total power demand is estimated to increase by 2-4 percent due to changing demands for cooling and heating (in addition to an estimated growth of 3½ percent in the baseline). Absent an expansion in power generation, staff estimates that the two latter effects could result in power deficiency up to 82 TWH in 2030 (or 14 percent of the power supply in 2021, Box 2).

Climate Impact on Hydropower Capacity Utilization
(Deviation from mean temperature, hydropower utilization, 2000-2020)



Sources: IRENA; World Bank; and Fund staff calculations.

Hydro Capacity by Scenario
(Percent change from baseline)



Source: Fund staff calculations.

17. The planned expansion of renewable capacity would fill power gaps and avoid higher fossil fuel consumption in the short term. Brazil's potential for energy from wind, solar and biomass is large, as also reflected in an impressive project pipeline. Over 111 GW non-hydro renewable capacity is projected to come on stream between 2024 and 2030,[12] which is more than enough to meet higher future demand and fill power gaps, creating opportunities for energy export, including through green hydrogen.

18. Addressing infrastructure bottlenecks is needed to deliver on the planned expansion of renewable energy and handle increased weather volatility.

- **Strengthening the grid and cross-border connections to alleviate infrastructure limitations**. More decentralized power generation, varying availability of wind and solar (which benefit from priority in the grid), as well as increased temperature and precipitation volatility, challenge effective distribution through the existing grid. Investments are needed to respond to these demands and secure the investment pipeline.[13]

- **Maintaining hydro capacity and expanding energy storage**. Solar and wind energy need to be paired with sources of reliable baseload such as hydropower (Wasti et al 2022). Investment plans could include capitalizing and retrofitting existing dams and hydro plants with more flexible design such as incorporating pumped storage. This could help make up for the generation losses brought by climate change without entailing significant investment and

[11] Based on Zhao, Wild, and Vernon (2023).

[12] Agencia National de Energia Electrica (ANEEL).

[13] The likelihood of realization of the pipeline's investments as collected by ANEEL depends on improvements in grid infrastructure.

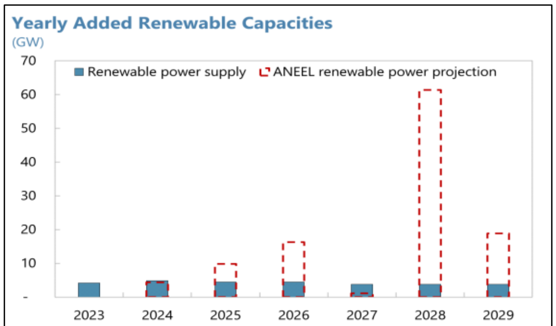
environmental costs of building new dams. Alternative storage facilities, including batteries and hydrogen, are being considered.

- **Mainstreaming climate risk management into energy sector planning**, including monitoring and response systems to adjust hydro supplies and meet power demands.

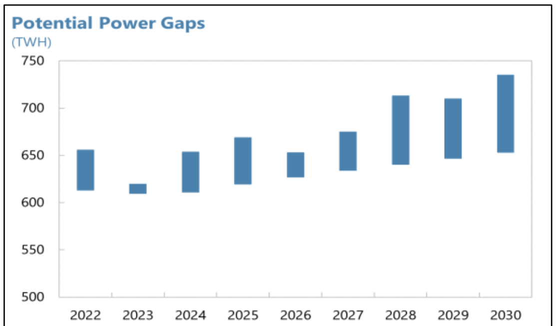
Box 2. Alternative Investment Scenario and Higher Fossil Fuel Consumption

Strictly following the current trajectory of investments in renewables, IMF staff estimates that the additional renewable capacity will experience a moderate increase of approximately 2-5 percent compared to the baseline in 2030, bringing cumulatively 28.6 GW new capacity sourced from wind, solar, and other renewables.

Under this trajectory, power gaps arise due to hydro deficiency and increasing demand and may be filled by higher fossil fuel consumption, which would lead to higher emissions in the short term. IMF staff estimate that between 2024 and 2030, fossil fuel consumption could experience a cumulative increase by 20-70 percent due to power gaps, reintroducing up to 150 megatons of CO_2 into the atmosphere over the same period.[1]



Sources: ANEEL; Fund staff calculations.

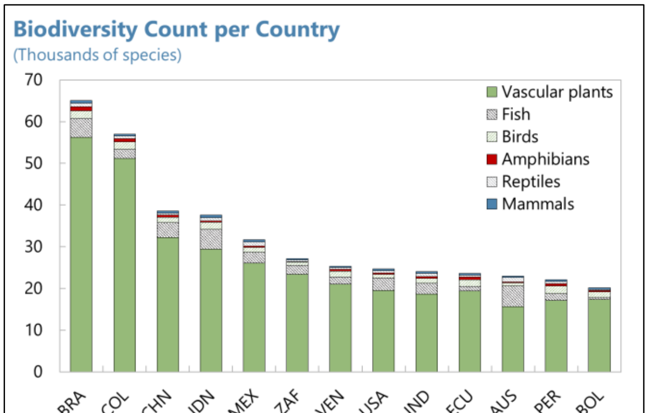


Source: Fund staff calculations.

[1] Equivalent to around 10% of total emission in Brazil in 2019.

Leveraging Opportunities for Green Growth

19. **Brazil could build on its relatively green energy mix to step up export-oriented manufacturing and seize growing demand for green goods and services.** Further expansion in renewables could allow for production and export of energy, for instance via green hydrogen. Brazil also holds a competitive advantage in some key green industries, such as biofuel production



Source: Mongabay, using data from World Conservation Monitoring Centre of UNEP, 2004; Fishbase; Birdlife International; AmphibiaWeb; IUCN; and Reptile Database.

(11 percent global market share[14]) and hydropower equipment (4 ½ percent global market share). Brazil is topping biodiversity indices worldwide and could leverage this potential as input to R&D. Finally, transferability of technology between oil and gas and renewable energy, particularly offshore wind, could be explored more broadly.

20. To further green the economy, Brazil is considering the introduction of a mandatory ETS. Achieving cost-efficiency calls for encompassing all sectors and greenhouse gases to achieve cost-efficiency. Administrative and political constraints make it challenging to include forestry and methane from agriculture, a key consideration in Brazil since most emissions come from these sectors. Price stability mechanisms, such as a price floor or program to purchase surplus allowances, can increase certainty over future prices and support the use of overlapping mechanisms.[15] Auctioning emissions allowances (rather than granting them for free) generates government revenue, part of which can be recycled to support vulnerable households and energy-intensive, trade-exposed industries (EITI).[16] Allowing for forestry offsets requires robust rules and monitoring of whether afforestation delivers additional, long-term GHG removal. Without such a system, offsets can result in a net increase in emissions (World Bank, 2018).

21. The ETS can draw lessons from international experience. Several jurisdictions already have ETSs in place, with the EU, South Korea, and California being some of the most prominent. These ETSs vary in coverage (e.g., the EU's covers primarily CO2 from industry and power, while California's and Korea's covers all GHGs from most major sectors), while all have mechanisms to reduce price volatility and increase the effectiveness of overlapping policies, clear pathways for reductions in emissions allowances (e.g., California's will restrict emission to 80 percent of 1990 levels by 2050), and expanded their coverage over time (e.g., the EU is introducing an ETS covering buildings and transportation by 2028). They caution against the use of nature-based offsets—this is not allowed in the EU's ETS, removed from California's as of 2021 due to a lack of effectiveness, and limited in Korea—and address competitiveness concerns through free allowances for EITI.

D. Conclusion

22. Brazil's main vulnerabilities to rising temperatures and changing precipitation patterns are in agriculture and power generation. Important policy initiatives are underway to boost resilience and green Brazil's economy, including the new government's holistic approach to steer Brazil's ecological transformation and decarbonization and the BCB's drive to green and sustainable regulation and supervision.

23. This paper discussed four main policy options to further enhance these initiatives. First, fiscal incentives and private sector crowding-in for forest protection would help boost the Amazon's

---

[14] Lebdioui (2022), based on OECD, UN Comtrade, IMF Climate data monitor and EurObserver'ER, and ITC databases.

[15] The uncertainty of ETS prices has been shown to increase abatement costs by up to 15 percent (Fell, MacKenzie, and Pizer, 2021). An ETS without a price floor has a purely fixed emissions quantity, resulting in the impact of other mitigation policies being offset by lower ETS prices and, thus, ineffective.

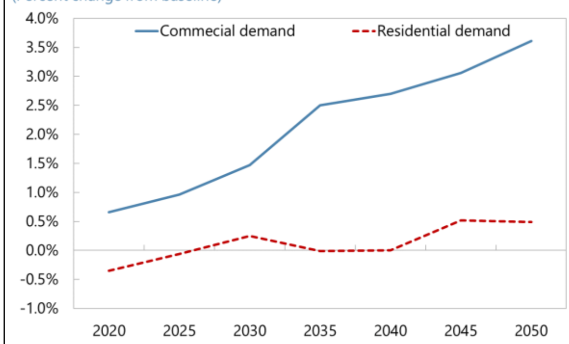
[16] See Parry and others (2022) for more on design considerations.

resilience. Second, more investment in climate-smart agriculture, including through the expansion of insurance schemes, would reduce food loss and price volatility against the backdrop of increasing drought frequency. Third, filling power gaps from climate-related shocks and avoiding fossil fuel consumption in the short term would require investment in renewable energy infrastructure. Finally, building on Brazil's very green energy mix and world-wide leading biodiversity, low- or negative-emission growth opportunities include energy export or export-oriented manufacturing to seize growing demand for green goods and services.

Annex I. Estimating the Effects of Climate Change on the Power Sector

1. **Climate impact on power demand**. Projections on the impact of climate change on power demand were drawn from the projection out of the Global Change Analysis Model (GCAM)[1], a market equilibrium model by the Pacific Northwest National Laboratory (PNNL), that operates from 1990 to 2100. The model allows to examine sectoral dynamics under various climate pathways and scenarios. The model projection reflects the impact of slow-moving temperature increases and precipitation changes on power demand of commercial and residential buildings, taking into account the evolving demands for cooling and heating. While residential demand is expected to increase in line with the baseline, commercial power demand is set to rise by around 3 ½ percent in addition to the baseline, assuming a high emission scenario that closely mirrors current trends.

Power Demand Change Under Moderate Climate Scenario
(Percent change from baseline)



Source: Fund staff calculations.

2. **Climate impact on hydropower generation.** To ensure internal consistency, projections on dispatchable hydro capacity were taken from the PNNL's global hydrological model, Xanthos,[2] designed to quantify and analyze global water availability historically and in the future at high geographic and temporal resolution. Xanthos is compatible with the GCAM as the former typically provides important inputs to the latter.

3. **Effect on emissions**. Building on the estimated evolution of power demand and hydropower generation, potential power gaps were computed. The IMF's Climate Policy Assessment Tool (CPAT) was expanded to incorporate the impacts of climate change on the power sector and study the sector's response to potential power gaps. The standard CPAT power demand equation was extended for both residential and service sectors (as part of commercial sector), to account for the percentage changes in power demand taken from GCAM. Hydropower generation projections were integrated in CPAT's engineering model algorithm in two steps. First, an upper bound on hydropower generation was introduced by year. Second, the upper bound was parametrized in line with Xanthos projections, representing the impact of climate change. Third, dispatch decisions on hydropower generation were based on the minimum between the upper bound and the historical capacity factor.

[1] GCAM: Global Change Analysis Model | Global Change Intersectoral Modeling System (pnnl.gov).

[2] Based on Zhao, Wild, and Vernon (2023). Xanthos Output Dataset Under ISIMIP3b Selected CMIP6 Scenarios: 1850 - 2100 (Basin and Regional Scale) (v0.0) [Data set]. MSD-LIVE Data Repository. https://doi.org/10.57931/1923091.

References

Assuncao, Juliano and Priscila Souza, 2020, "Risk Management in Brazilian Agriculture: Instruments, Public Policy, and Perspectives," Rio de Janeiro, Climate Policy Initiative, 2020.

BCB, 2022, "Financial Stability Report 2022," Banco Central do Brasil. Available via the Internet: https://www.bcb.gov.br/publicacoes/ref/202210.

BCB, 2023a, "Report on Social Environmental and Climate-Related Risks and Opportunities, Banco Central do Brasil." Available via the Internet: https://bcb.gov.br/en/publications/report-risk-opportunity.

BCB, 2023b, "Financial Stability Report 2023," Banco Central do Brasil. Available via the Internet: https://www.bcb.gov.br/publicacoes/ref.

Carter, Anna J., 2020, "Effectiveness, Equity and Ethics of Costa Rica's Payment for Environmental Services Program," College of Arts & Sciences Senior Honors Theses. Paper 212.

Faruk, Miguel, Alvaro Pedraza, and Claudia Ruiz-Ortega, 2022, "Climate Change Regulations: Bank Lending and Real Effects," Policy Research Working Papers 10270 (Washington: World Bank).

Fell, H., I.A. MacKenzie, and W.A. Pizer, 2012, "Prices versus quantities versus bankable quantities," *Resource and Energy Economics*, 34 (4), 607-623.

Lebdioui, Amir, 2022, "Latin American Trade in the Age of Climate Change: Impact, Opportunities, and Policy Options," May 2022, LSE and Canning House.

Levy, Samuel A., Federico Cammelli, Jacob Munger, Holly K. Gibbs, and Rachael D. Garrett, 2023, "Deforestation in the Brazilian Amazon Could Be Halved by Scaling up the Implementation of Zero-Deforestation Cattle Commitments," *Global Environmental Change* 80: 102671.

Parry, Ian W.H., 2020, "The Rationale for, and Design of, Forest Carbon Feebates," in *Designing Fiscal Instruments for Sustainable Forests*, World Bank Group, Washington DC, 2020, 137-158.

Parry, Ian W.H., Simon Black, Danielle N Minnett, Victor Mylonas, and Nate Vernon, 2022, "How to Cut Methane Emissions," Staff Climate Note No 2022/008 (Washington: International Monetary Fund).

Wasti, Asphota, Patrick Ray, Sungwook Wi, Christine Folch, Maria Ubierna, and Pravin Karki, 2022, "Climate change and the hydropower sector: A global review," RMetS Climate Change Volume 13, Issue 2. Available via the Internet: https://doi.org/10.1002/wcc.757

World Bank, 2023, Brazil Country Climate and Development Report, CCDR Series, World Bank Group (Washington DC). Available via the Internet: http://hdl.handle.net/10986/39782.

Zhao, Mengqi, Thomas Wild, and Chris Vernon, 2023, "Xanthos Output Dataset Under Isimip3b Selected CMIP6 Scenarios: 1850 - 2100 (basin and Regional Scale)," MSD-LIVE Data Repository (February). Available via the Internet: https://doi.org/10.57931/1923091