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Foreword

This *Survey* is published under the responsibility of the Economic and Development Review Committee of the OECD.

The economic situation and policies of Brazil were reviewed by the Economic and Development Review Committee on 26 September 2023 with participation of representatives of the Brazilian authorities. The draft report was then revised in the light of the discussions.

The Secretariat's draft report was prepared for the Committee by Falilou Fall and Priscilla Fialho and Tony Huang under the supervision of Jens Arnold. Statistical research assistance was provided by Tony Huang and editorial assistance by Emily Derry. The *Survey* also benefitted from contributions at various stages by Alvaro Pereira, Luiz De Mello and Isabell Koske.

The previous Survey of Brazil was issued in December 2020. Information about the latest as well as the previous Survey and more information about how Surveys are prepared is available at http://www.oecd.org/eco/surveys

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Basic statistics of Brazil, 2022*

(Numbers in parentheses refer to the OECD average)**

LAND, PEOPLE AND ELECTORAL CYCLE					
Population (million, 2021)	203.1		Population density per km² (2021)	23.9	(38.7)
Under 15 (%, 2021)	20.0	(17.2)	Life expectancy at birth (years, 2021)	77.8	(78.7)
Over 65 (%, 2021)	10.5	(18.0)	Men (2021)	74.3	(75.9)
International migrant stock (% of population, 2019)	0.5	(13.2)	Women (2021)	81.2	(81.7)
Latest 5-year average growth (%)	0.5	(0.4)	Latest general election	October	2022
ECONOMY					
Gross domestic product (GDP)			Value added shares (%, 2021)		
In current prices (billion USD)	1 920.7		Agriculture, forestry and fishing	8.1	(2.6)
In current prices (billion BRL)	9 910.6		Industry including construction	22.2	(26.6)
Latest 5-year average real growth (%)	1.5	(1.6)	Services	69.8	(70.8)
Per capita (thousand USD PPP, 2021)	16.4	(50.9)			
GENERAL GOVERNMENT Per cent of GDP					
Expenditure (OECD: 2021)	43.3	(46.3)	Gross financial debt (2021)	90.0	(107.3)
Revenue (OECD: 2021)	38.7	(38.7)	Net financial debt (2021)	57.1	(68.9)
EXTERNAL ACCOUNTS					
Exchange rate (BRL per USD)	5.16		Main exports (% of total merchandise exports)		
PPP exchange rate (USA = 1)	2.53		Crude materials, inedible, except fuels	29.9	
In per cent of GDP			Food and live animals	23.3	
Exports of goods and services	20.0	(33.4)	Mineral fuels, lubricants and related materials	16.9	
Imports of goods and services	19.3	(34.9)	Main imports (% of total merchandise imports)		
Current account balance	-3.0	(-1.1)	Machinery and transport equipment	31.2	
Net international investment position (2021)	-36.7		Chemicals and related products, n.e.s.	29.1	
			Mineral fuels, lubricants and related materials	17.5	
LABOUR MARKET, SKILLS AND INNOVATION					
Employment rate (aged 15 and over, %)	56.6	(57.5)	Unemployment rate, Labour Force Survey (aged 15 and over, %)	9.3	(5.0)
Men	67.0	(65.4)	Youth (aged 15-24, %)	21.4	(10.9)
Women	46.9	(50.1)	Long-term unemployed (1 year and over, %)	3.7	(1.2)
Participation rate (aged 15 and over, %)	62.9	(60.9)	Tertiary educational attainment (aged 25-64, %, 2021)	20.7	(39.9)
Mean weekly hours worked	37.9	(36.7)	Gross domestic expenditure on R&D (% of GDP, 2019, OECD: 2020)	1.2	(3.0)
ENVIRONMENT					
Total primary energy supply per capita (toe, 2021)	1.4	(3.8)	CO_2 emissions from fuel combustion per capita (tonnes, 2021)	2.1	(7.9)
Renewables (%, 2021)	44.2	(11.6)	Renewable internal freshwater resources per capita (1 000 m³, 2019)	26.7	
Exposure to air pollution (more than 10 µg/m³ of PM 2.5, % of population, 2019)	81.7	(61.7)			
SOCIETY					
Income inequality (Gini coefficient, OECD: latest available)	0.518	(0.315)	Education outcomes (PISA score, 2018)		
Relative poverty rate (%, OECD: 2019)	24.5	(11.4)	Reading	413	(485)
Median disposable household income (thousand USD PPP, OECD: 2019)	4.8	(26.6)	Mathematics	384	(487)
Public and private spending (% of GDP)			Science	404	(487)
Health care (2020)	10.1	(9.3)	Share of women in parliament (%)	17.7	(32.5)
Education (% of GNI, 2021)	5.9	(4.4)			

* The year is indicated in parenthesis if it deviates from the year in the main title of this table.

** Where the OECD aggregate is not provided in the source database, a simple OECD average of latest available data is calculated where data exist for at least 80% of member countries.

Source: Calculations based on data extracted from databases of the following organisations: OECD, International Energy Agency, International Labour Organisation, International Monetary Fund, United Nations, World Bank, IBGE.

Executive Summary

Brazil has had a strong recovery

The economy rebounded strongly in 2021 and in 2022. After a strong expansion in early 2023, growth momentum is now converging to the economy's potential growth. Amid declines in labour market participation, unemployment has decreased to levels not seen since 2015.

GDP growth is projected to reach 3.0% in 2023 before slowing to 1.8% in 2024, driven by lower domestic demand (Table 1). Private consumption and investment will grow at a more moderate pace than in the past over 2024 on the back of tighter credit conditions and a global slowdown. A record harvest is bolstering growth, while the services sector is still recovering from the pandemic shock.

Table 1. The economy is slowing

% change unless noted	2022	2023	2024
Gross domestic product	**2.9**	**3.0**	**1.8**
Private consumption	4.3	2.8	2.1
Government consumption	1.5	1.8	1.3
Gross fixed capital formation	0.8	-2.3	0.8
Exports of goods and services	5.9	7.1	4.0
Current account balance (% of GDP)	-2.9	-1.7	-1.6
Unemployment	9.3	7.8	8.0
Harmonised consumer price index	9.3	4.5	3.2
Harmonised core price index	9.3	6.1	3.4
Fiscal balance (% of GDP)	-4.6	-7.2	-3.4
Government gross debt (% of GDP)	72.9	77.5	80.0

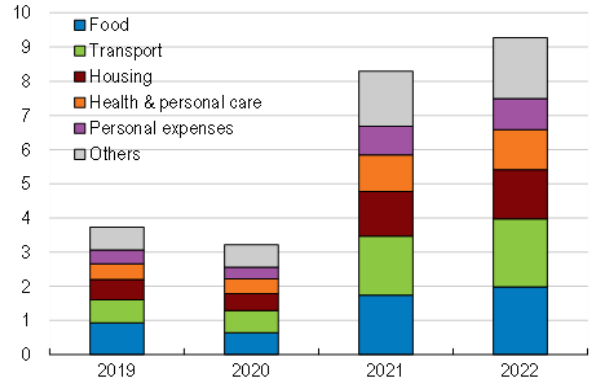
Source: OECD Economic Outlook 113 (database) and updates.

Fiscal policy reacted forcefully to the COVID-19 crisis, dedicating around 9% of GDP to emergency support measures, including income support to households and firms. Most of these measures have been withdrawn by now. Fuel tax exemptions introduced to cope with high inflation have also been mostly withdrawn. Higher income transfers for *Bolsa Familia* recipients have been made permanent.

Inflation has receded, mostly explained by lower food and energy prices. Russia's war of aggression against Ukraine and the resulting global price surges fuelled inflationary pressures which then became more widespread (Figure 1). Inflation has declined since mid-2022, supported by lower fuel taxes, and core inflation has also declined. Slower credit growth and lower wage increases will reduce household income and contribute to lower inflation.

Risks to economic activity are balanced. Weaker growth in China, Brazil's main trading partner, could reduce exports, while faster disinflation could allow lower policy rates and boost investment.

Figure 1. Food prices and transport costs including fuel prices drove the rise in inflation



Note: Others include categories of household items, clothing, education and communication.
Source: IBGE; and OECD calculations

StatLink https://stat.link/bcd023

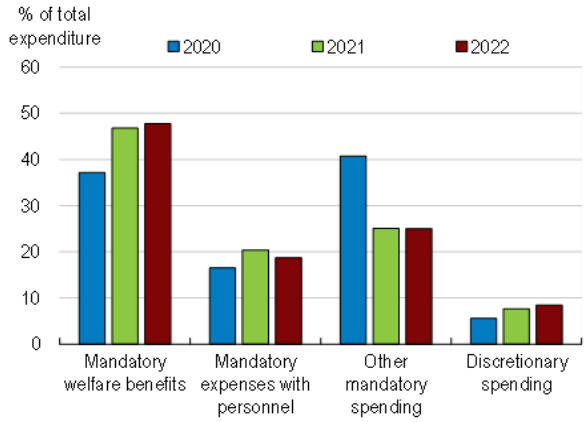
The new fiscal framework and a tax reform will boost debt sustainability and growth

Public debt remains high compared to other emerging market economies. Ensuring its sustainability requires a credible fiscal framework and better spending efficiency. A planned reform of the fragmented system of consumption taxes will reduce compliance costs substantially.

Previous fiscal rules have not addressed widespread budget rigidities such as constitutionally mandated spending items, revenue earmarking and automatic indexation mechanisms (Figure 2). Therefore, fiscal space for policy priorities declined until becoming very small, and the rules were changed frequently to avoid breaching them.

The new fiscal framework, adopted in August 2023, is meant to address these challenges by combining more medium-term predictability with added flexibility. The framework establishes multi-year targets for the primary balance until 2026 and defines limits on real spending growth. The new framework also contains a mechanism to bring the primary balance back to target when deviations occur.

Figure 2. Mandatory spending limits the room for policy initiatives



Note: Annual aggregates of monthly data. The spike in other mandatory spending in 2020 was due to Covid-related spending.
Source: National Treasury; and OECD calculations

StatLink https://stat.link/yet79h

Brazil's tax system is highly complex and distorts production decisions. Five different taxes on the consumption of goods and services are levied on sometimes overlapping bases and at different levels of government, with incomplete credits for intermediate inputs and substantial legal uncertainty, giving rise to long tax disputes.

A proposal currently discussed in Congress aims to consolidate the different consumption taxes into a unified value-added tax (VAT). This VAT would have simple rules and a common, broad tax base harmonised across states, full tax credit on all inputs and zero-rating for exports. The government has made this tax reform a key priority. Political challenges include the distribution of revenues across states, but a gradual transition and transfer mechanisms between states should help build a consensus for the tax reform.

Boosting productivity will be key to maintaining strong growth

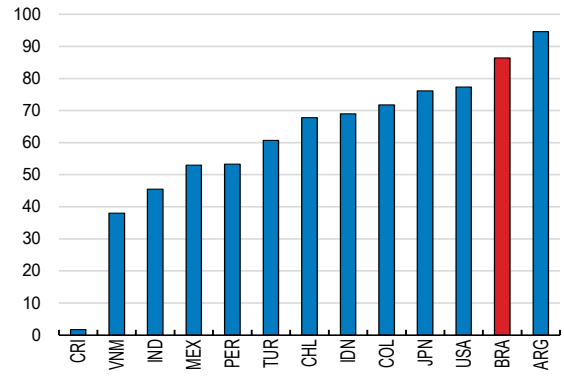
Potential growth and productivity gains have declined. Reforming regulatory policies, a stronger engagement in international trade, increasing female labour participation and a stronger education and training system would boost potential growth.

Stringent regulations and high administrative burdens on markets for goods and services restrict competition and the entry of new firms, hampering productivity growth. Recent reforms have reduced unnecessary bureaucracy and regulations. However, barriers in services sectors are still higher than the OECD average.

Access to foreign markets and deeper integration into global value chains could be facilitated by lowering existing trade barriers. Average import tariffs are about eight times higher than in Mexico, for instance. Non-tariff barriers are also relatively high, including widespread local content requirements (Figure 3).

Figure 3. Non-tariff barriers are high

Coverage ratio



Note: Coverage ratio refers to the value of imports of commodities subject to non-tariff measures as a percentage of total imports.
Source: World Integrated Trade Solution database (WITS).

StatLink https://stat.link/zac83r

Female labour force participation and employment are about 20 percentage points lower than for men. Limited access to early childhood education is one barrier to women's access to the labour market. Only about a third of all children under the age of three in Brazil have access to day care.

The pandemic has worsened the educational attainments of children from disadvantaged backgrounds. Despite high public spending on education relative to GDP, resources are not always targeted towards improving inequalities of opportunities. Moreover, participation in vocational education programmes remains low and post-secondary vocational education opportunities are limited.

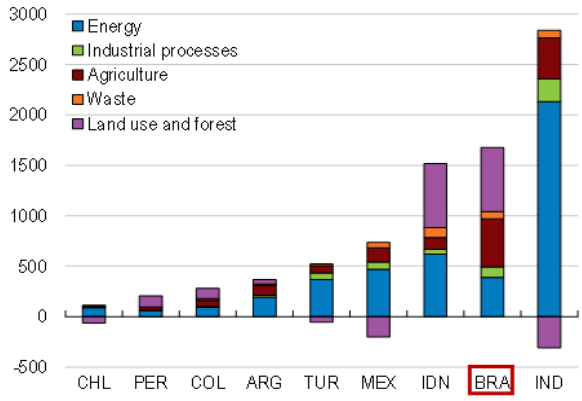
Greening growth and building climate-resilient infrastructure will reduce greenhouse gas emissions

Strengthening the enforcement of the Forest Code, developing rural economies and

incentivising the adoption of new technologies can help to reduce greenhouse gas emissions.

Deforestation, a major source of greenhouse gas emissions, has risen since 2019, although early indicators now suggest a decline in 2023. Stricter enforcement of the Forest Code, coupled with more adequate resources for enforcement agencies, are now expected to support national efforts towards reducing deforestation. The Brazilian government has recently committed to reach zero deforestation by 2030 in its nationally determined contribution to the Paris Agreement under the UNFCCC, as defined by Brazil's Action Plan for the Prevention and Control of Deforestation in the Legal Amazon. Emissions from agriculture, the second-largest contributor to GHG emissions, come mostly from livestock (Figure 4). Better regulations and incentives for more sustainable production have substantial scope for reducing them. Carbon pricing mechanisms will also be key for emission reductions.

Figure 4. Deforestation and agriculture are the mains sources of greenhouse gas emissions



Note: Million tonnes of CO2 equivalent, 2021 or latest.
Source: OECD environment database; PNMC (6ª Edição), Ministério da Ciência, Tecnologia e Inovação; and OECD calculations.

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Scaling-up infrastructure investment

Better planning, including tighter coordination across the federal and subnational governments, could strengthen infrastructure investment. Reducing risks associated with long-run infrastructure projects has the potential to attract more private and international financing.

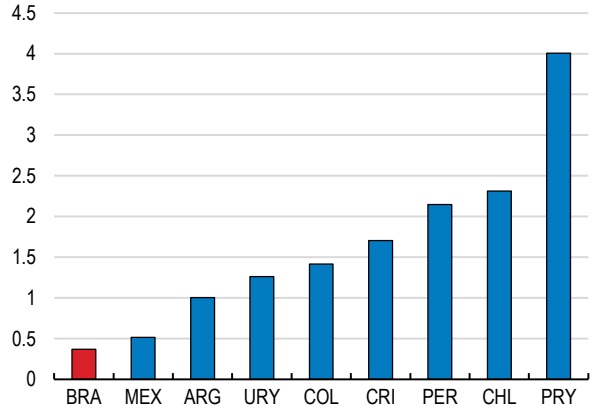
The infrastructure damages caused by climate events are already detrimental to growth and represent approximately 1.3% of GDP in annual losses. Public infrastructure is particularly vulnerable to climate shocks amid a rapid, unplanned, and uncontrolled urbanisation. Frequent droughts and rising temperatures will create challenges for energy supply, particularly from hydroelectric sources.

Infrastructure investment has been low in international comparison and has even declined (Figure 5**).** Public spending on infrastructure has delivered results that have often fallen short of expectations over the last decades. Improvements in planning and project execution could substantially improve the performance of public infrastructure investment. Each year, more than 30% of public infrastructure projects are interrupted and either temporarily or permanently paralysed.

Most public sector investment is executed by subnational governments. States and municipalities often lack the technical capacities needed for infrastructure project preparation and procurement. In addition, local infrastructure plans are not always aligned with federal priorities and a consistent monitoring of infrastructure spending across different levels of government is difficult.

Opening up additional sources of private investment will be essential for filling infrastructure financing gaps in the medium run. Creating the appropriate framework conditions for private investment will require rethinking current risk sharing mechanisms and minimising risks related to changing policy settings and judicial uncertainty.

Figure 5. Public investment in economic infrastructure is low



Note: % of GDP, 2021 or latest. Economic infrastructure refers to water, energy, telecommunications and transport.
Source: Infralatam.

StatLink https://stat.link/lgxwvi

MAIN FINDINGS	KEY RECOMMENDATIONS
Adjusting monetary policy and improving fiscal policies	
Inflation and inflation expectations have been above target but are coming down as monetary policy has tightened substantially.	Continue the gradual easing of monetary policy provided that the ongoing convergence of inflation with the target continues.
Fiscal rules have been overly focused on the short-term. The previous spending rule has not been respected in recent years.	Implement the new fiscal framework and reduce the public deficit to ensure the sustainability of public debt. Develop medium-term budget plans, with a rolling four-year horizon, and annex them to the annual budget law.
The budget process is constrained by widespread revenue earmarking and mandatory spending floors, coupled with strong automatic indexation.	Reduce mandatory spending floors and earmarked revenues. Index social benefits to inflation rather than the minimum wage.
Budget amendments for individual parliamentarians lack systematic audits and exacerbate the disconnect between policy strategies and effective budget allocations.	Put stricter limits on and audit systematically expenditures financed through budget amendments from individual parliamentarians.
A fragmented system of overlapping indirect taxes generates extraordinarily high compliance costs.	Consolidate all federal and subnational consumption taxes into a unified value added tax.
Public procurement is vulnerable to corruption and can lead to public funds being wasted through higher expenses and infrastructure of lower quality.	Improve whistle-blowers protection and continue implementing the National Strategy to Combat Corruption and Money Laundering.
Boosting productivity growth	
Regulatory barriers in service sectors are high. Professional services are often reserved to members of professional associations.	Reduce market entry barriers in professional services, including by abolishing exclusive rights for certain ancillary tasks.
Despite recent progress, openness to trade in Brazil is still lower than in other emerging economies. Integration into GVCs remains concentrated in commodities. Trade barriers are high in international comparison.	Pursue further reductions of tariffs and non-tariff barriers together with Mercosur partners, announced in advance and subject to gradual implementation.
Female labour force participation and employment are about 20 percentage points lower than for men.	Prioritise educational investments in the early years of schooling and expand access to early childhood education, giving priority to low-income households and single mothers.
Labour informality is high at around 40%. The cost difference between informal and formal employment contracts contributes to informality.	Devise a comprehensive strategy to foster formalisation, including through lower non-wage labour costs, better skills and stronger enforcement.
Spending on active labour market programmes in Brazil is close to the OECD average, but it is mostly focused on less effective employment subsidies rather than training.	Shift active labour market spending from employment subsidies towards high-quality training programmes that respond to labour market needs.
Educational attainments are strongly related to socio-economic backgrounds, including race. Students from wealthier backgrounds are more likely to progress and benefit from fully subsidised higher education.	Consider introducing means-tested tuition fees in public universities combined with targeted grants for disadvantaged students and other strategies to improve access to higher education.
Greening growth	
Since 2004, greenhouse gas emissions have been increasing, driven by the recent upward trend of deforestation.	Implement plans to establish a regulated carbon market (cap-and-trade) with a primary focus on industrial and agriculture sectors.
Deforestation has risen since 2019, amid weaker enforcement including budget and staff cuts. These trends are now reversing and deforestation has come down.	Continue to strengthen enforcement efforts to combat illegal deforestation. Ensure adequate staffing and budget of environmental enforcement agencies.
The forest economy and payments for environmental services are underdeveloped. Rural communities often lack alternative revenue sources.	Restore and further develop payments for environmental services.
The Plan for the Consolidation of a Low Carbon Economy in Agriculture (ABC) has been the main instrument to ensure the continuous improvements in agricultural practices that reduced GHG emissions.	Scale up the ABC plan to enhance existing incentives, R&D and technical assistance to reduce GHG emissions from agriculture.
Brazil has 40 million hectares of degraded pasture and two thirds of direct agricultural emissions come from livestock natural emissions.	Boost incentives for the abatement and soil sequestration of carbon and the restoration of degraded pastures, e.g. through carbon credits.
The production of electricity is highly exposed to severe weather events, such as droughts, prolonged dry seasons, and rising temperatures.	Further diversify renewable energy sources by increasing investments in wind and solar energy, as well as biofuels.
Scaling-up infrastructure investment	
Infrastructure investment has been particularly low in international comparison and has even declined, and maintenance levels are low.	Increase investment in infrastructure and maintenance, including in transport, energy, telecommunications, water, sanitation and urban mobility.
Most public infrastructure investment is executed by subnational governments or SOEs, with often limited project management capacity.	Expand technical assistance by BNDES to sub-national governments for infrastructure projects.
Different groups of investors have different desired risk profiles and restrictions. Tailoring financial assets for infrastructure financing to different investor groups may allow tapping into new funding pools.	Expand the use of structured financial instruments, project financing and carefully designed guarantees to attract a wider range of institutional investors, with the help of BNDES.

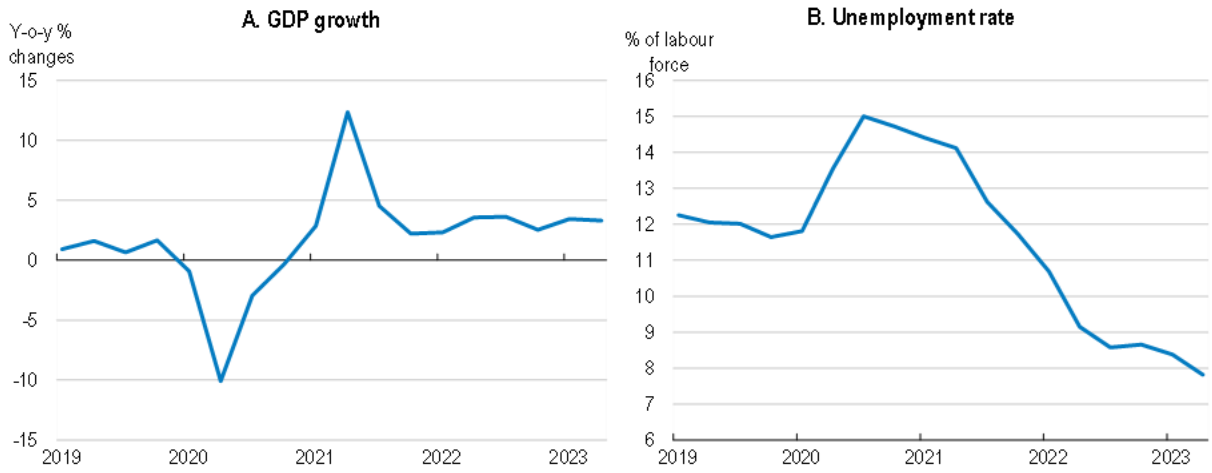
1 Key Policy Insights

Brazil's economic growth has been lower than in other emerging economies. Strengthening productivity growth and investment will support further progress in improving household incomes while reducing poverty and inequality. Implementing a strong fiscal framework and a comprehensive tax reform, as well as fine-tuning social protection programmes, will restore confidence in public finances and create fiscal space for productive investment. Further reductions in regulatory barriers to competition, including by fostering trade integration, would boost firms' productivity. Mobilising currently underutilised labour resources by improving female labour force participation and reallocating education spending will help sustain stronger long-term economic growth. Halting illegal deforestation and greening agriculture by investing in smart technologies and training will make growth more sustainable.

Introduction

After the deep recession caused by the pandemic, growth rebounded strongly and is currently exceeding the economy's potential growth (Figure 1.1, Panel A). Unemployment has fallen to its lowest level since 2015 (Figure 1.1,Panel B). Inflation peaked in June 2022 at levels not seen since the financial crisis in 2009 and has come down to the inflation target since.

Figure 1.1. Economic activity is rebounding



Source: OECD analytical database.

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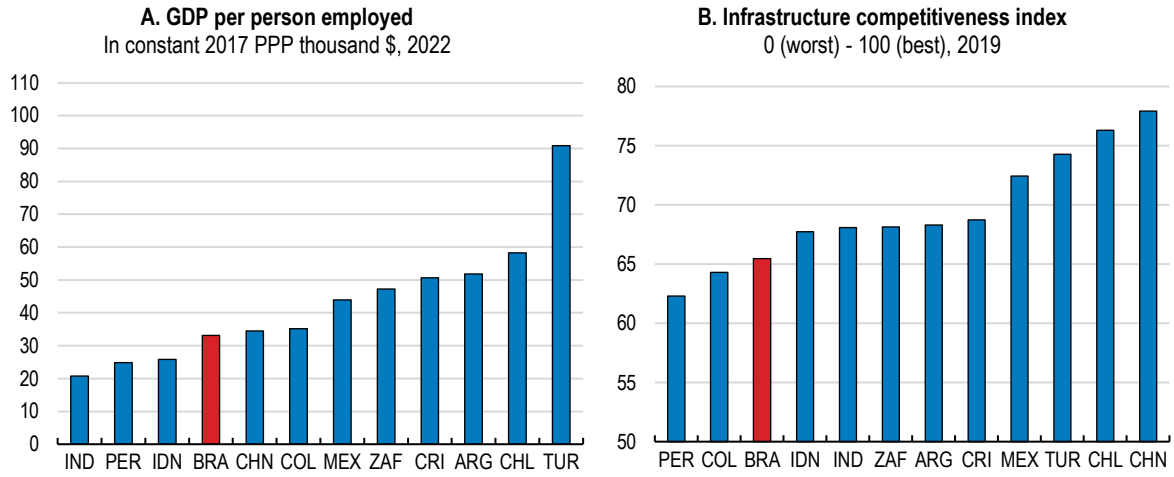
The time has now come to re-focus on the pressing structural challenges that Brazil is facing. Productivity has been declining since 2010 and growth in GDP per capita has been disappointing, especially when compared to other emerging economies (Figure 1.2, Panel A). Low investment, particularly in infrastructure, has contributed to declining productivity. Logistics bottlenecks, high costs of transport and a deteriorating quality of roads -on which most of goods and commodity exports are transported- hamper competitiveness (Figure 1.2, Panel B). Competition, a key driver of productivity growth, is hampered by complex regulations and administrative burdens that act as entry barriers, while cumbersome insolvency procedures and judicial uncertainty raise financing costs and slow down the flow of resources to the most productive firms.

Over the last decades, growth has been mostly explained by favourable demographic developments, and a rising labour force supported growing per-capita incomes even as productivity declined. Demographics are now reaching a turning point, and over the next 25 years, rapid population ageing will reverse the entire boost to growth from demographics since the year 2000. Unless gains in labour productivity can offset slower labour force growth, economic growth is set to slow markedly over the medium to longer term.

Boosting economic growth will support further improvements in household incomes but will not be enough to ensure rising living standards for all Brazilians. The first decade of the millennium saw the emergence of an entire new middle class as inequality declined visibly amid strong growth and rising educational attainments (Neri, 2011). Since then, however, the extremes of the income distribution have gained weight again, hollowing out this new middle class. The pandemic support initially overcompensated income losses among poor households in 2020, but its withdrawal led to an increase in poverty rates in 2021 (Neri, 2022). Average real household incomes are now back to their levels of 2012, implying a lost decade in terms of social progress. Brazil has one of the highest levels of income inequality in the world (Figure 1.3, Panel A).

Figure 1.2. Low productivity and infrastructure competitiveness are impeding a stronger growth



Source: World Bank; World Economic Forum; and OECD calculations.

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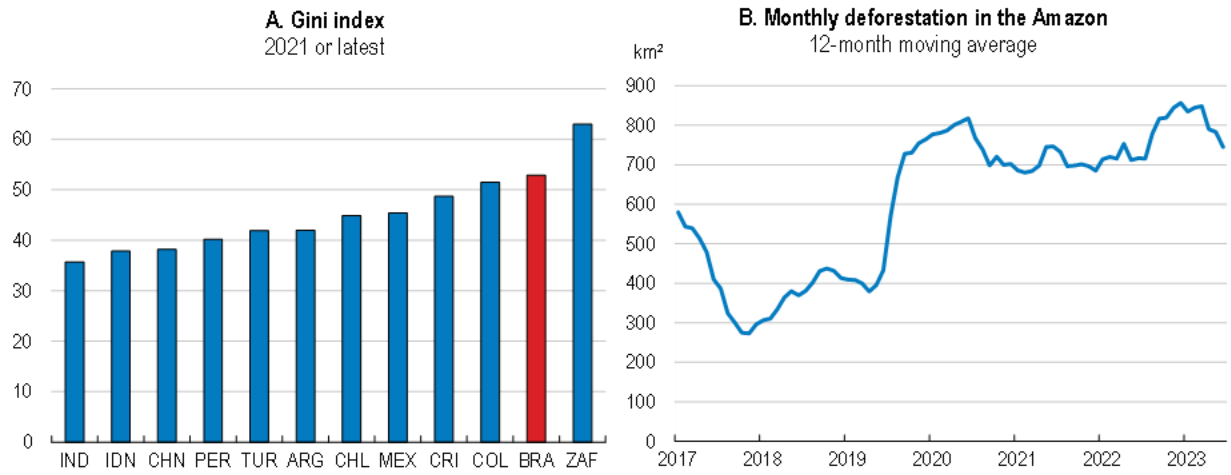
Social policies have played and will continue to play a key role for reducing poverty and fighting inequalities. Brazil's flagship anti-poverty programme *Bolsa Família* has been a well-targeted instrument to support those most in need. Its level has been raised substantially, on a permanent basis, in line with earlier OECD recommendations. An outstanding challenge is to find permanent fiscal space to finance this more generous social programme.

Labour market participation and employment remain about 20 percentage points lower among women than among men, and men earn on average 34% more, controlling for differences in qualifications. Lack of childcare services and public urban transport are an obstacle to higher female participation to the labour market. Despite significant public spending on education, learning outcomes remain weak and highly correlated with socio-economic background and race. Further improvements along these dimensions will be key to increase the country's human capital and potential growth.

Greening the economy represents a challenge but also offers opportunities. Deforestation is now falling again after increases in recent years, which had added to climate change risks. Deforestation is one of the main sources of greenhouse gas emissions, followed by agriculture.

Figure 1.3. Inequalities are high and deforestation has decreased recently



Note: Panel B shows monthly deforestation according to INPE's deforestation alert system, DETER.
Source: World Bank; Instituto Nacional de Pesquisas Espaciais; and OECD calculations.

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However, thanks to a remarkably clean electricity matrix based on hydropower and a rising share of other renewable sources, energy use and production have a relative low carbon footprint. The potential for solar and wind energy generation is outstanding in international comparison and may become a major competitive advantage in the future, with significant potential to strengthen Brazil's export performance.

Against this background, the main messages of this Survey are:

- Implementing the new fiscal framework and a comprehensive tax reform will restore confidence in public finances. Aligning monetary and fiscal policies in the fight against inflation will help to bring it back to target and keep expectations anchored. Social challenges have been forcefully addressed by enhanced social benefits, but further improvements in spending efficiency will be required.
- Strengthening productivity growth and investment will be key challenges for the years to come, including by boosting infrastructure investment and improving the planning, selection, prioritisation, and implementation of projects. Reforming the complex tax system and reducing regulatory barriers to competition would also boost firms' productivity.
- Introducing carbon pricing and climate adaptation measures will be key to deal with the challenges of climate change. Halting illegal deforestation and investing in smart technologies, training and financial capacity of low-scale farms will reduce the greenhouse gas emissions and accelerate the greening of the economy.

Following a strong recovery, the economy is growing above the low potential

Growth remains strong

The strong economic rebound from the pandemic that initiated in 2021 continued in 2022 as GDP growth reached 2.9%, significantly above current OECD estimates of potential growth (Table 1.1). Following a slowdown in late 2022, growth rebounded strongly on account of a buoyant agriculture sector. GDP growth is projected to reach 3.0% in 2023 and 1.8% in 2024, driven by strong domestic demand. Household consumption growth continues to be the main engine of growth in 2023 despite tight monetary conditions (Figure 1.4) On the supply side, a record agricultural harvest provided a strong boost to GDP growth in

2023, while the services sector is growing at a slower pace. As external demand is expected to decline and commodity prices fall, exports will contribute moderately to growth. Fiscal policy uncertainty has been weighing on confidence and investment but is expected to dissipate with the implementation of a new fiscal framework.

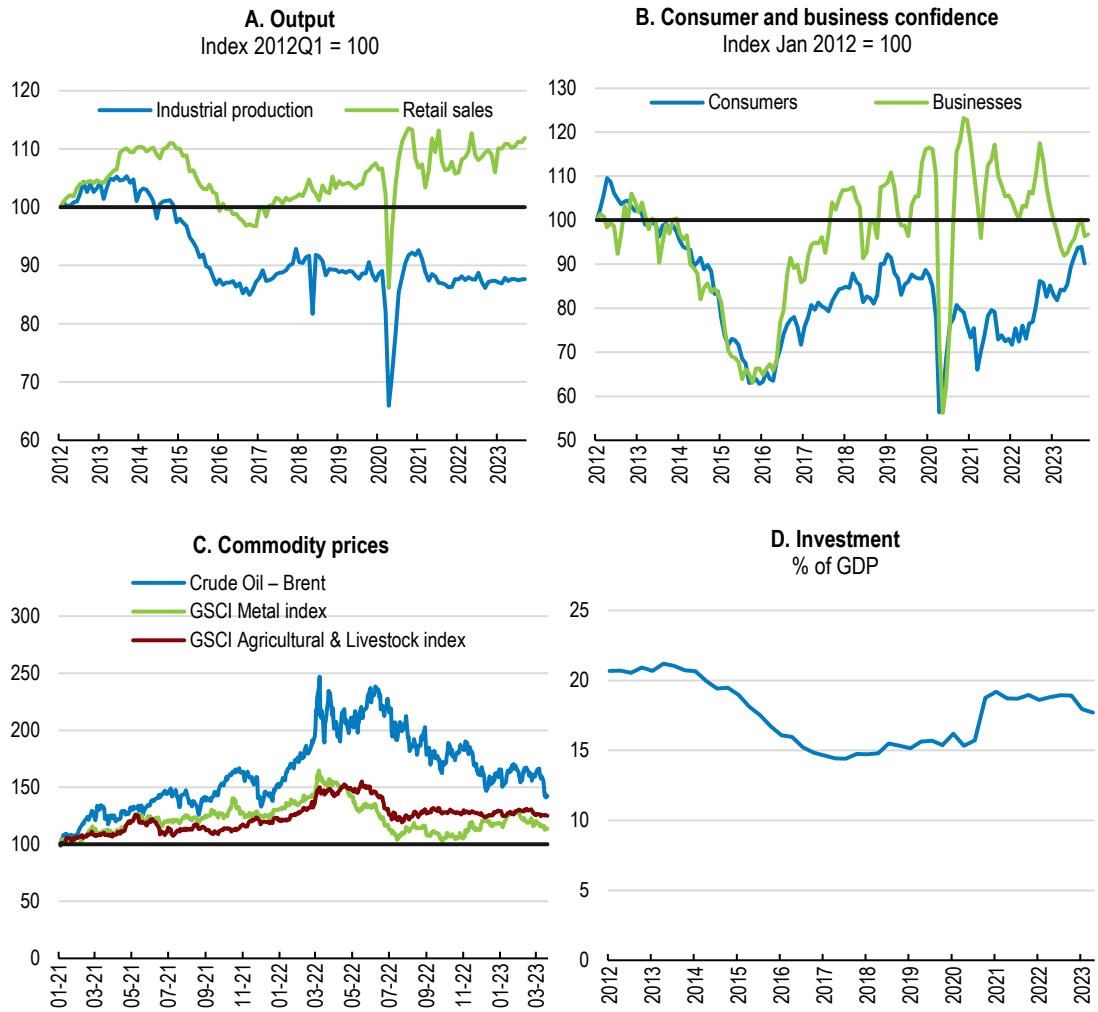
The labour market has been improving since the pandemic, but unemployment is projected to stabilise over 2023-24. Labour participation remained below pre-pandemic levels over 2022 but is improving, while job creation reached a historic high during 2022. The unemployment rate has declined continuously, from over 14% in early 2021 to 8.0% in July 2023, partly related to lower labour participation (Figure 1.5). Average monthly nominal wage increased by 7.5% in 2022, corresponding to an average real decrease of 1.1%. Higher social transfers to low-income families have contributed to sustained demand in 2022. The effect should be fading in 2023, though the increase of civil servants' wages announced by the federal government and the permanent increase of social transfers will strengthen aggregate household income.

Table 1.1. Macroeconomic indicators and projections

	2021	2022	2023	2024	2025
Gross domestic product (GDP) (%)	5.3	3.0	3.0	1.8	2.0
Private consumption	4.0	4.3	2.8	2.1	1.9
Government consumption	3.5	1.5	1.8	1.3	1.3
Gross fixed capital formation	16.6	0.8	-2.3	0.8	1.2
Final domestic demand	6.0	3.1	1.7	1.7	1.7
Stockbuilding[1]	0.6	-1.0	0.3	0.1	0.0
Total domestic demand	6.5	2.1	1.9	1.9	1.7
Exports of goods and services	6.5	5.9	7.2	4.0	3.7
Imports of goods and services	12.1	0.6	2.4	4.6	2.1
Net exports[1]	-0.9	1.0	1.0	0.0	0.4
Other indicator					
Unemployment rate (% of labour force)	13.2	9.3	7.8	8.0	8.2
Consumer price index (annual growth rate)	8.3	9.3	4.6	3.2	3.0
Consumer price index (December-to-December % changes)	10.1	5.8	4.6	3.2	2.9
Core consumer price index (annual growth rate)	5.1	9.3	6.1	3.4	3.0
Current account balance (% of GDP)	-2.8	-2.8	-1.7	-1.6	-1.5
General government headline balance (% of GDP)	-4.6	-4.6	-7.2	-6.4	-5.8
General government primary balance (% of GDP)	0.7	1.3	-1.0.	-0.5	-0.5
General government gross debt (% of GDP)	78.3	72.9	77.5	80.0	82

Note: Contribution to changes in real GDP.
Source: OECD projections, OECD Economic Outlook Database, Central Bank of Brazil, and IMF.

Figure 1.4. Indicators point to growth picking up



Source: CEIC; OECD analytical database; Central Bank of Brazil; and OECD calculations.

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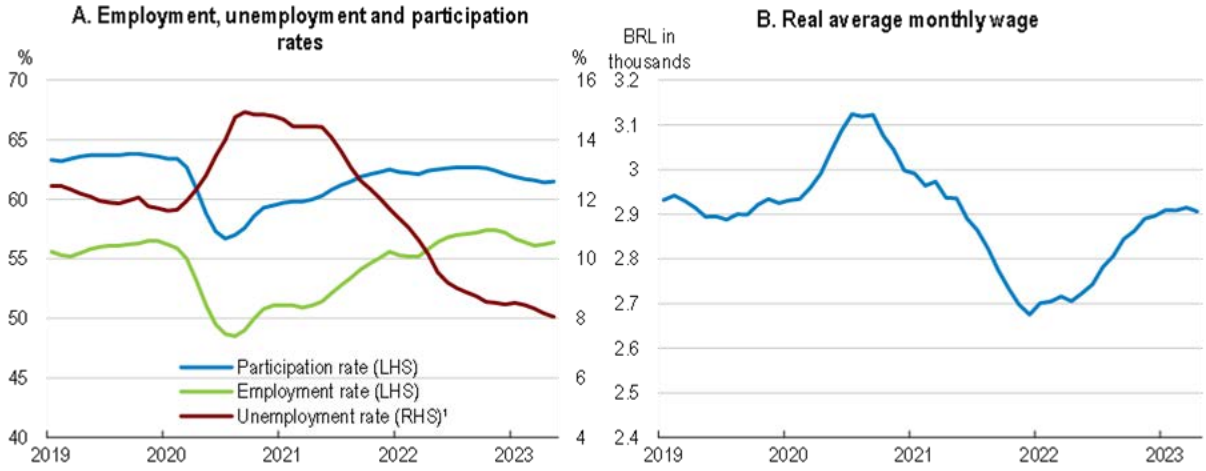
Figure 1.5. The labour market has improved but real wages remain below pre-pandemic levels



Note: 1. CEIC seasonally adjusted series by X-12 ARIMA.
Source: IBGE; and CEIC.

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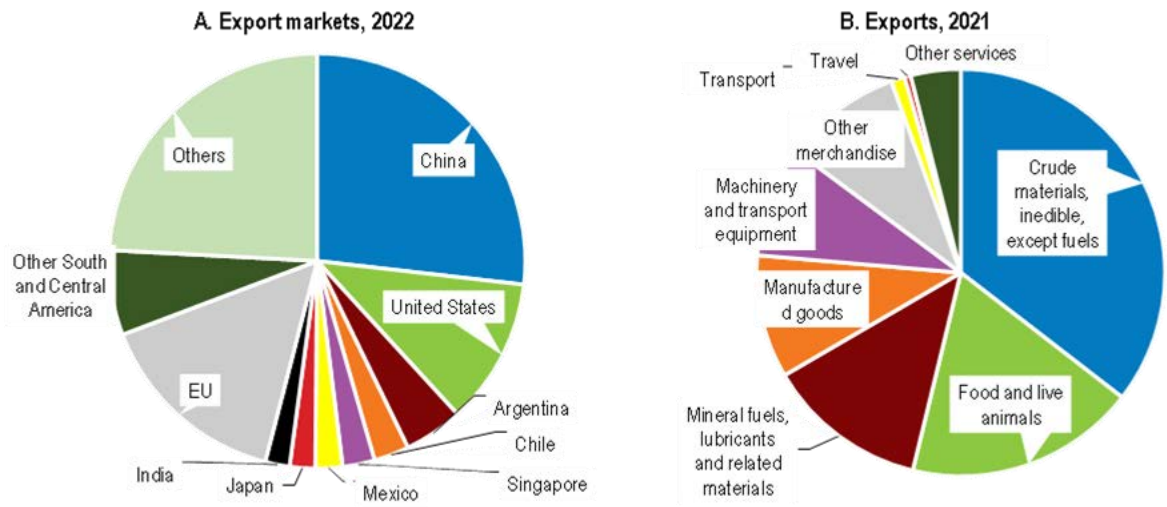
Exports growth remained strong during 2022, partly supported by commodities. Favourable weather conditions for agricultural production boosted exports in early 2023 but falling commodity prices and weaker global demand, including from China, Brazil's main export market, will limit export performance (Figure 1.6). Imports will rebound in 2024 driven by capital goods. The current account deficit in 2022 has been driven by the deterioration of the income and transfers balance but will be recovering in 2023-2024 (Figure 1.7). Overall, the exchange rate remained relatively stable as internal interest rates increased along with increases in advanced countries. The economy has significant cushions against external financial risks, as currency reserves of 15.8% of GDP (as of 2023Q1) make the public sector a net creditor in foreign currency.

Figure 1.6. A balanced export products and destinations matrix



Source: UN Comtrade; UNCTAD; and OECD calculations.

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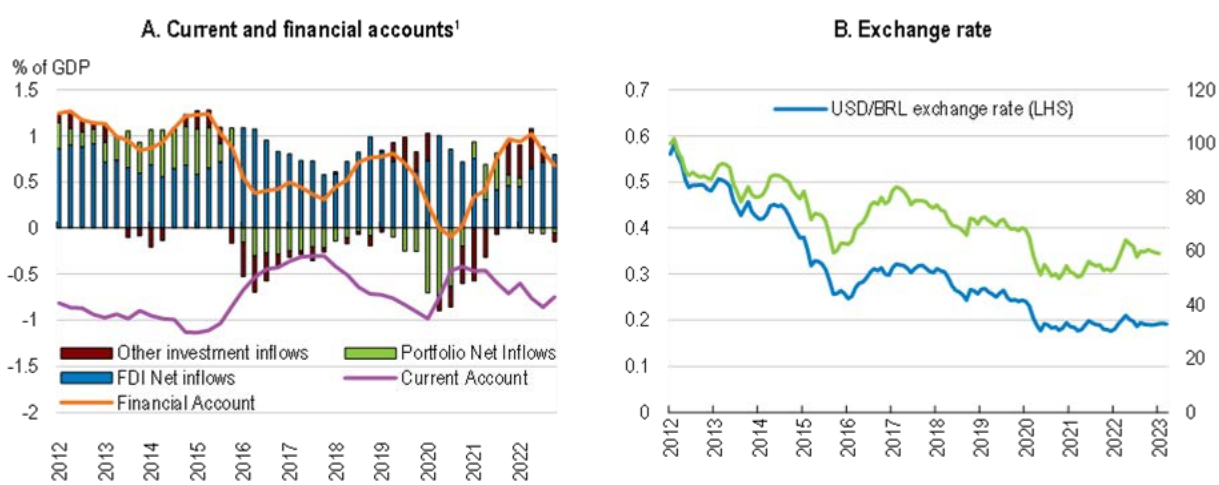
Figure 1.7. The external balance remains robust to foreign financial developments



Note: 1. Moving average, excluding reserves.
Source: Central Bank of Brazil; CEIC; and OECD calculations.

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Risks are balanced

Risks to economic activity are balanced. On the upside, a successful implementation of the new fiscal framework and other reforms, could provide an even larger boost to confidence in public finances than expected and sustain stronger investment. A successful adoption of the tax reform in 2023 could raise productivity beyond current expectations (Table 1.2). On the downside, a failure to implement key reform plans, such as the tax reform or the new fiscal framework, could erode confidence, leading to lower growth. Moreover, a slower decrease in inflation could delay monetary policy easing, which would hurt investment and consumption. Finally, weaker growth in China, Brazil's main trading partner, could lead to lower exports.

Additional risks include the impact of protracted high rates on household debt service costs, especially for revolving loans which have outgrown other loan modalities. Global financial market developments, including policy rates in advanced countries, remain a risk for financial flows and the currency. By contrast, direct macroeconomic risks from Russia's war against Ukraine are limited, as Brazil's goods trade with Russia, Ukraine and Belarus is modest.

Table 1.2. Events that could lead to major changes in the outlook

Shock	Possible impact	Policy response options
Failure to implement structural reforms	Without structural reforms, potential growth will remain low at around 1.5% and render improving fiscal outcomes and bringing debt down difficult.	Accelerate and implement the tax reform, and other structural reforms.
A flight to safer assets in global capital markets	If capital flows to emerging markets were to dry up or decline substantially, Brazil could find it more difficult to tap into external financing sources. This could trigger higher interest rates and lower growth.	Maintain a credible fiscal and monetary policy to reduce inflation. Lower inflation would open space for reducing policy rates while preserving real yields.
Slower growth in China and the United States due to trade tensions.	Rising trade tensions could lead to a slowdown of demand from Brazil's main trading partners. Lower commodity prices would reduce exports and growth.	Implementing trade agreements with major economies has the potential to further diversify Brazil exports destinations.

The financial system has substantial safety buffers

Brazil's financial sector has remained stable and resilient since the COVID-19 pandemic. Bank capitalisation remains comfortably above regulatory requirements (Figure 1.8). Against the background of a recent relaxation of capital requirements aimed at encouraging banks to lend, regulatory capital to risk-weighted assets has decreased by 2 percentage points compared to pre-pandemic levels. Non-performing loans have also been on an increasing trend in 2022 along with higher inflation and interest rates, and the withdrawal of post-COVID-19 policy and financial support measures. Stress tests carried out by the Central Bank (BCB, 2023) suggest that banks are enough resilient to macro-financial shocks and can withstand substantial shocks to growth or risk premiums. Capital and liquidity buffers are adequate, and if needed, banks could draw down their capital conservation buffers and their stock of high-quality liquid assets. High margins point to scope for strengthening competition among financial institutions, as currently pursued by the Central Bank (BCB, 2022).

Figure 1.8. Banks are well capitalised but loan quality has deteriorated

Source: Central Bank of Brazil.

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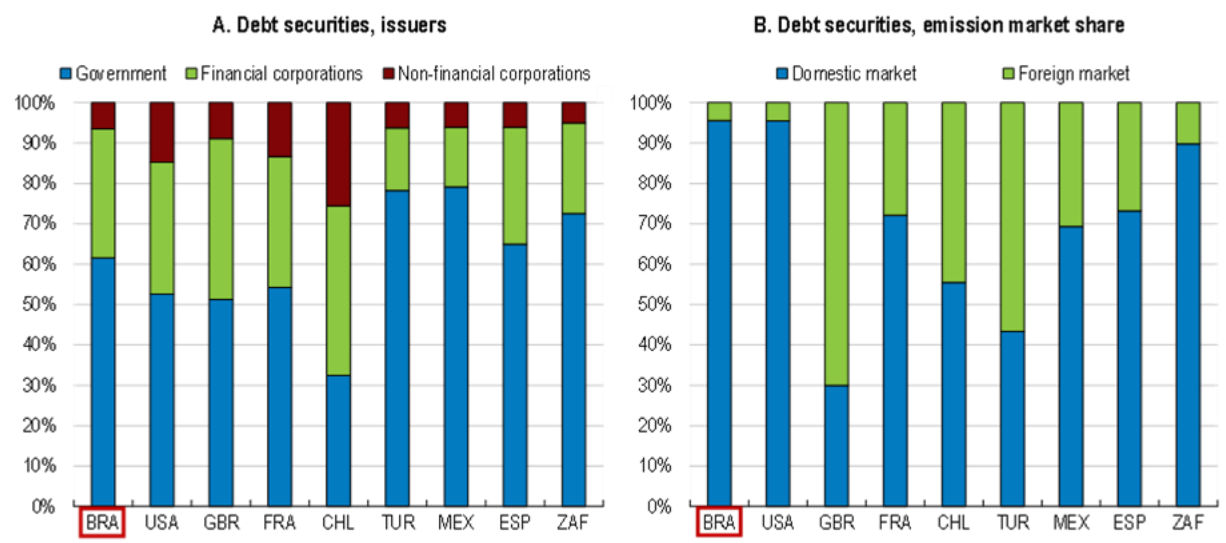
The financial system has substantial exposure to domestic public debt (61%) and financial markets-sovereign linkages should be closely monitored. Government debt is predominantly issued on the domestic market and in domestic currency (Figure 1.9, Panel B). Gross public debt is exposed to roll-over risk as 29% of gross public debt comes due within 12 months, reflecting short average maturities of 4 years (Tesouro Nacional, 2023). Interest expenses are vulnerable to short-term changes in economic conditions as 38% have floating rates linked to overnight interbank rates and 32% of outstanding bonds are inflation-linked. With over 95% of gross public debt denominated in domestic currency, exchange rate risks are not a concern for public debt, especially as foreign-currency bonds have a longer average maturity of 7 years.

Figure 1.9. The financial system is exposed to public debt



Note: Data for 2022Q3.
Source: Bank for International Settlements.

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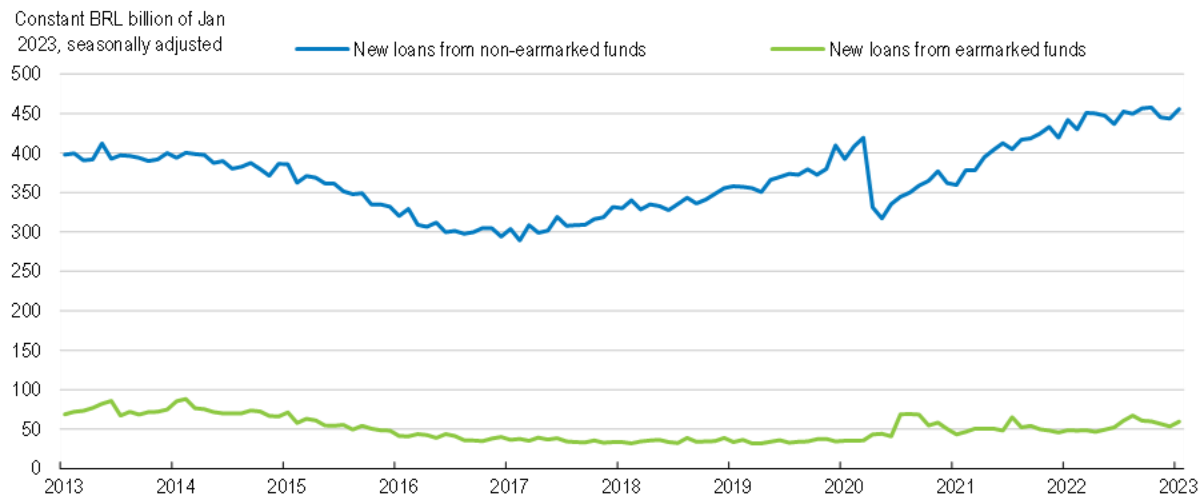
A new instant electronic payment system (PIX) established by the Central Bank in late 2020 and an enhanced credit registry that also includes positive payment histories in addition to payment defaults (*Cadastro Positivo*) are improving both the efficiency and the inclusiveness of the financial system. Two thirds of the adult population use PIX and 131 million individuals have either made or received a PIX

transaction. The progressive introduction of the new credit registry in 2021 has enhanced the sharing of customer data between financial institutions and is supporting competition in financial intermediation. Analysis from the Central Bank suggests the database has led to a 10.4 percent reduction in borrowing costs on non-payroll-deductible loans (BCB, 2021).

Given significant earmarking of bank funds towards directed lending programmes, Brazil's credit market is segmented into a credit market from non-earmarked sources using market rates and an earmarked credit market with regulated rates. New loans in the non-earmarked credit market have increased three times more rapidly than directed loans from earmarked funds. This reflects the evolution towards a more competitive credit market (Figure 1.10).

Figure 1.10. The competitive segment of the credit market is gaining weight



Note: Both lines include corporate borrowers and households.
Source: Central Bank of Brazil.

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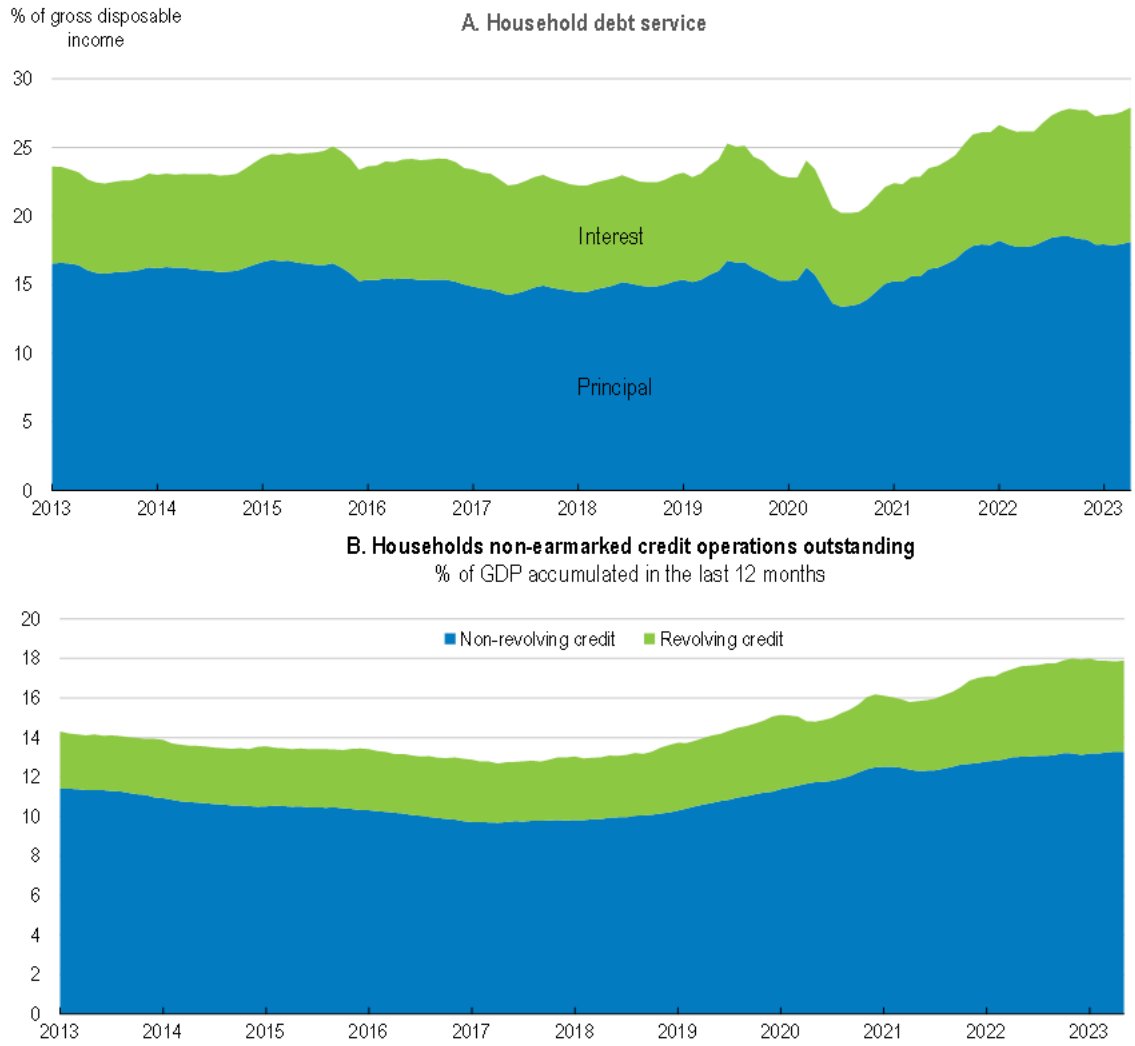
Household indebtedness has increased during the post-pandemic recovery. Household debt service stands at 27% of gross disposable income in early 2023 and has been increasing steadily since mid-2021, driven by the sharp rise of interest rates and to some extent by higher debt (Figure 1.11, Panel A). Second, the share of revolving credit lines to households has been increasing since the pandemic (Figure 1.11, Panel B). Mortgages credit remains low. The evolution of revolving credit should be monitored closely, and macro-prudential measures strengthened, to prevent an excessive build-up of debt. A recent programme to promote the debt restructuring of highly indebted households may help reducing debt service burdens and allow them a fresh start. Credit to corporates both from banks and the capital market amount to 51% of GDP and declined marginally in the second semester of 2022 but continued to grow at levels higher than those of the pre-pandemic period (BCB, 2023). Risks associated with credit to firms remain high, but provisions are above the estimated expected losses for the loan portfolio (BCB, 2023).

Figure 1.11. Household debt service has increased and revolving credit lines have gained weight



Source: Source: Central Bank of Brazil.

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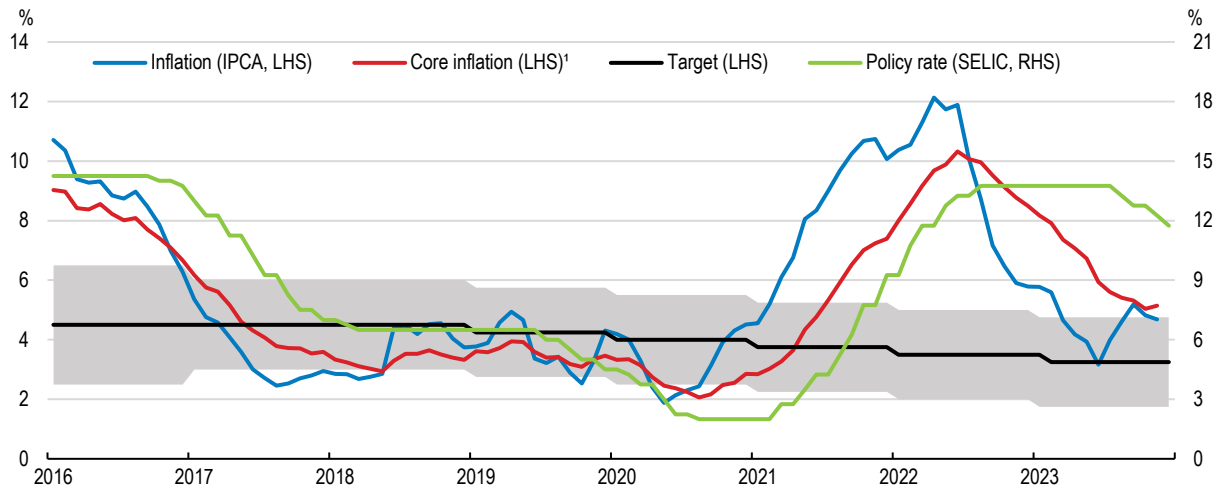
Monetary policy has reacted forcefully to persistently high inflation

Inflation accelerated substantially from the end of 2020, mostly explained by higher food and energy prices (Figure 1.12). In August-September 2021, the worst drought in over 90 years significantly reduced water levels in the reservoirs used for electricity generation. The drought also contributed to rising food prices, while pervasive bottlenecks in global value chains pushed up prices of industrial goods. As a result, inflation reached more than 10% in 2021, a record high since 2015.

During early 2022, Russia's war of aggression against Ukraine and the resulting global price surge added to inflationary pressures. Inflation peaked in April 2022, before starting to decline more visibly as of August. Headline inflation has receded from 11.9% year-on-year in June 2022 to 3.2% in June 2023, but then picked up in August (4.16%) and in September (5.2%). It has slightly declined in October to 4.8% and 4.68% in November. Though declining, core inflation remains above headline inflation and the inflation target. The decline of headline inflation was initially mainly due to falling international oil prices and significant tax relief that reduced the tax burden on fuels, electricity, natural gas, communications, and

public transport. The tax exemptions on fuels have mostly been removed in early 2023. Since the beginning of the year, the decline in inflation has become broader based, starting with declining food and petrol prices, and then tradable goods. Although core inflation remains far more persistent than the more volatile consumption items, the number of individual items with rising prices is now declining. Slower credit growth will reduce household consumption and contribute to lower inflation. Although ongoing monetary policy tightening in advanced countries may continue to put pressure on the exchange rate, the currency has strengthened recently.

Figure 1.12. Headline and core inflation have declined

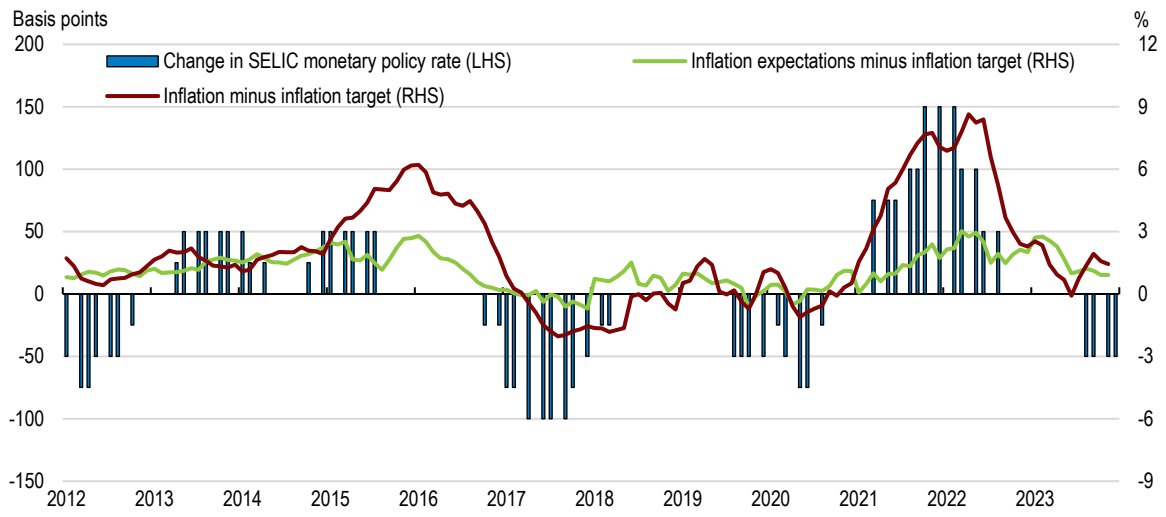


1. Core inflation excludes energy and food products. The shaded area corresponds to the inflation tolerance band.
Source: OECD Economic Outlook database; Central Bank of Brazil; and OECD calculations.

StatLink https://stat.link/i4plfb

The central bank responded swiftly and aggressively to rising inflation and took decisive and successful actions to avoid a de-anchoring of inflation expectations (Figure 1.13). The benchmark policy interest rate (Selic rate) increased from 2% in March 2021 to 13.75% in August 2022. The central bank initiated monetary policy easing in August 2023 by reducing the policy rate from 13.75% to 13.25%, followed by further rate cuts to 12.75% in September, 12.25% in November and 11.75% in December. However, as inflation has declined, real interest rates remain high; currently among the highest among advanced and emerging economies. In light of the downward trend of inflation, there is room to continue easing policy rates, while ensuring that inflation expectations are anchored at the target in the medium run. The recent adoption of a continuous 3 percent inflation target from 2025 onwards, in line with regional peers, should help reduce uncertainty and improve monetary policy effectiveness. Preserving the credibility of monetary policy is essential to maintain inflation expectations firmly anchored. Curbing demand pressures emanating from fiscal policy in the short run and boosting the credibility of fiscal policy in the longer run would support monetary policy in controlling inflation and could allow interest rates to come down further.

Figure 1.13. Monetary policy has reacted successfully to rising inflation



Note: Inflation expectations are calculated as market expectations from the Central Bank's FOCUS survey, 12-months ahead.
Source: CEIC; Central Bank of Brazil; and OECD calculations.

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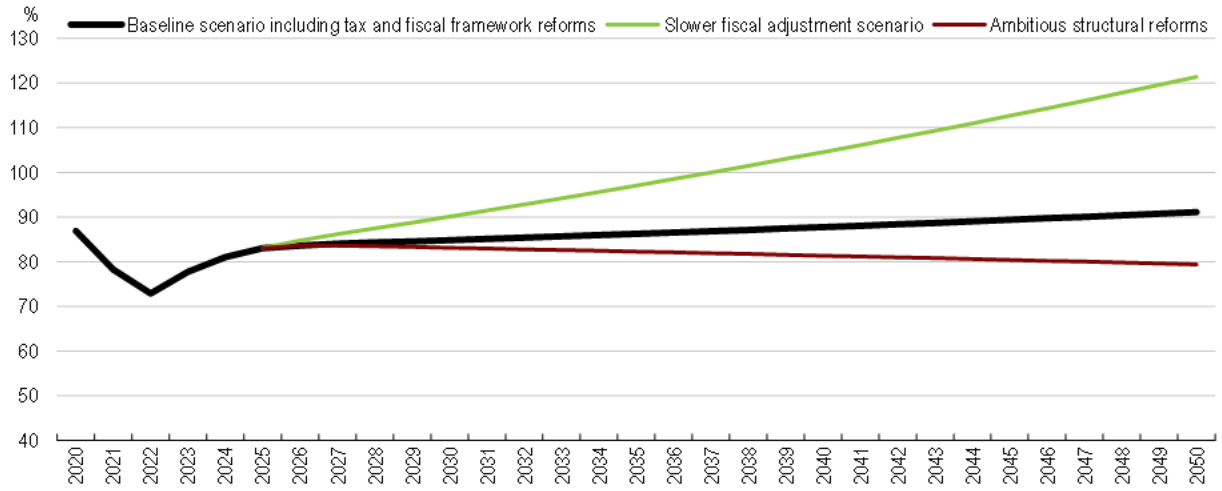
Fiscal reforms are needed to stabilise public debt and create fiscal space

Fiscal support, provided during the early stages of the COVID-19 pandemic and then in 2022 to cushion the impact of higher international energy prices on households and firms, has been almost entirely withdrawn. In April 2020, the government introduced a temporary emergency benefit of BRL 600 per month for self-employed and unemployed workers earning up to half the minimum wage. The emergency benefit was reduced to half that level in September 2020 and completely withdrawn in December 2020. To cushion the impact of inflation on households and firms, temporary tax exemptions on fuel were introduced in July 2022. These exemptions have been progressively withdrawn in December 2022 and March 2023. Remaining exemptions only apply to diesel and are scheduled to end in December 2023.

COVID-19-related policy measures drove gross public debt to 87% of GDP by the end of 2020. The strong recovery in 2021 and 2022 led to debt receding to 73% of GDP by the end of 2022, but an expansionary fiscal policy, higher interest rates and lower growth are now putting debt on an upward trending trajectory again, with gross public debt reaching about 80% of GDP in 2024 according to OECD projections. OECD debt simulations further suggest that gross public debt will reach 90% of GDP in 2047. This baseline scenario assumes that the adopted new fiscal framework and the tax reform are implemented lifting potential growth by around 0.5 percentage point (Figure 1.14). The primary fiscal surplus would rise to 1.0% of GDP from 2026, accounting for higher tax revenues from improvements in tax collection.

The debt trajectory is highly sensitive to the implementation of the reform agenda. A lower fiscal consolidation (exemplified by a balanced primary surplus from 2025) would lead to a clearly unsustainable debt trajectory with the debt level reaching 100% of GDP as soon as 2037 and a strong upward slope, as shown by the green line. A more ambitious package of structural reforms (see Table 1.3) would boost potential growth and lead to a decline of the debt-to-GDP ratio (the red line in Figure 1.14).

Figure 1.14. Reforms are needed to stabilise gross public debt



Note: Projections of ageing-related expenditures are reflected in all scenarios. In the baseline scenario, the primary fiscal result improves from -1.2% in 2022 to +1.0% of GDP by 2026, in line with projections by the Treasury and the OECD. After 2026 compliance with the new fiscal framework is assumed. The exchange rate and the interest rate are assumed to remain constant after 2025. The tax reform is assumed to boost GDP growth to 2.0% from 2026. The ambitious reforms scenario assumes structural reforms that add an additional 0.5 percentage point as of 2026 (see table 1.3). The slower fiscal adjustment scenario assumes that compliance to the new fiscal rule is not strict, and the primary balance surplus is 1 percentage points below the baseline.
Source: OECD calculations based on National Treasury, IBGE (Instituto Brasileiro de Geografia e Estatística), Brazilian Central Bank and OECD projections.

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Table 1.3. Expected gains from structural reform are substantial

Estimated impact of selected reforms on real GDP after 15 years

Reform	Impact on real GDP
Scenario A: Reduce barriers to entrepreneurship and competition (e.g., by cutting administrative burdens and streamlining licensing requirements)	5.3%
Scenario B: Stronger global integration (e.g., by reducing tariffs and opening the capital account)	8.0%
Scenario C: Improve institutions, economic governance and reduce corruption, including the tax reform	6.3%
Scenario D: Increase permanently public investment by 2 pp. of GDP	2.5%
Ambitious reform scenario: all the above together	14.1%
Implied average annual growth increase (of ambitious reform scenario):	1 percentage point

Note: These estimates were obtained on the basis of the OECD Long term growth model (Guillemette and Turner, 2018). Scenario A assumes aligning product market regulations as captured by the OECD PMR indicator with the current OECD average by 2060. Scenario B assumes a reduction in average tariffs by around 7 percentage points by 2025, when they would reach the level prevalent today in the five OECD economies with the lowest tariffs. In addition, the capital account is assumed to open gradually to reach Chile's current level by 2025. Scenario C assumes that institutional quality, as captured by the Worldwide Governance Indicators (Kaufmann, Kraay and Mastruzzi, 2010), converges to the current OECD median value by 2060. Scenario D assumes raising public investment by 2 pp. of GDP permanently leading the capital stock to stabilise around 8% higher than in the baseline scenario. The individual reform effects do not sum up to the effect of the ambitious reform scenario due to non-linear effects in the model.
Source: OECD calculations.

Strengthening fiscal rules will be key for debt sustainability and confidence

Brazil's budget process is constrained by widespread revenue earmarking and mandatory spending floors for certain expenditure items. The 1988 Constitution introduced separate minimum shares of spending earmarked for health, education, and social security. For example, at least 18 percent of tax revenue should be allocated to education at the federal level and 25 percent at the subnational level. While ensuring

sufficient funding for health, education, and social security is understandable from a social policy perspective, it limits the flexibility of fiscal policy to account for demographic changes or adjust to adverse economic shocks. Budget rigidities contribute to the pro-cyclicality of fiscal policy and are associated with lower efficiency of public spending (Herrera and Olaberria, 2020).

A significant share of mandatory expenditures is indexed, either to the minimum wage or inflation. Minimum pension benefits, which the overwhelming majority of pension beneficiaries receive, are indexed to the minimum wage, leading to increases in the minimum wage having sizeable fiscal implications. Indexation has led to a considerable increase in mandatory expenditures and reduced fiscal space. At the end of 2022, 91% of the proposed budget for 2023 reflected mandatory spending, leaving the new government with very limited fiscal space for implementing policy priorities and also for public investment.

Public finances have been governed by a series of fiscal rules, often strongly focused on the short-term. Fiscal targets can change every year, creating some uncertainty about the fiscal stance in the medium-term. A public expenditure ceiling established in 2016 sought to make fiscal policy more predictable and soon became the most binding fiscal rule. The rule restricted real spending growth to zero, but without addressing constitutionally mandated spending items and automatic indexation mechanisms.

Ad hoc changes to the fiscal rules became increasingly frequent to avoid breaching the rules, weakening the credibility of the fiscal framework. In 2021, for example, large spending items were excluded from the spending ceiling and the primary balance target. Successive changes have created fiscal uncertainty and made the rules more difficult to enforce. Without a waiver from the rule for 2023 voted by the Congress in December 2022, a recent 50% increase in benefit levels of the *Bolsa Família* transfer programme, one of the main electoral promises of the current administration, would not have been possible.

A new fiscal framework was approved by Congress in August 2023, meant to enhance medium-term predictability in public finances while also adding flexibility, most notably for investment. The new fiscal framework establishes a rolling four-year primary balance target, with a tolerance band of 0.25 percentage points around it, providing a prudential margin to accommodate moderate shocks affecting public finances. Real growth in public spending is allowed, within a range of 0.6% and 2.5%, but capped at 70% of the previous year's effective revenues growth. This ensures that spending is not based on unrealistic assessments of future revenues. It also guarantees that whenever revenues exceed expectations, part of it is used to reduce public debt. The new framework also contains a mechanism to bring the primary balance back to target when deviations occur: If the actual primary balance is below the floor of the tolerance band, public spending growth in the following year will be limited to 50% of effective revenue growth. The new rules replace the current primary balance target and the expenditure ceiling rule, albeit at the cost of additional complexity.

The new framework also establishes that the annual budget law should provide public debt projections over 10-years, assuming compliance with the established primary balance targets, to assess the associated debt-to-GDP trajectory and fiscal sustainability. Experience from other countries points to the benefits of using the debt trajectory to anchor fiscal rules (Fall et al., 2015). In Colombia, for example, despite compliance with the structural primary balance target introduced in 2011, debt continued to increase significantly. To address concerns regarding the long-term sustainability of public finances in Colombia, the medium-term fiscal framework was reformed in 2021 to formally link the structural primary balance target to a sustainable public debt trajectory (Box 1.1).

Reducing budget rigidities is one area where the new rule is unlikely to bring much progress. Scaling back mandatory spending floors and earmarked revenues, while rethinking some automatic indexation mechanisms, would allow more flexibility to adjust policies to changing priorities and Brazil's volatile macroeconomic environment and should be a priority (OECD, 2020a; Medas, 2019). Developing indicative and rolling multi-year budget plans would be a better alternative option to ensure appropriate funding of priorities and to protect public investment and social spending over time (Box 1.2).

Box 1.1. Colombia's Medium-Term Fiscal Framework

Following the pandemic and the temporary suspension of fiscal rules in 2020, the Colombian government enacted the "Social Investment Law" in 2021, which re-activated the fiscal framework and re-anchored the fiscal path with explicit deficit targets linked to a new debt limit. In this revamped medium-term fiscal framework, the net government debt should not exceed 71% of GDP in any circumstances. Nonetheless, the structural primary balance target should be calculated and defined so that the net government debt reaches 55% of GDP, to provide a prudential margin. If public debt at some point exceeds 71% of GDP, the structural primary balance target will be automatically set to at least 1.8% of GDP until debt is brought back below its limit.

Source: Comité Autónomo de la Regla Fiscal (carf.gov.co).

In Brazil, annual budgeting often fails to take into account the full cost of policy decisions and it also fails to provide resource predictability for line ministries. Since the early 2000s, multi-year plans, known as *Planos Plurianuais*, were meant to provide medium-term guidance on public spending. However, the link between the multi-year plans and annual budget laws is weak, and they are not binding. The allocation of budget resources across ministries should be anticipated and discussed for multiple years to ensure compliance with the new medium-term primary balance target. The budget allocations should guarantee that multi-year fiscal objectives are effectively translated into budget execution. Several OECD countries have successfully implemented multi-year budgeting planning (Box 1.2). The new fiscal framework provides for the establishment of a new medium-term budget plan, with a rolling four-year horizon, which would be annexed to the annual budget law and should be swiftly implemented.

Box 1.2. Multi-year budgeting in selected OECD countries

Medium-term budgeting has long been proposed to reduce over-reliance on annual budgets. Australia was the first OECD country to introduce a medium-term budget framework in 1983 and many countries followed with some sort of medium-term budget plan, based on different approaches.

Indicative multi-year budget plans. Some countries use indicative multi-year expenditure and revenue estimates, presented with the annual budget and intended to reflect future costs of current policies. Indicative multi-year budget plans can contain significant detail. In New Zealand, for example, the indicative multi-year budget plan is broken down to the programme level. In Canada, multi-year plans are detailed at the ministry level. These detailed multi-year estimates are meant to inform and guide the decision-making process, without binding future decisions.

Binding multi-year budget plans. In other countries, multi-year expenditure and revenue estimates are presented with the annual budget as a commitment and are intended to bind future policy changes. In such cases, the level of detail tends to be lower, and the frequency of revisions varies depending on the level of aggregation. In Austria, Finland, the Netherlands, and Sweden, a binding expenditure limit is fixed for the central government for two or more years and cannot be revised. Multi-year limits on expenditure categories within that aggregate ceiling are not imposed but left to the annual budgeting process. In France and the United Kingdom, multi-year expenditure limits are fixed for each line ministry but can be revised during that period. Australia publishes binding multi-year expenditure estimates for each programme, which can be revised twice a year under specific circumstances.

Source: Jason, H. et al. (2013), "Chapter 4: Medium-Term Budget Frameworks in Advanced Economies: Objectives, Design, And Performance". In Public Financial Management and its Emerging Architecture. USA: International Monetary Fund. Retrieved from https://www.elibrary.imf.org/view/book/9781475531091/ch004.xml

Subnational governments can create sizeable fiscal risks for the central government. Current law establishes several rules regarding debt and wage bill limits to prevent the build-up of fiscal imbalances at the subnational level. However, these rules have not been effectively monitored and are hard to enforce, ultimately leading to soft budget constraints for subnational governments (Medas et al., 2019). The debt ceiling is defined at 200% of net current revenues for states and 125% for municipalities, allowing for large increases in spending and debt during economic booms, which are then hard to revert during downturns. A few states and municipalities have built up large debt over time and some of them are still taking up more debt than allowed by law. The Federal government intervened several times on subnational finances, creating an expectation for future financial support, and incentives for further spending (Bornhorst et al., 2019).

In practice, the CAPAG system ("Capacidade de Pagamento") has been the most effective tool to limit fiscal risk from subnational governments by conditioning federal guarantees for new subnational lending to minimum fiscal performance standards (Box 1.3). To remain relevant, the CAPAG indicators' thresholds should be regularly updated and calibrated based on rigorous debt sustainability analyses. In the future, the CAPAG ratings could be used to determine the extent of permitted new borrowing of subnationals rather than to decide eligibility for federal guarantees. This would allow those subnational governments with strong fiscal accounts to borrow more, while in turn creating long-term incentives for subnationals to strengthen their fiscal accounts.

Brazil's high degree of decentralisation would even require more coordination in the pace of fiscal adjustment across levels of government. So far, the government has not clarified how efforts to comply with the new fiscal rules will be distributed across the central government, states, and municipalities, nor how the new fiscal rules will interact with other existing rules, such as the Golden Rule, which has done little to preserve public investment in the past. Complexity could be reduced by consolidating all fiscal rules into one law, ensuring consistency and clarifying the hierarchy among different fiscal rules.

Box 1.3. The "Capacidade de Pagamento" or CAPAG internal credit ratings system

Subnational governments applying for credit guarantees from the Federal government are subject to a system of internal credit ratings. Subnational entities can be classified in one of four categories, reflecting the health of their fiscal position. Ratings are determined according to: (i) the ratio of gross consolidated debt to net current revenues; (ii) the ratio of current expenditures to adjusted current revenues; and (iii) the ratio of financial obligations to gross disposable cash balances. To be eligible to receive a credit guarantee from the Federal government, a subnational government must achieve a minimum rating standard.

Source: Saxena (2022), How to manage fiscal risks from subnational governments, How To Notes, Note 22/03, Fiscal Affairs Department, International Monetary Fund, Washington D.C., September 2022. ISBN 9798400218378; Medas et al. (2019), "Brazil: Strengthening the framework for subnational borrowing", Technical Report, Fiscal Affairs Department, International Monetary Fund, Washington D.C., July 2019.

Table 1.4. Past OECD recommendations on fiscal policies

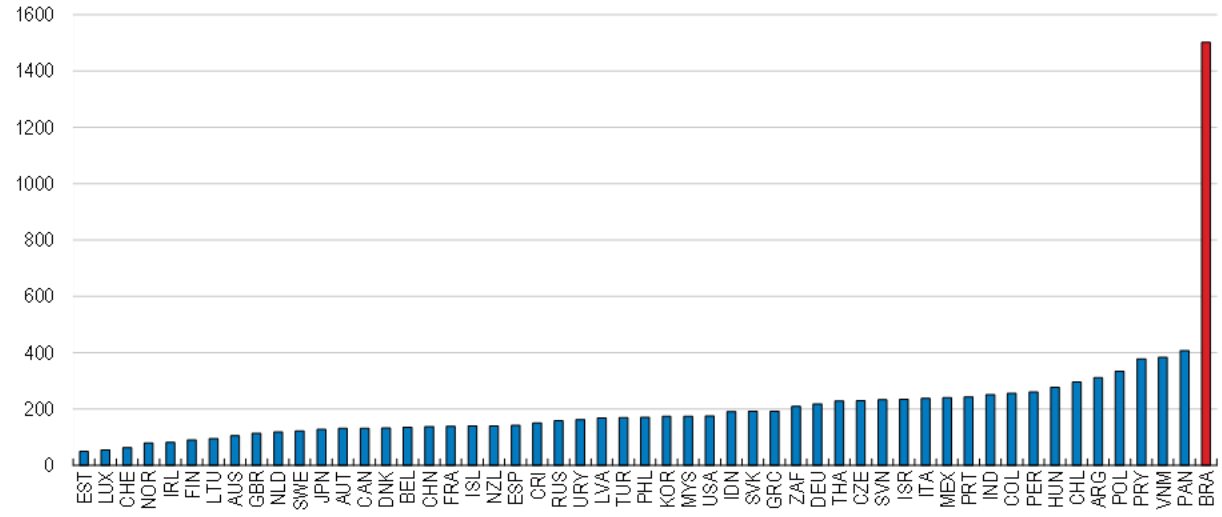
Recommendations	Actions taken since the 2020 Economic Survey
Ensure fiscal sustainability by continuing to comply with current fiscal rules, including the expenditure ceiling.	Fiscal rules have been frequently modified since 2020. A new fiscal framework has been proposed to Congress to reaffirm the government's commitment to sound public finances.
Reduce budget rigidity by reviewing revenue earmarking, mandatory spending floors and indexation mechanisms.	No progress made.

Redesigning the tax system can strengthen growth and equity

Brazil's tax system is extremely complex and induces several distortions to the economy. First, tax compliance costs are among the highest in the world (Figure 1.15). From an efficiency perspective, costly compliance activities can be seen as a waste of economic resources, as they increase the implicit tax burden of individuals and businesses without increasing the revenues of the government. Second, the incentives created by the current tax system distort economic decision-making and the optimal allocation of resources. Finally, complex rules can provide tax planning opportunities for well-informed taxpayers, thus contributing to the persistence of income inequality.

Figure 1.15. Tax compliance costs are extremely high

Hours required to prepare taxes, 2018



Source: World Bank.

StatLink https://stat.link/xroyk0

There is ample scope to simplify indirect taxation, for instance. Currently, there are five main different taxes on the consumption of goods and services, applying to sometimes overlapping bases and at different levels of government: three federal taxes (PIS, Cofins and IPI), one state tax (ICMS) and one municipal tax (ISS). None of these taxes has a large base: the IPI only applies to industrial goods; the ICMS applies to the sale of merchandise and to transport and communication services provided across municipalities and states; the ISS applies to remaining services defined in a list; PIS and Cofins apply only to firms' revenues. It is often difficult to determine where the scope of the ISS ends and where the incidence of the ICMS starts. Determining which goods and services fall into the category of industrial goods for the IPI is also a frequent source of litigation.

The PIS, Cofins and the ICMS are in principle designed to be mostly non-cumulative, although businesses' right to claim tax credits for these taxes paid on intermediate inputs are often restricted and subject to complex definitions and procedures, which gives rise to excessive litigation. Obtaining tax credits for interstate transactions is even more cumbersome. Finally, it can take years in Brazil for firms to receive the accumulated tax credits from the tax authorities.

The ICMS tax is not fully uniform across states, adding even more complexity and hampering interstate trade. Each state applies its own tax rate(s), exemptions, and tax benefits, so that de facto companies wishing to sell goods and services nationwide are required to comply with 27 different tax codes. For foreign companies wishing to enter the Brazilian market, this represents a significant barrier to entry. For interstate transactions, the system applies a mixture between origin and destination principles, leading often to double taxation.

Consumption taxes are not uniform across sectors, resulting in distortions and misallocation of resources across sectors and firms. The ISS, which applies to most service activities, has a lower tax rate than the other taxes. As a consequence, firms have low incentives to hire services from external firms in other sectors of activity that do not fall into the ISS list, even if these firms are more productive. Imported services and financial transactions are subject to, yet, another tax, called CIDE, with a tax rate that can go up to 50% in some cases, which precludes Brazilian firms from the competitive advantage of imported tradeable services.

Several proposals have been put forward to reform the indirect tax system. The Senate and the Chamber of Deputies have both made comprehensive proposals to consolidate the different consumption taxes into a unified value-added tax. These proposals have been combined into a single draft law and endorsed by the government. The resulting draft law is based on simple rules harmonised across states, a broad base, full tax credit of the value-added tax on all inputs and zero rating for exports. The proposal unifies three federal taxes (PIS, COFINS, IPI), as well as one state and one municipal tax (ICMS and ISS, respectively), into separate value added taxes (VATs) administered by the federal and the subnational governments. These two VATs would have a common tax base, but states could apply different rates, while taxing on the basis of the destination of goods and services. The reform also introduces a fund to compensate states that lose revenues after the changes, to be financed by the federal government. Finally, the new draft stipulates a specific timeline for the transition to the new system, beginning in 2026 and ending in 2033 for taxpayers. Questions that are currently still open to debate include the extent of exemptions and different rates across goods and services.

The government has made reforming the taxation of consumption goods and services a key priority. A special secretariat has been established to provide accurate assessment of the different options and drive the negotiations between the two chambers of Congress and the government, with a view toward distilling a consensus approach from the two existing proposals. Congress finally approved the consumption tax reform in December 2024. One of the main political challenges related to the distribution of revenues across subnational governments. Some states and municipalities will experience significant revenues shortfalls with a full application of the destination principle. To address these concerns, both proposals guarantee a long transition period of 15 to 50 years, during which the current distribution across states would be preserved initially, adjusted for inflation, and progressively changed to the destination principle. This will ensure that states have time to adapt and allow the likely growth dividend from this tax reform to materialise. India faced similar challenges for the VAT reform implemented between 2003 and 2017 (Box 1.4).

Box 1.4. VAT reform in a federal state: the case of India

India has 29 states and six union territories, and all 29 states have revenue-raising authority. Prior to the reforms, states' own revenues accounted for about one third of public revenues.

Before the reform

States' tax revenues came mostly from indirect taxes including a sales tax on commodities and another tax on commodities traded across states, called the central sales tax (CST). States also collected a 4% tax on inter-state trade of domestic goods. State governments could set differentiated tax rates by product. Some states had up to 19 different rates, ranging from 0.25 to 37%.

The introduction of a VAT on commodities in 2003

For commodities, the sales tax was replaced with a VAT in 2003. VAT rates were harmonized across states with a 12.5% standard rate, a 4% reduced rate for basic goods, and a 1% rate on gold, silver, precious and semiprecious stones. The VAT allowed input tax deductions and was progressively implemented from 2003 to 2008. The interstate tax rate was progressively lowered and finally removed in 2017. To limit revenue losses, the central government compensated states in the first three years.

The introduction of a national-level Goods and Services Tax (GST) in 2017

Multiple indirect taxes were merged under the Goods and Services Tax, a comprehensive consumption tax levied on all goods and services with two components: a Central Goods and Services Tax, levied by the Central Government, and a State Goods and Services Tax, levied by subnational governments. For the inter-state trade of goods and services, an Integrated Goods and Services Tax was introduced, as the sum of the above. The Goods and Services Tax rate varies from 5% to 28% depending on the goods and services, being 18% in most cases.

Source: Sen A. and S. Wallace (2022), "The Revenue Productivity of India's Subnational VAT", National, Tax Journal, vol. 75, n0 4; OECD (2019c), "OECD Economic Survey of India"; PWC: https://taxsummaries.pwc.com/india/corporate/other-taxes

The adoption of a unified value-added tax instead of the current multiple consumption taxes will align Brazil with OECD best practices and reduce distortions. The benefits of a well-designed VAT include its neutrality for production and sourcing decisions as long as the VAT is guided by the destination principle. Current discussions should avoid replicating a regime of broad exemptions over a long period, which would undermine the expected gains from the reform. Moreover, using new digital payment and identification systems could be explored to include a targeted social benefit dimension in the reform. For instance, low-income households and the beneficiaries of social transfers could be granted a reduced VAT rate for limited purchases of essential goods using a combination of identification instruments, including the PIX payment system.

Beyond consumption taxes, there is also scope to reform income taxes. A current personal income tax deductibility of expenditures for private health and education expenses has regressive distributional effects, as 90% of Brazilians have incomes below the threshold where they would pay income taxes and only 25% of Brazilians are subscribed to private health plans, while most of the population relies on the public health system. Phasing out these deductions could save 0.3% of GDP.

In the area of corporate taxes, Brazil's transfer pricing rules for affiliated of multinational enterprises have been aligned with the OECD transfer pricing standards as the result of a joint project between the OECD and Brazil's tax authorities.

A targeted corporate tax regime for small and medium enterprises called Simples Nacional combines a lighter tax burden with a simplified calculation of tax liabilities based on turnover, replacing up to 9 separate taxes. The eligibility condition for the simplified regime is to have revenues below approximately USD 1

million, which is high in international comparison and discourages firms to grow beyond the threshold. Being based on revenues rather than income, it also discourages sourcing intermediate inputs from potentially more efficient external providers. For very small firms, the easier compliance may outweigh these considerations. However, with its high participation ceiling, the regime is currently used by 74% of Brazilian firms and could be much better targeted, including by reducing the participation threshold. Especially once the VAT reform reduces the cost of compliance with the general regime, the case for maintaining this special regime in its current size will become much weaker. Filing as a corporate entity under Simples Nacional has also become a preferred choice for high-income professionals, as this can reduce the effective tax burden from almost 50% to as little as 11.5% for those with few deductible expenses (Appy, 2017). Brazil also has the smaller Microempreendedor Individual programme, with a ceiling of USD 16,000 in turnover. At significantly lower fiscal cost, this programme has contributed to lower informality among low-income entrepreneurs, especially women (OECD, 2012). Going forward, Brazil should evaluate the design of its presumptive tax regimes and align it with international good practice (OECD, 2023).

Taken together, subsidies and tax expenditures amounted to 3.8% of GDP in 2021 (DEAP, 2022), or 4.9% of GDP at the federal level when including the simplified SME tax regime. The economic case for reconsidering many of these is strong, but the political economy is not easy. This said, a reduction of subsidies and tax expenditures on the order of 2% of GDP appears feasible (OECD, 2020).

Table 1.5. Past OECD recommendations on tax policies

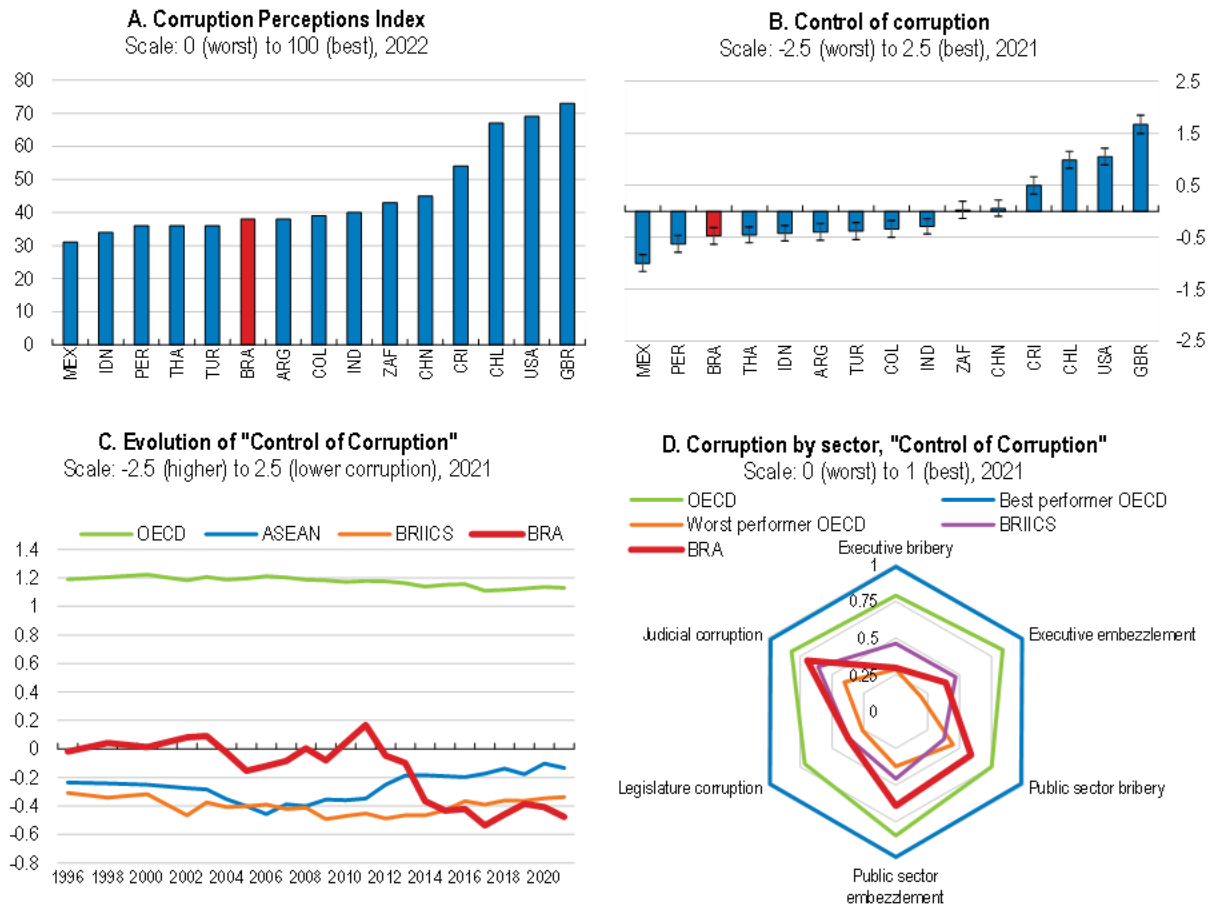
Recommendations	Actions taken since the 2020 Economic Survey
Eliminate the income tax deductibility of expenditures for private health and education expenses and lower the participation threshold in the SME tax regime Simples Nacional.	No action.
Convert the exemption of “basic goods” from consumption taxes into a targeted tax rebate available only to low-income families.	No action.
Strengthen spending efficiency by reviewing civil service pay structures, ineffective subsidies, special tax regimes and tax expenditures.	Under consideration.
Consolidate consumption taxes into a value added tax.	The reform is being discussed in the Parliament.
Align transfer pricing rules with OECD standard	Brazil has aligned its transfer pricing legislation with OECD Transfer Pricing Guidelines, effective January 1, 2024

Fighting corruption and tax avoidance will increase tax collection

Raising the efficiency of public spending will not be possible without further improvements in the fight against corruption and economic crimes. Corrupt practices and kick-backs waste public resources, increase the perception of political and litigation risk, deteriorate the investment climate of a country, and exacerbate income inequalities by allowing relatively prosperous public officials and businesspeople to divert taxpayer resources. Comparative indicators of corruption perceptions point to significant challenges in economic governance (Figure 1.16). Beyond perceptions, systematic evidence with respect to high-level corruption is scarce with the exception of a few high-profile cases that have emerged since 2014. Economic crimes have surfaced in the context of public procurement, including by state-owned companies or tax expenditures to the benefit of specific companies and sectors.

Brazil has made some progress in fighting corruption and money laundering and has strengthened its institutions to combat corruption over the past two decades. The National Strategy to Combat Corruption and Money Laundering (ENCCLA) is the main network involving approximately 90 public institutions, as well as the Public Prosecutor's Office. It oversees updating the strategy to combat corruption, develops training and guidance, and monitoring the development of corruption practices. Each year, ENCCLA defines action plans to tackle new roads of corruption and has proposed laws, decrees, and normative instructions to improve corruption prevention and detection.

Figure 1.16. Corruption indicators in international context



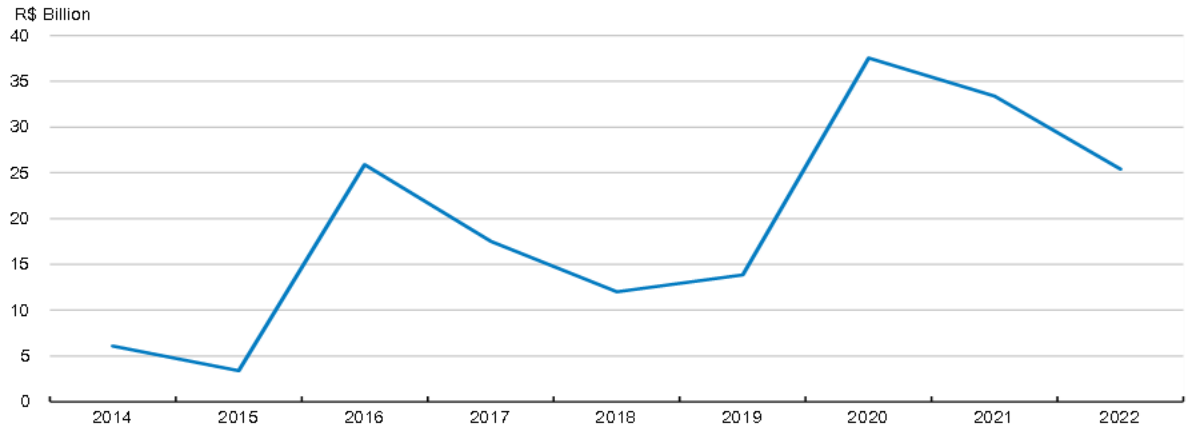
Note: Panel B shows the point estimate and the margin of error. Panel D shows sector-based subcomponents of the "Control of Corruption" indicator by the Varieties of Democracy Project.
Source: Panel A: Transparency International; Panels B & C: World Bank, Worldwide Governance Indicators; Panel D: Varieties of Democracy Project, V-Dem Dataset v12.

StatLink https://stat.link/x5tvqj

Regular audits and strict control mechanisms are key instruments to avoid the diversion of public funds from their public-interest objectives. Brazil's practice of budget amendments for individual parliamentarians, for instance, allocates federal funds to members of Congress for projects in their constituency, with little *de facto* oversight or audits. This practice creates rooms for political or electoral considerations to prevail over a consistent prioritisation of spending needs (World Bank, 2017). Budget amendments for parliamentarians represented about one-quarter of Brazil's discretionary federal budget in 2022, at a time when the need for fiscal consolidation, together with increasing mandatory spending, had already left limited fiscal space for public investment (Figure 1.17). These budget amendments should be limited and systematically audited for more transparency, as recommended in previous *OECD Economic Surveys of Brazil* (OECD, 2020a). A recent Supreme Court decision to improve the transparency of these budget amendments is a step in the right direction.

Figure 1.17. Budget amendments for parliamentarians have gained importance in recent years

Allocations in budget amendments for parliamentarians



Source: Portal da Transparência, Controladoria-Geral da União (CGU).

StatLink https://stat.link/bwfus9

Large-scale public procurement, including in the context of infrastructure projects and the operation of state-owned companies, are typically among the government activities most vulnerable to governance challenges and corruption, and also present risks of collusion among bidders in public auctions (OECD, 2016). These challenges, partly addressed by a new Public Procurement Law of 2021, will be discussed in Chapter 2 of this report, which is dedicated to infrastructure investment.

A string of prominent corruption cases has been uncovered based on whistle-blower reports. Brazil has made progress in protecting whistle-blowers, including civil servants, involved in anti-corruption investigations against the criminalisation of and retaliation for their activities. Some recent progress in 2018 and 2019 strengthened transmission channels and protections for whistle-blowers. In 2021, a new Anti-crime Law protecting whistle-blowers entered in force. It applies to whistle-blowers reporting public corruption and any fraud related to government procurement and contracts and SOEs. The federal whistle-blower protection system includes a national computerised system for receiving complaints with built-in identity protection mechanisms, as well as a centralisation of channels for receiving complaints through public ombudsperson offices. The identity protection is meant to safeguard whistle-blowers against retaliation and improve incentives for coming forward.

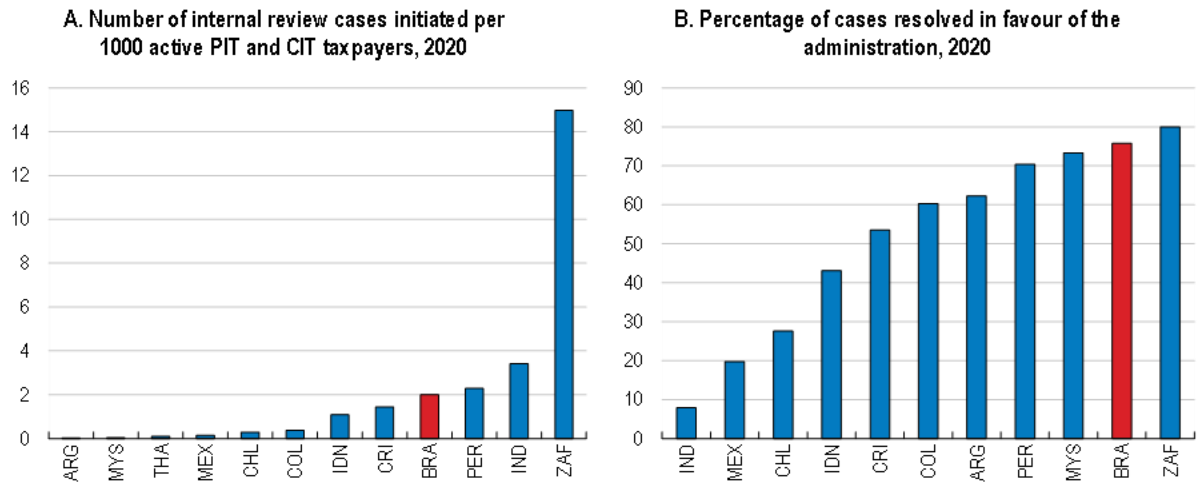
Most OECD countries have dedicated whistle-blower protection laws, like the one implemented by Australia in 2019. However, the new law on the abuse of authority is unnecessarily vague (OECD, 2019a), leaving room for retaliation from powerful suspects by allowing prosecution of officials if they prosecuted a case “without just cause”, though there has been no retaliation case so far. The proposal from ENCCLA of improvements in public programmes for reporting corruption and to increase trust and engagement of citizens in reporting channels, including issues related to gender, as well as identifying technological initiatives should be implemented.

On the revenue side of public accounts, a strong tax administration is key to collect revenues. This is also important for ensuring equal treatment across taxpayers, as those with higher incomes can often identify more opportunities to avoid paying taxes owed. Brazil’s tax administration has made progress in digitalisation and automation. For instance, automatic letters are sent to taxpayers in self-assessment where there are divergences on the declared values from the data held. Electronic compliance checks are used to detect tax under declaration or mistakes. In 2021, 40,000 taxpayers, totalling BRL 7.4 billion in amounts subject to self-assessment were summoned thanks to electronic compliance checks (OECD,

2022a). Brazil has also started to apply behavioural analysis to tax data to better target messages to different groups of taxpayers (OECD, 2022a).

However, Brazil has around 7.3% of 2022 GDP in outstanding administrative court tax appeals (OECD, 2022a). It takes about six years for an appeal ruling and the number of outstanding appeals is constantly rising. Increasing the number of independent reviews of audits of taxpayers before litigation procedures would strengthen the efficiency of tax collection, as internal audits of taxpayers' cases are relatively infrequent (Figure 1.18, Panel A). The dispute resolution mechanism could also be improved (Figure 1.18, Panel B). The effectiveness of Brazil's judiciary is hampered by an extensive array of appeal possibilities that creates court congestion (OECD, 2020a). As disputes can be resource-intensive processes, preventing them is the most effective strategy, and a key element in the dispute prevention framework is the provision of guidance and advice to taxpayers. Many administrations offer specific dispute prevention mechanisms. For example, the Review and Dispute Resolution (RDR), an independent unit within the ATO, is responsible for the objection and litigation functions of the Australian Taxation Office. The RDR offers an independent review of the technical merits of an audit case prior to the finalisation of the audit. It aims to encourage early engagement to resolve disputes (OECD 2022a, Australian Taxation Office, 2022 and OECD, 2019).

Figure 1.18. Performance indicators of the tax administration



Note: PIT: Personal income tax; CIT: corporate income tax.
Source: OECD Tax Administration 2022.

StatLink https://stat.link/q9wbej

A well-functioning justice system is fundamental for fighting corruption, but also for improving the enforcement of contracts. Enforcing contracts through the judicial system is lengthy and the outcome is often uncertain due to the significant discretionary power of judges. The cumbersome procedures of dealing with courts can substantially add to firms' costs and reduce their productivity. Enforcing a standard debt contract takes significantly longer than in regional peers (OECD, 2018a). The time and value losses resulting from inefficient processes of resolution of contractual conflicts and insolvency situations are a key constraint for the investment climate (Canuto, 2016). Measures to enhance the efficiency of the judicial system adopted across OECD countries include reorganising courts, implementing electronical judicial files and promoting out-of-court solutions to conflicts. Increasing competition in the legal profession can also induce lower litigation and hence have a positive effect on the efficiency of the system.

Table 1.6. Past OECD recommendations on corruption

Recommendations	Actions taken since the 2020 Economic Survey
Strengthen the legal autonomy of all anti-corruption enforcement bodies.	No action
Consider creating the legal basis for executing sentences as of the second instance of appeal, or limit the number of appeals, including to the Supreme Court.	No action.
Clarify and limit the circumstances under which public officials working on anti-corruption cases can be prosecuted.	No action.
Facilitate data sharing across public agencies engaged in anti-money laundering efforts, including a single public registry.	The implementation of the positive registry is a step in the right direction.
Make illicit enrichment a crime and not only an offence, to facilitate the confiscation of ill-obtained assets.	No action
Implement a dedicated whistleblower protection law.	A new 2021 law has led to improvements. The National Strategy to Combat Corruption and Money Laundering envisages a further strengthening of whistle-blower protection.

Re-organising social protection programmes could strengthen spending efficiency

Social policies have played a key role for reducing poverty and inequality in the last decades. Brazil has a sophisticated array of social protection instruments, with the co-existence of different benefits sometimes conflicting with spending efficiency. Brazil's flagship anti-poverty programme *Bolsa Família* covers more than 21 million households and has been a key instrument to support those most in need (Box 1.5). By making means-tested cash transfers conditional on children's school attendance and basic health check-ups, it also lays the foundations for families to move out of poverty over time.

To mitigate the impact of inflation on low-income households, and in line with recommendations in previous OECD Economic Surveys of Brazil, the government permanently raised the minimum cash transfer value of *Bolsa Família* in early 2023, from BRL 400 to BRL 600. The minimum benefit, which had already been temporarily raised during the pandemic to address massive income losses (Box 1.5), now represents about 45% of the minimum wage. This measure will have a manageable fiscal impact of 0.5% of GDP in 2023, raising the total cost of the programme to around 1% of GDP (IFI, 2022).

Enhanced cash transfers will help to address new surges in poverty and inequality. They were effective in alleviating poverty during the first year of the pandemic (Figure 1.19). However, as much of the additional benefits were withdrawn in 2021, poverty reached a 10-year high in that year (Box 1.5). Pending the release of full household data for 2022, early evidence based on a smaller sample suggests that poverty has fallen again in 2022, relative to the peak in 2021 (Duque, 2023).

Box 1.5. Recent developments in Brazil's flagship anti-poverty programme *Bolsa Família*

Brazil's flagship anti-poverty programme is known as *Bolsa Familia.* Based on a fairly complete nationwide registry of poor households and their living conditions, the programme has proven a powerful and well-targeted tool to reduce poverty. Its main principle is to define a maximum eligibility income, and all households with children and with incomes below that threshold can benefit from a cash transfer that will lift their incomes above this level. Eligibility is therefore not limited to formal workers.

The attached conditionalities of Bolsa Família regarding school attendance and medical check-ups also help to reduce inequalities with respect to education and health, which further strengthens future economic opportunities for those living in poverty. The programme has had well-documented positive impacts on schooling, health and social mobility.

Between 2014 and 2019, the programme's budget declined by 13% in real terms. Regular readjustments of benefit levels were halted, and the average monthly benefit plummeted 20% at a time when poverty and inequality increased (Barbosa et al, 2020). Some adjustments took place in 2016 and 2018, but they were insufficient to replace the real losses and the average benefit level at the end of 2019 was 16% below the historical peak in real terms.

To address massive income losses during the pandemic, the government launched the *Auxílio Emergencial* programme in April 2020. An original government proposal for a monthly BRL 200 benefit was raised to BRL 500 by Congress and finally defined at BRL 600 in an agreement between both. The 13 million beneficiaries of the *Bolsa Família* programme were automatically eligible but had to substitute one benefit for the other. The programme remained in place throughout 2020, with benefit levels being halved in the last months of the year, when they were temporarily interrupted, before being re-instated with a slightly different design between April and September of 2021.

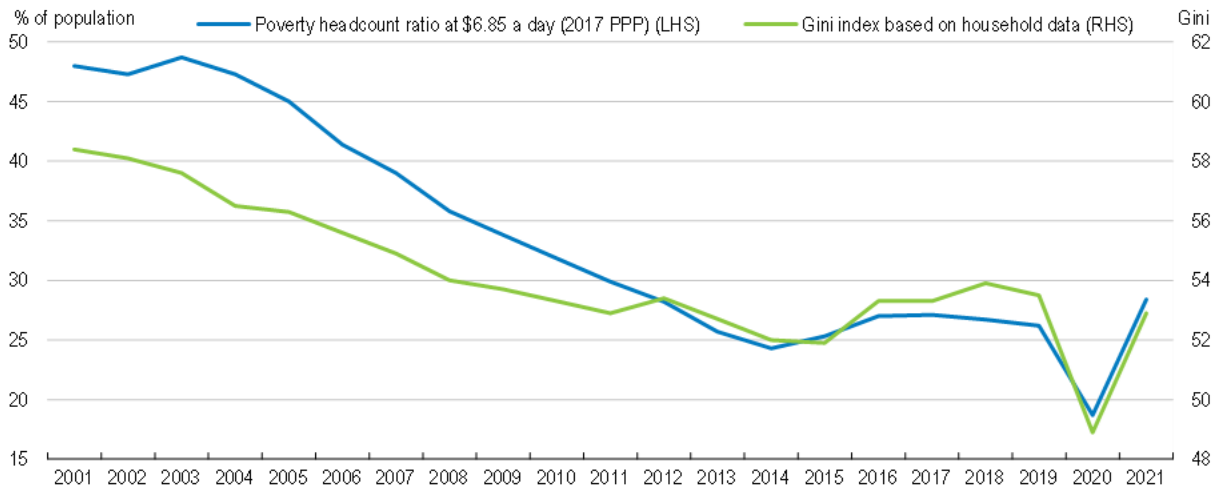
When the *Auxilio Emergencial* ended in October 2021, the Federal Government renamed the *Bolsa Família* programme to *Auxílio Brasil*. The new programme's eligibility line was slightly increased from BRL 178 to BRL 210. Changes also included new additional bonuses, but a lesser role for the conditionalities related to school attendance and healthcare. Further temporary bonuses then took the average benefit level of *Auxílio Brasil* to around BRL 400.

In early 2023, the government reinstated *Bolsa Família*, discontinuing *Auxílio Brasil* and permanently increasing the cash transfer value to BRL 600. The original conditionalities related to school attendance and healthcare were fully re-established in the new *Bolsa Família* design.

Source: Barbosa et al. (2020), "Income Distribution in Brazil during the 2010s: A Lost Decade in the Struggle Against Inequality and Poverty", Commitment to Equity (CEQ) Working Paper 103, CEQ Institute, Tulane University; OECD (2020), OECD Economic Surveys: Brazil 2020.

Income inequality followed a similar pattern as poverty until 2021 when calculated on the basis of household data. However, combining these with tax data, which allow a better coverage of high-income households, suggests that income inequality is not only much higher, with a Gini coefficient exceeding 70, but also does not appear to have declined during the pandemic (Neri, 2023).

Figure 1.19. Poverty and inequality have increased again in the last years



Source: World Bank based on IBGE: Pesquisa Nacional por Amostra de Domicílios.

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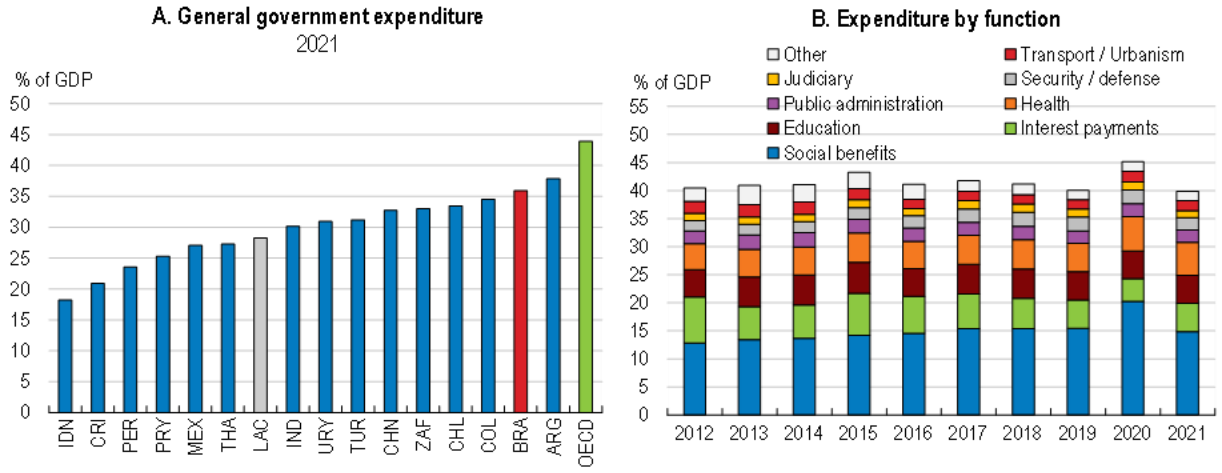
Beyond *Bolsa Família*, there is scope to consolidate various social protection programmes to reduce duplication and save resources that could be redirected to protect the most vulnerable. Brazil's overall public spending is higher than the Latin American average (Figure 1.20, Panel A) and social spending is the highest expenditure category (Figure 1.20, Panel B).

Figure 1.20. Public spending is high compared to peers



Source: IMF; Central Bank of Brazil; National Treasury; and OECD calculations.

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Unemployment benefits for formal sector workers, for instance, present scope for reforms that could improve spending efficiency. Two separate social protection instruments serve essentially the same purpose of providing resources to dismissed formal-sector workers (OECD, 2020a). *Seguro Desemprego*, with a fiscal cost of about 1% of GDP, pays up to two minimum wages for a period of 3 to 5 months and is financed through earmarked resources from a turnover tax on firms. FGTS (*Fundo de Garantia do Tempo de Serviço*) is an individual unemployment account paid upon dismissal, based on contributions from the employer and the Federal government, with a fiscal cost of about 0.3% of GDP. More recently, annual withdrawals have become an option, but workers who exercise it have no further withdrawal available in case of dismissal, which defies the purpose of the scheme.

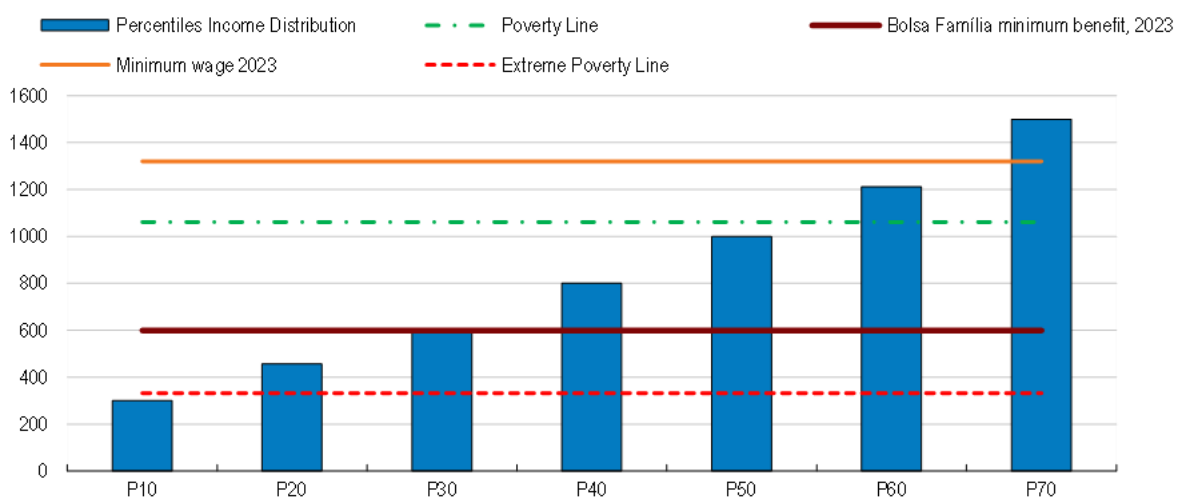
The two schemes could be merged, which would reduce public spending on unemployment insurance by approximately 0.6% of GDP (World Bank, 2017). These savings would allow a reduction in mandatory social security contributions, as recommended in previous OECD Economic Surveys of Brazil (OECD, 2020a). In fact, non-wage labour costs in the formal sector currently exceed 35% of wages for minimum-wage earners, creating incentives for evasion through the creation of informal jobs.

Around 40% of active Brazilians still work in the informal sector, less than in many other Latin American countries, but more than the average in the OECD. Informal workers are not currently covered by any of the unemployment benefit programmes, although they are probably the ones most in need of protection. For informal workers, *Bolsa Família* is currently the only programme that can protect them against unexpected income losses from dismissals, but that would require making benefit disbursements more responsive to changes in beneficiaries' personal situation by speeding up processing of benefit claims. Currently, these can take months or more, while dismissed workers need immediate income support.

In the medium-term, *Bolsa Família* could become the basis for a universal means-tested and tax-financed basic social safety net that would pay benefits to all those with incomes below the poverty line, including formal workers who lost their jobs. For formal-sector workers earning more than the minimum wage, contribution-based unemployment insurance, with progressive contribution and benefit levels, could top-up this basic safety net to achieve a higher replacement rate. Formal workers earning around the minimum wage could be exempt from these contributions. Such a reorganisation would shift part of the financial burden of unemployment protection to general tax revenues and would allow lower social security contributions for workers earning close to the minimum wage. This would reduce non-wage labour costs and strengthen formalisation incentives in the most relevant income range for fostering the transition from informal to formal jobs.

Additional programmes for formal-sector workers include the *Abono Salarial* and *Salário Família*. *Abono Salarial* is a wage subsidy granted to all formal workers earning between one and two minimum wages per month. The *Salário Família* benefit, in turn, is a wage subsidy to formal workers with children below the age of 14 and earning up to 1.35 minimum wages. Given that at least 60% of Brazilians have per-capita incomes below one minimum wage, the beneficiary income ranges of these programmes are considerably above the median income (Figure 1.21). As a result, these benefits are not well targeted and could be reconsidered.

Figure 1.21. Social benefits tied to the value of the minimum wage are not well targeted



Note: Extreme poverty is defined as earning less than 2.15 USD 2017 PPP per day. Poverty is defined as earning less than 6.85 USD 2017 PPP per day.
Source: IBGE (PNAD Contínua) and Banco Central do Brasil.

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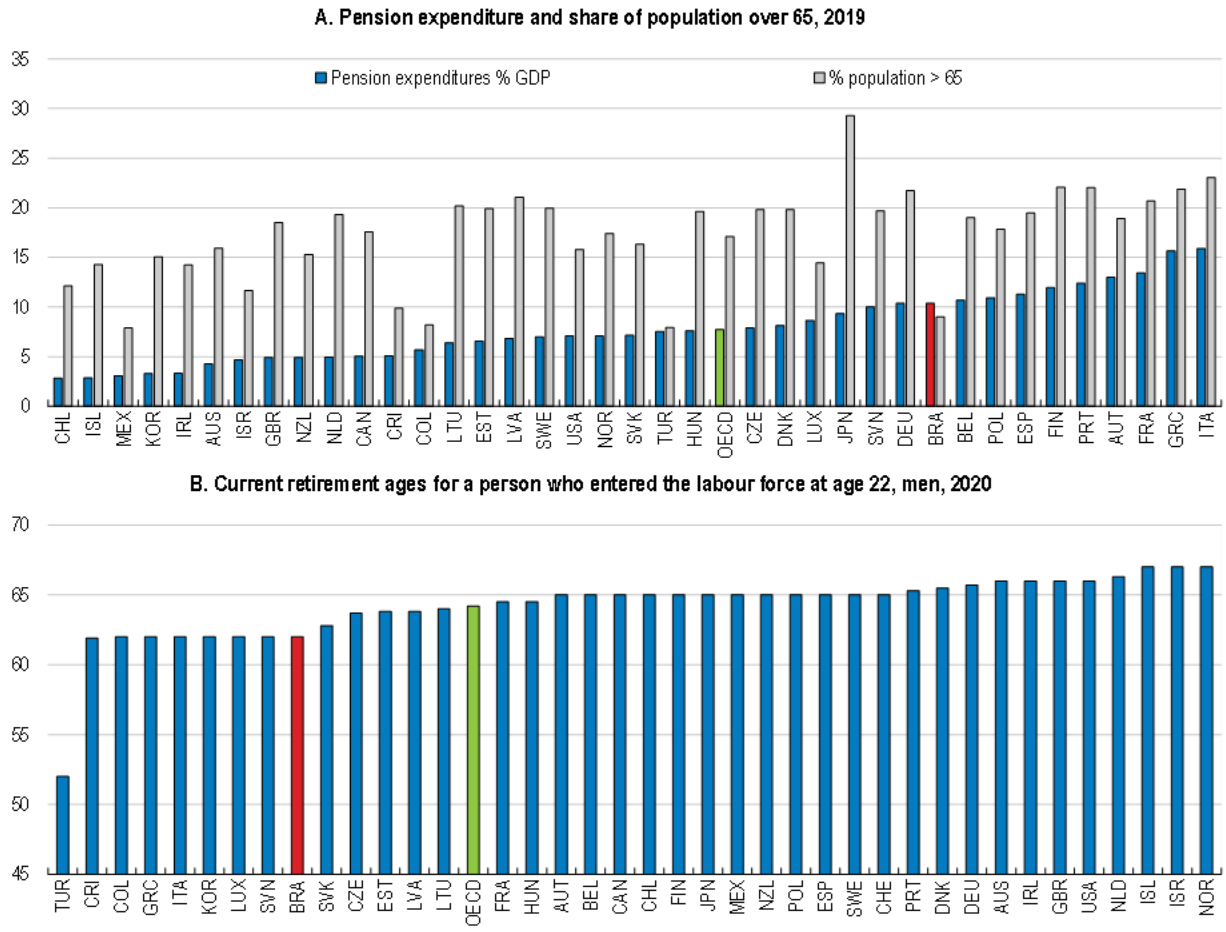
Old-age pensions have achieved almost universal coverage in Brazil through a combination of contributory and non-contributory pensions. Current public spending on pension is 10.4% of GDP, which is high relative to the share of the elderly in the population (Figure 1.22, Panel A). Pension expenditures will continue to rise as Brazil's population is one of the world's fastest ageing (United Nations, 2015). Life expectancy at birth has increased by almost 6 years since 2000, reaching about 76 years in 2021, 80 years for women and 72 for men (OECD, 2021a).

The 2019 pension reform marked an important step to contain future increases in pension costs and strengthened the system's sustainability. It introduced a general minimum retirement age of 62 years for women and 65 for men, raising the effective retirement age to levels closer to the OECD average (Figure 1.22, Panel B). It is estimated that the 2019 pension reform will generate savings of about 10 percentage points of GDP over 10 years (OECD, 2020a; IFI 2019). Further reforms may become necessary to stabilise pension spending in the coming years as it is projected to increase again from 2028 onwards, reaching 12.46% of GDP in 2060 (MTP, 2022).

One further reform option would be to reconsider the current indexation of pension and other formal-sector benefits. Currently no old-age pension benefit can be lower than a full minimum wage, whose real value has increased by 33% over the last 15 years and is now between the 60th and the 70th percentile of the income distribution. This strong effective indexation explains Brazil's high pension replacement rates (OECD, 2021b) and has mostly benefited households with above-median incomes, exacerbating income inequality. Adjusting social security benefits, including pensions, in line with inflation could free up resources to finance the higher level of *Bolsa Família* and reallocate social spending towards those that need it the most. Removing the automatic link between pensions and the minimum wage would generate savings of about 6.1 percentage points of GDP by 2050 (Cuevas et al., 2019).

Figure 1.22. Despite improvements since the 2019 reform, spending on pensions is still high



Note: The net replacement rate is the individual net pension entitlement divided by net pre-retirement earnings, taking account of personal income taxes and social security contributions paid by workers and pensioners.
Source: OECD pensions at a glance 2021; World Bank; Tribunal de Contas da União; and OECD calculations.

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Table 1.7. Past OECD recommendations on social policies

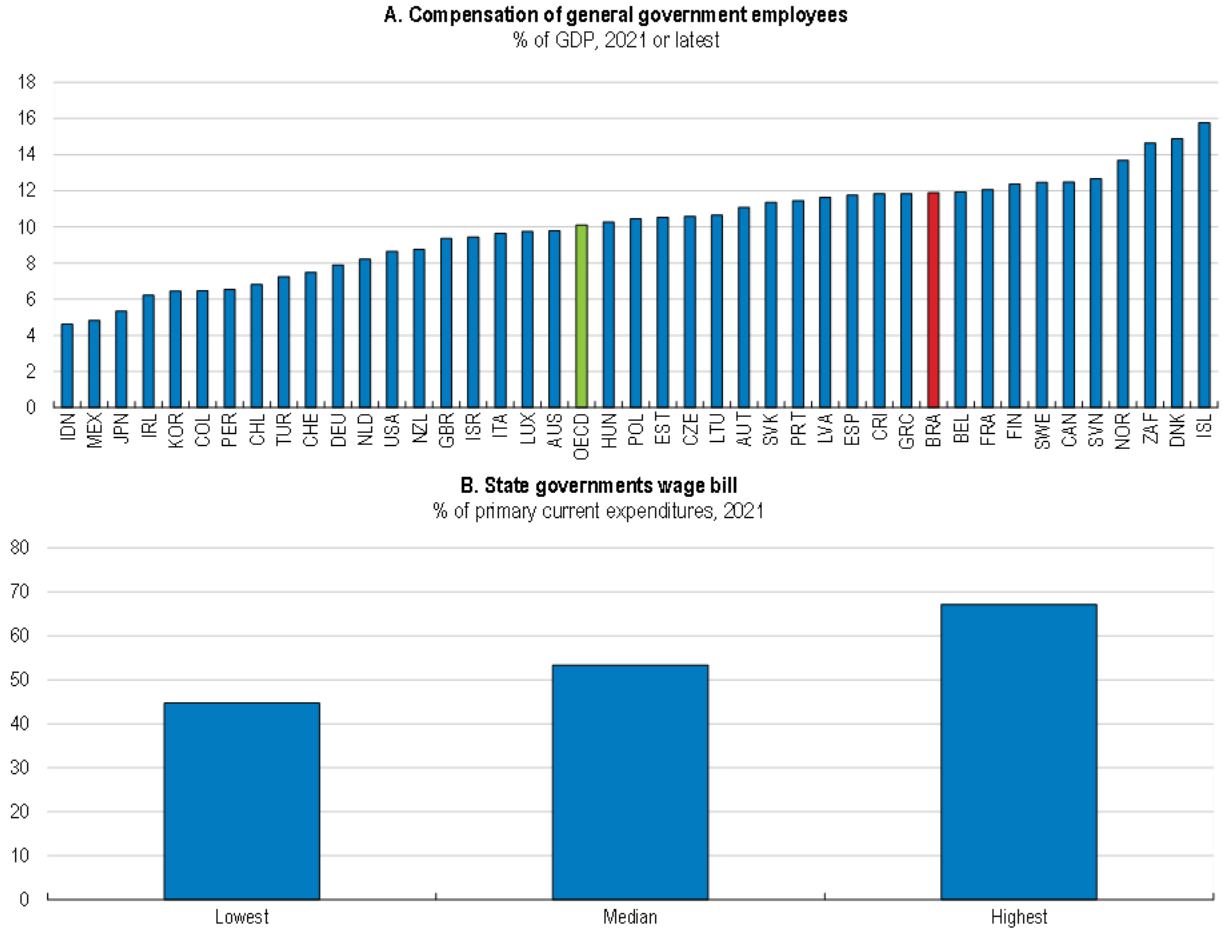
Recommendations	Actions taken since the 2020 Economic Survey
Index social security benefits to consumer prices rather than the minimum wage.	No action.
Increase benefits and accelerate benefit concessions in the *Bolsa Família* programme, while withdrawing benefits only gradually.	The *Bolsa Família* benefit has been permanently increased in early 2023, from BRL 400 to BRL 600.
Merge the two current formal-sector unemployment schemes and reduce fiscal spending and employer contributions on these.	No action.

A reform of the public administration could create additional fiscal space

Brazil's public sector wage bill for current and retired civil servants is high in international comparison, including when compared with emerging economies and Latin America (Figure 1.23, Panel A). Most of public employment is concentrated in subnational governments, where the wage bill is now well above half of the primary expenditure (Figure 1.23, Panel B). Containing the growth of the wage bill, by strengthening links between pay and performance instead of seniority, will be key to comply with fiscal rules and ensure fiscal sustainability, while also bringing positive benefits for productivity. In fact, the significant space taken by staff costs limits other productive spending, such as public investment (see Chapter 2). Congress is currently discussing a reform proposal aimed at modernising public administration management. The

proposal seeks to introduce regular and systematic performance evaluations of civil servants, particularly during the probationary period. If approved, this reform could bring fiscal savings of up to 8% of GDP in ten years (IPEA, 2020). The Federal government is currently working on a parallel proposal to enhance the efficiency of the public administration.

Figure 1.23. Brazil's public sector wage bill is high in international comparison



Note: In panel B, "lowest", "median" and "highest" refer to the state with the lowest, median and highest wage bill as a % of primary current expenditures in 2021, respectively.
Source: IMF Government Finance Statistics; National Treasury of Brazil; and OECD calculations.

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Table 1.8. Fiscal impact of recommendations

Fiscal recommendation	Estimated impact on fiscal balance, % of GDP
Reduce tax expenditures	+2
Reduce public payroll expenses	+2
Improve tax compliance	+0.5 (or more)
Raise permanently spending on *Bolsa Família* program	-0.5
Reform public unemployment schemes	+0.5
Raise spending on professional training	-0.3
Raise spending on childcare	-0.3
Increase public infrastructure investment in water, sanitation and urban mobility	-2
Resulting change in primary balance	**+1.9**

Note: Numbers in this table are estimates and some are subject to uncertainty. Implementation would take several years.

Additional reforms will be crucial to boost productivity and living standards

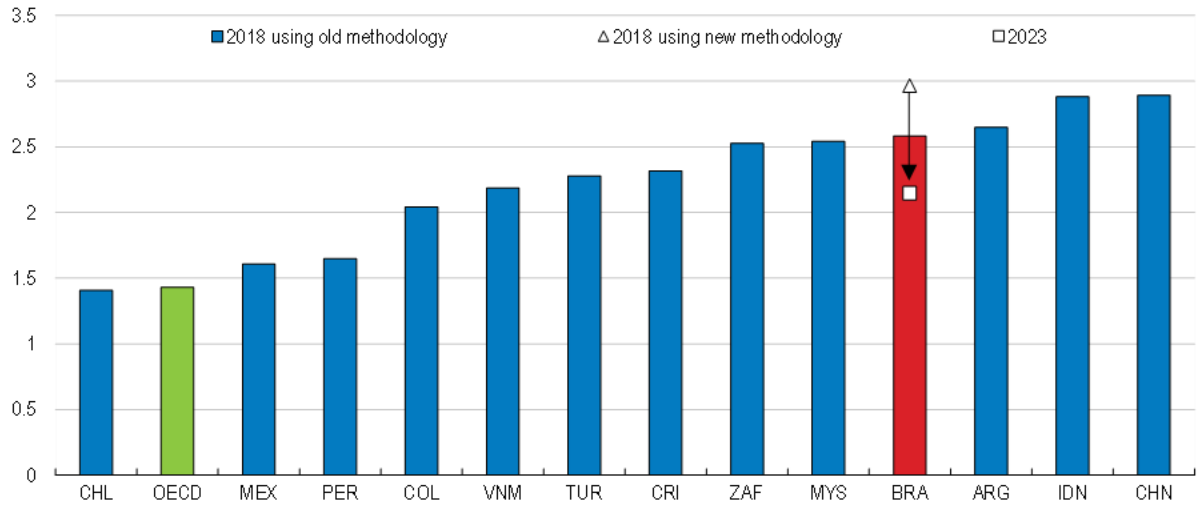
Productivity is the principal source of long-run growth in most economies and provides the basis for better material living standards and reductions in poverty and inequality, but productivity growth has been weak over the last decade. Structural reforms have significant potential to unlock stronger productivity growth. Burdensome regulations, market entry barriers that hamper competition, a heavy labour tax burden, and poor educational outcomes can all be obstacles to productivity growth. Structural reforms that increase labour mobility and support firms in becoming more dynamic, innovative, and greener can boost potential growth.

Efforts to lower regulatory barriers to domestic competition should continue

Brazil has long been characterised by stringent regulations and high administrative burdens on markets for goods and services, which have often ended up restricting competition and new entry. Recently, there have been significant efforts to reduce unnecessary bureaucracy and to simplify existing regulations (Vitale et al., 2022a). In 2019, Brazil conducted a full Regulatory Review at the federal level, analysing over 74 000 pieces of legislation, of which more than 31 000 were revoked for being outdated or overlapping with other texts (OECD, 2022b). Authorities also reviewed existing licences and eliminated explicit approval requirements for all but a few high-risk activities. Opening a business can now be done in one day in about 96% of the cases (OECD, 2020a). Consequently, Brazil's position compared to OECD countries in the economy-wide Product Market Regulation indicator, is likely to have improved since 2018, although the full-fledged update of Brazil's indicator value is still ongoing, in collaboration with the OECD (Figure 1.24). Further plans to simplify the regulatory environment include the creation of an oversight body to implement good regulatory practices in all government instances and allowing for multiple products and services to operate under the same licence.

Figure 1.24. Brazil has improved significantly in the OECD Product Market Regulation indicator

Index scale from 0 to 6, from most to least competition-friendly regulations



Note: The 2023 PMR value for Brazil is still preliminary and pending discussion with the Brazilian authorities. The PMR value for all other countries in the figure has not been updated yet and reflects the regulations in place in 2018. The PMR methodology has changed in 2023 and the PMR values in 2018 and 2023 are not directly comparable. The PMR value in 2018 using the 2023 methodology has been added to the figure to provide a time perspective for Brazil.
Source: OECD PMR database.

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Brazil has also approved new sector-specific regulatory frameworks that lower the regulatory burden for the private sector. New regulatory frameworks have been introduced in the telecommunications sector, with the 2019 Broadband Law and the withdrawal of restrictions on foreign capital in 2021, in the water and sanitation sector in 2020, in the oil and gas sector in 2021, in the railway sector in 2021, and in the aviation sector in 2022. These reforms have addressed some of the regulatory weaknesses highlighted in the 2018 PMR results, namely in the energy sector, and more specifically in the natural gas segment (Vitale et al., 2022a). The new gas law opened the way for separating the activities of gas production and gas distribution, to increase the number of market participants and reduce natural gas prices. However, the multi-level regulatory governance of the natural gas sector, involving the federal government and subnational governments, can be an obstacle to achieve the objectives of the new gas law. Moving forward, it is important to harmonise regulations across different states (Vitale et al., 2022b).

Regulatory impact assessments have become a powerful tool for reform but could be strengthened further. Ex-ante Regulatory Impact Assessments (RIA) became mandatory in 2021 for all federal entities, before enacting new secondary regulations that could have economic impacts, including on competition, but the resulting recommendations are non-binding. The government should require a systematic follow-up to monitor whether solutions have been implemented, as recommended in the 2020 OECD Economic Survey of Brazil (OECD, 2020a). In addition, exemptions to the ex-ante RIA obligation should be progressively removed, so the practice becomes even more widespread. In the longer-term, mandatory Regulatory Impact Assessments should also be required for primary legislation.

Barriers in services sectors are still higher than the OECD average and could be lowered (OECD, 2022b). The provision of services by accountants, architects, engineers, lawyers, notaries, and estate agents is still subject to a range of regulatory constraints that limit competition and increase service cost. For example, these specialists need to be part of a professional association and the accreditation procedures are lengthy. Exclusive rights for certain ancillary tasks should be withdrawn, as recommended previously (OECD, 2020a).

Brazil's autonomous competition agency, the Administrative Council for Economic Defence (CADE), lacks sufficient budget and staffing as well as its own civil service career path, which limits its ability to recruit and retain staff. This has made it difficult to clear the backlog of investigations and reduce their length, some of which have taken up to a decade (OECD, 2019b). Further resources should be allocated to the competition authority, in particular to prevent bid-rigging and other anti-competitive practices in procurement processes. CADE should have a more active role advising the government on public procurement procedures, especially for strategic, complex, and high-value infrastructure projects (OECD, 2022c).

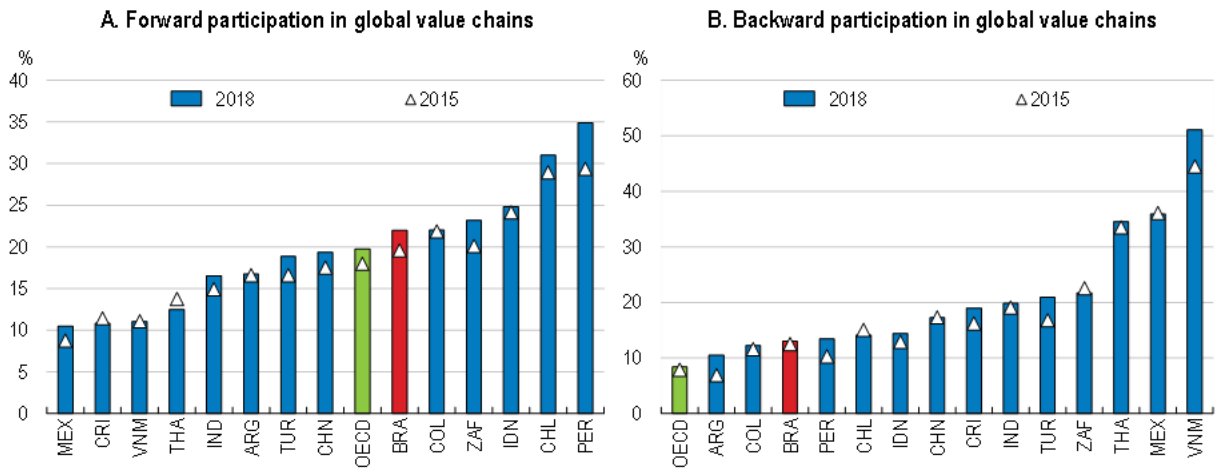
There is scope to boost competition in key infrastructure sectors. CADE, in cooperation with the OECD, conducted a competition assessment review to identify regulations that may hinder the competitive and efficient functioning of markets in the civil aviation and ports sectors. The assessment resulted in 368 recommendations that, if implemented, could generate savings between BRL 700 million to BRL 1 billion, each year, increasing the efficiency of public investment (OECD, 2022c). The OECD Competition Assessment Toolkit could be used in other economic infrastructure sectors, such as railways and telecommunications, for example. The OECD Competition Assessment Review has been extensively used in other countries, such as Romania in the construction, transport, and food processing sectors, Greece in the food processing, retail trade, building materials and tourism sectors, or Mexico in the medicine and meat sector.

Fostering trade integration and foreign competition would bring substantial benefits

With exports and imports below 40% of GDP over the last decade, Brazil remains significantly less integrated into international trade than other emerging market economies of similar size. Stronger trade integration would provide Brazilian companies with greater access to intermediate inputs and technology at internationally competitive prices. By reducing the cost of capital goods, it would spur much-needed investment and boost productivity, employment, and wages. To mitigate the labour market effects of the resulting structural shifts, stronger trade integration should be accompanied by policies to help workers cope with the reallocation of jobs across firms and sectors (OECD 2018a; 2020a; Bueno et. al, 2021).

Integration into Global Value Chains (GVCs) remains concentrated in commodities. While forward participation increased in recent years, backward participation remains below most emerging economies (Figure 1.25). This means that Brazilian imports are mainly for domestic consumption, not to add value to exports. At the same time, Brazil is a global supplier of intermediate inputs, with low levels of processing and few ties with the domestic industrial sector, such as mining, basic metal, food, mineral products, paper, and wood. GVC-related trade brings benefits that go beyond those associated with international trade in final goods, such as learning externalities and technology spill overs (Ignatenko et al., 2019). These benefits are generally higher for activities positioned at higher-value stages of the global production chain and Brazil has scope to engage in higher value-added activities in GVCs.

Figure 1.25. Brazil's backward participation in Global Value Chains remains below peers



Note: Forward participation provides the share of exported goods and services used as imported inputs to produce other countries' exports. This indicator gives an indication of the contribution of domestically produced intermediates to exports in third countries. Backward participation measures the value of imported inputs in the overall exports of a country (the remainder being the domestic content of exports). This indicator provides an indication of the contribution of foreign industries to the exports of a country by looking at the foreign value added embodied in gross exports.
Source: OECD Trade in Value Added (TiVA) database 2021.

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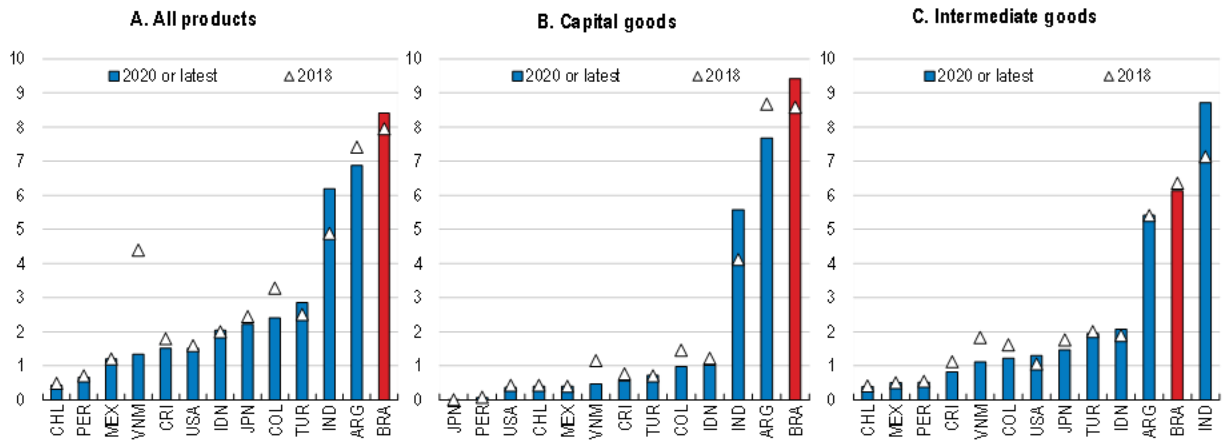
Deeper integration into GVCs is hampered by many trade barriers. Average import tariffs, for instance, are about eight times higher than in Mexico. Import tariffs are particularly high for capital goods and intermediate goods (Figure 1.26). To avoid getting stuck in low-value activities and to reinvigorate its industrial sector, Brazil needs to increase its capacity to use imports to promote the competitiveness of its own exports. In a welcome move, applied tariffs were cut permanently by 10% in 2021, and then again by 10% for 87% of tariff lines in May 2022, although on a temporary basis until December 2023. Some IT and capital goods saw even higher tariff reductions of 20%. The unilateral permanent cut led Mercosur partners to agree to a 10% cut of the Mercosur common external tariff in July 2022. However, the future of the

second and temporary cut is still unclear. The authorities should consider a comprehensive tariff reform, starting with making permanent the most recent tariff cut.

Progress in multilateral trade agreements would also help Brazil become more integrated into the global economy. Brazil is a member of the Mercosur customs union, comprising Argentina, Brazil, Paraguay, and Uruguay. However, Mercosur is still far from its initial ambition to become a common market and its members have not participated in major agreements with other regions, unlike members of the Pacific Alliance. Mercosur has negotiated an agreement with the European Union/EFTA. Integrating with a large market would bring an immediate boost to competition, and significant benefits. Brazil should therefore continue its efforts to conclude the EU-Mercosur agreement and its attempts to reform Mercosur's external tariffs.

Figure 1.26. Trade tariffs are higher than in most emerging economies

Effectively applied weighted average, %, 2020 or latest



Source: World Integrated Trade Solution database (WITS).

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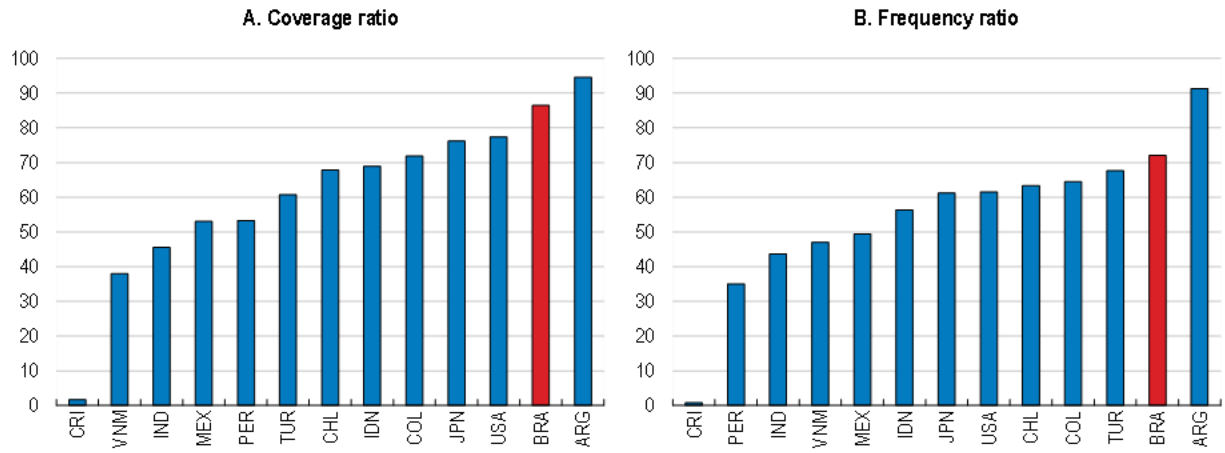
Mercosur could also continue to negotiate bilateral agreements, which are far less than those signed by countries such as Chile, Peru, Mexico and Colombia, all members of the Pacific Alliance. In 2020, Brazil and the United States signed a new protocol updating the 2011 Agreement on Trade and Economic Cooperation, including new provisions on customs procedures, transparent regulatory practices, and anti-corruption policies. The protocol was ratified by Congress and entered into force in February 2022. Similarly, bilateral negotiations with Canada, Singapore, and South Korea have been taken up and should continue.

There may also be a case for reviewing widely used non-tariff barriers (Figure 1.27), including several binding local content requirements. Recent progress includes the elimination of approximately 700,000 automatic and non-automatic import licensing requirements per year for more than 500 products, and the acceleration of import and export processes. A new type of licence, called "licença flex", was introduced to replace hundreds of documents, reducing costs, and increasing flexibility to export and import. Since March, Brazil started issuing certificates of origin with an electronic signature and a QR code for exports of poultry into the EU and the UK. The new certificate can replace the paper format certificate with a handwritten signature and a stamp, reducing exporting costs and delays.

Figure 1.27. Non-tariff barriers are also an obstacle to Brazil's integration in international trade



Note: Coverage ratio refers to the value of imports of commodities subject to non-tariff measures as a percentage of total imports. Frequency ratio accounts for the presence or absence of a non-tariff measure, and indicates the percentage of traded products to which one or more non-tariff measures are applied.
Source: World Integrated Trade Solution database (WITS).

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Table 1.9. Past OECD recommendations on product market regulation policies and trade

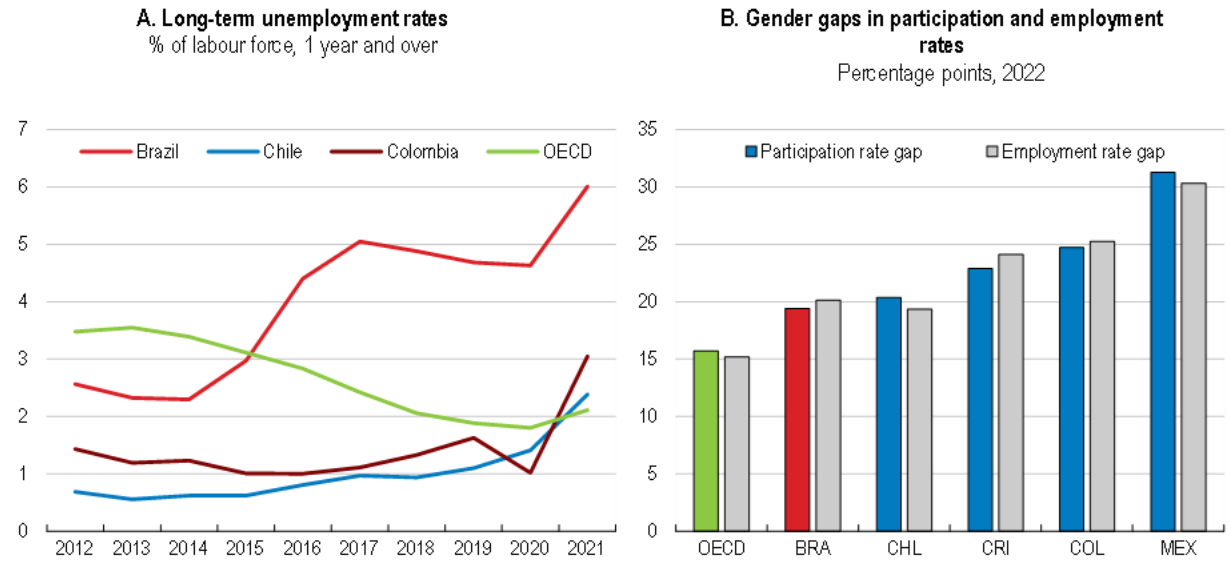
Recommendations	Actions taken since the 2020 Economic Survey
Further simplify licence requirements and apply silence-is-consent rules wherever possible.	The government eliminated the approval requirement for all but a few high-risk activities.
Continue the ongoing comprehensive review of the competition impact of regulations and administrative burdens.	The Intensive Front for Regulatory and Competition Assessment – FIARC - has been created in 2020 to assess public regulations that may harm competition. Ex-ante Regulatory Impact Assessments (RIA) became mandatory for secondary regulations in 2021.
Reduce the role of professional associations in regulation.	No action.
Reduce tariff and non-tariff barriers, starting with capital goods and intermediate inputs.	Tariffs were cut permanently by 10% in 2021. Tariffs were cut again by 10% for 87 percent of tariff lines in May 2022, on a temporary basis until December 2023. Some IT and capital goods saw even higher tariff reductions of 20%. In 2020, Brazil and the US signed a protocol that will lower trade barriers between the two countries. Import licences have been eliminated for more than 500 products.

Labour market policies should facilitate worker reallocation

The pandemic has left Brazil with a lower labour force participation rate, particularly for older workers, and a higher number of long-term unemployed, augmenting the risk that even more workers become discouraged and, eventually, exit the labour force (Figure 1.28, Panel A). The pandemic also disproportionately affected the employment of women, whose employment share in the domestic services sector was significantly higher than men (IADB, 2022; CEPAL, 2021). Mobilising currently underutilised labour resources is key to sustain stronger long-term economic growth, along with the product market reforms mentioned above.

An effective way of doing this would be to improve female labour market participation and employment, which are about 20 percentage points lower than for men (Figure 1.28, Panel B). Men earn on average 27.3% more than women in Brazil, compared to a gender gap of about 11% in the OECD (Schymura, 2022; OECD, 2023b forthcoming). When controlling for education, experience, occupation, industry, and type of employment, the gender wage gap in Brazil increases to 34.1% (Schymura, 2022).

Figure 1.28. Labour resources are underused, lowering potential growth and inclusion



Source: IBGE; ILOstat; OECD labour market statistics; and OECD calculations.

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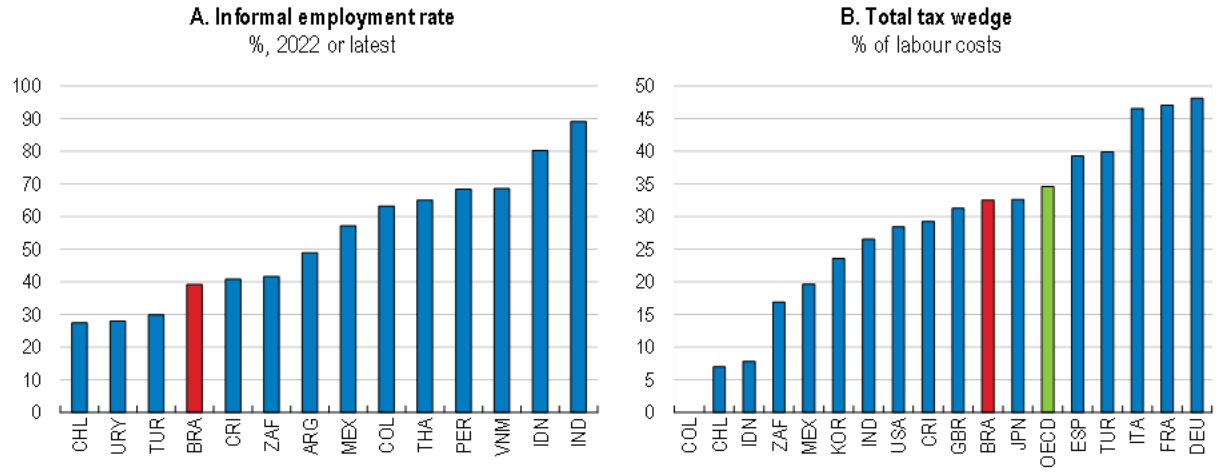
A new 2023 law prohibits gender-based wage discrimination between women and men exercising the same function. An inter-ministerial working group has also been created to address equality of opportunity and pay between men and women in the labour market. Among the measures that should be considered, female labour force participation and employment would greatly benefit from expanding access to early childhood education, as recommended in previous OECD Economic Surveys of Brazil (OECD, 2020a). Only about a third of all children under the age of three in Brazil have access to day care (Anjos Couto and Sousa, 2022). Lack of accessible childcare has forced many women to leave the labour force. Furthermore, there are large differences in access to day care across municipalities and regions, and depending on socioeconomic status, contributing to perpetuate inequalities (Anjos Couto and Sousa, 2022). Low-income women and single mothers should have a prioritised access to childcare.

Brazil should also encourage a more flexible and equal use of parental leave. Mothers are entitled to four months of parental leave, while fathers are only entitled to five days. Uneven parental leaves tend to slow women's career progression (OECD, 2023d). Many OECD countries have introduced paid leave of several weeks for fathers that cannot be transferred to the mother. In Spain, for example, fathers are entitled to the same number of weeks as mothers (OECD, 2023b forthcoming; OECD, 2023d).

Building a more inclusive labour market also requires tackling labour informality, which remains high at around 40% (Figure 1.29, Panel A). Informality does not only imply a lack of social protection, but firms employing informal workers also tend to be less productive. Moreover, they compete on an uneven playing field with firms that are fully compliant with labour regulations (Amin et al., 2019). Informality has many reasons, but one likely key determinant is the cost difference between informal and formal employment contracts (Levy and Cruces, 2021; Firpo and Portella, 2021). Brazil's labour tax wedge of 35% for minimum-wage earners is high in comparison with other emerging economies, raising the cost of formal job creation (Figure 1.29, Panel B). Reducing tax wedges for low-skilled workers at risk of informal employment would strengthen formalisation incentives, as argued in the section on social protection above and in previous OECD Economic Surveys of Brazil, (OECD, 2020a).

Figure 1.29. Informality remains high, partly explained by the significant labour tax wedge



Note: For panel B, 2021 data for OECD countries and 2019 data for non-OECD countries. Tax wedge computed for a single individual without children, earning the average income.
Source: ILOstat; OECD Taxing Wages 2022.

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Stringent labour market regulations also add to the cost differential between formal and informal work. A major labour market reform in 2017 significantly modernised labour market regulations. Recent research shows that by reducing legal uncertainty and labour litigation costs for employers, the 2017 reform contributed to increase formal employment and economic activity (Corbi et al., 2022). Further changes to the labour legislation could be considered, in particular to accommodate and regulate online platform-mediated work, which has gained even more importance in Brazil during the COVID-19 pandemic (Miguez and Menendez, 2021).

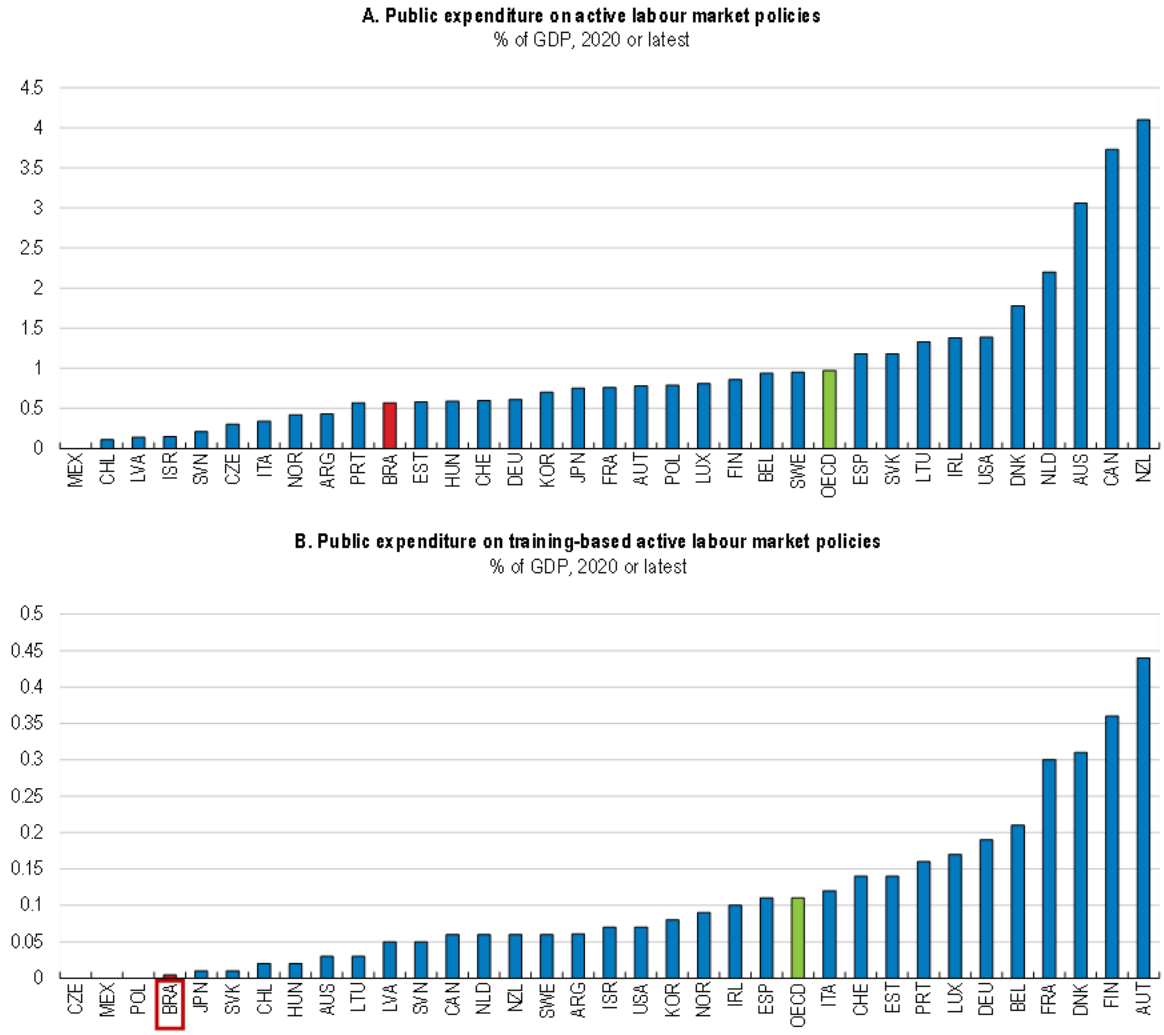
Workers in platform markets often face low entry barriers and flexibility, which can facilitate the labour market integration of underrepresented groups and the reallocation of workers towards sectors in high demand (Lane, 2020). Moreover, transactions in online labour platforms are digital and traceable, with positive implications in terms of tax compliance and labour formality. In 2020, the Brazilian Statistical Institute (IBGE) estimated that more than five million Brazilian workers derived their main source of income from digital platforms and that at least 17 million were getting some occasional income through such platforms. However, there have been rising concerns about working conditions for digital platform workers regarding low pay, long working days, and a lack of access to social protection (Abilio et al., 2021).

Platforms could be required to introduce a working hour limit and a minimum hourly wage, for example. Some digital platforms in the transportation sector are already imposing resting times in some states. The Federal government could regulate platform markets to harmonise requirements across states and players in the market, ensuring minimum working conditions. Even if workers are paid per task, the platforms could also be required to compensate workers if the average hourly pay falls below the minimum wage (Lane, 2020). For example, BigBasket, a platform that has a significant presence in India, instituted a “Gig Workers Payment Policy” to guarantee at least the national minimum hourly wage after all work-related costs are accounted for (OECD, 2023c; Fairwork, 2021). New York City has imposed a minimum wage for Uber and Lyft drivers (Lane, 2020).

Strengthening active labour market policies would complement the recent labour market reform in facilitating the reallocation of workers towards more productive jobs and firms. Spending on active labour market programmes in Brazil is close to the OECD average (Figure 1.30, Panel A). However, it is mostly focused on supporting self-employed workers and employment subsidies, which are less effective in

improving employability (Figure 1.30, Panel B; OECD, 2021c). Shifting spending towards high-quality targeted reskilling and upskilling programmes would better support return to employment. Professional training programmes, such as the short-term professional courses with low entry requirements targeting displaced workers *("Cursos de formação inicial e continuada")*, which closely respond to labour market needs have proved quite effective in the past and should be expanded (OECD, 2018a; OECD, 2020a; Bueno et al., 2022).

Figure 1.30. Spending on active labour market policies and training is low



Source: OECD labour market programmes database; ILO (2016), What works: Active labour market policies in Latin America and the Caribbean, International Labour Office, Geneva.

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Table 1.10. Past OECD recommendations on labour market policies

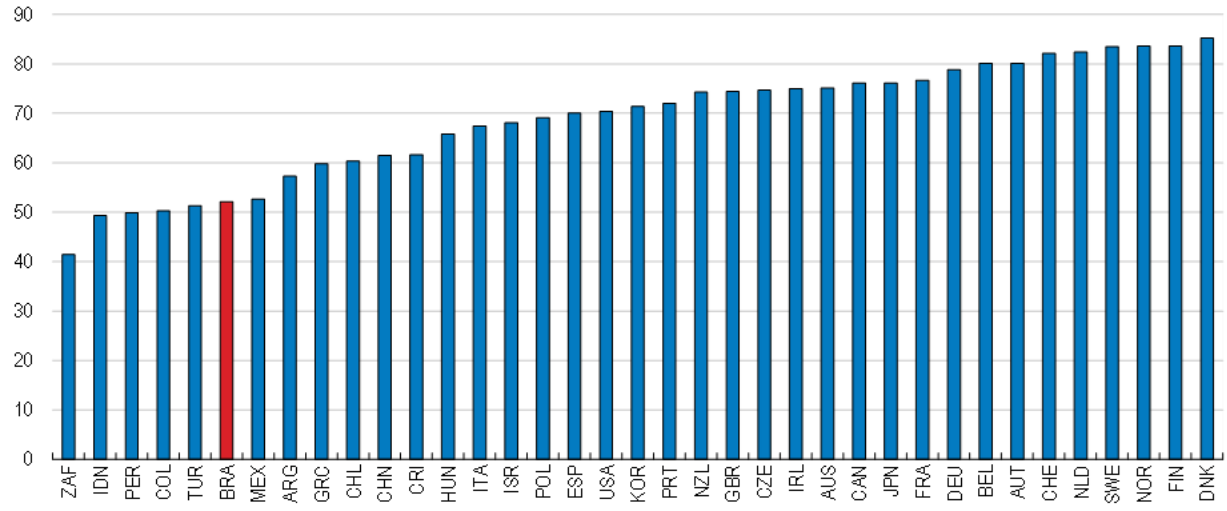
Recommendations	Actions taken since the 2020 Economic Survey
Reduce labour tax wedges for low-skilled workers by levying social security contributions at progressive rates, starting at low rates.	The exemption limit for the individual income tax has been raised from BRL 1,903.98 (1.4 minimum wages) to BRL 2,112 (1.6 minimum wages), benefiting about 13.7 million workers.

Spending on education could be more effective and more equitably distributed

Equal access to quality education is key for raising social mobility, which has been particularly low in Brazil compared to OECD countries (Figure 1.31). Improving the quality of education and widening its access would also raise human capital, boosting productivity growth and incomes. In the last decades, participation in education has expanded in Brazil and younger generations entering the workforce have been better educated than their parents. However, student performance is still behind the OECD average and some Latin American countries, such as Mexico, Costa Rica, and Chile (OECD, 2021d). Moreover, the correlation between educational attainment and socio-economic background, including race and regional differences, are stronger in Brazil than in many comparable countries (OECD, 2021d).

Figure 1.31. Social mobility is low in Brazil compared to OECD countries

Global social mobility index, 0 (worst) - 100 (best)



Note: The index is a composite indicator of 51 measures covering health, education, technology access, fair work opportunities, social protection, and inclusive institutions.
Source: World Economic Forum (2020), The Global Social Mobility Report 2020, Geneva.

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Unequal access to quality education has been exacerbated by the COVID-19 crisis, which disrupted traditional schooling during 2020 and the first half of 2021. Lack of access to basic material and educational resources at home and differences in parents' capacity to provide support were a considerable barrier for learning, especially for students from disadvantaged backgrounds and young children. Between 2019 and 2020, the drop-out rate among students aged 5 to 9 increased from 1.4% to 5.5%, undoing 14 years of progress in bringing drop-out rates down (Neri and Osorio, 2022). In 2021, the 5–9 years old drop-out rate was still 4.3%, much higher than before the pandemic.

As early childhood education, including pre-primary school, sets the foundation for later learning outcomes, stronger investments in this earliest part of education could be particularly effective to prevent irreversible damage and decades of progress from being reversed (Heckman and Masterov, 2007; UNICEF, 2019). Prioritising educational investments in early years of schooling would likely be the most equitable and cost-effective parts of education spending. Access to quality early education should be expanded further, prioritising children from disadvantaged socio-economic backgrounds and single-parent families. Recent increases in public investment in pre-primary education are steps in the right direction.

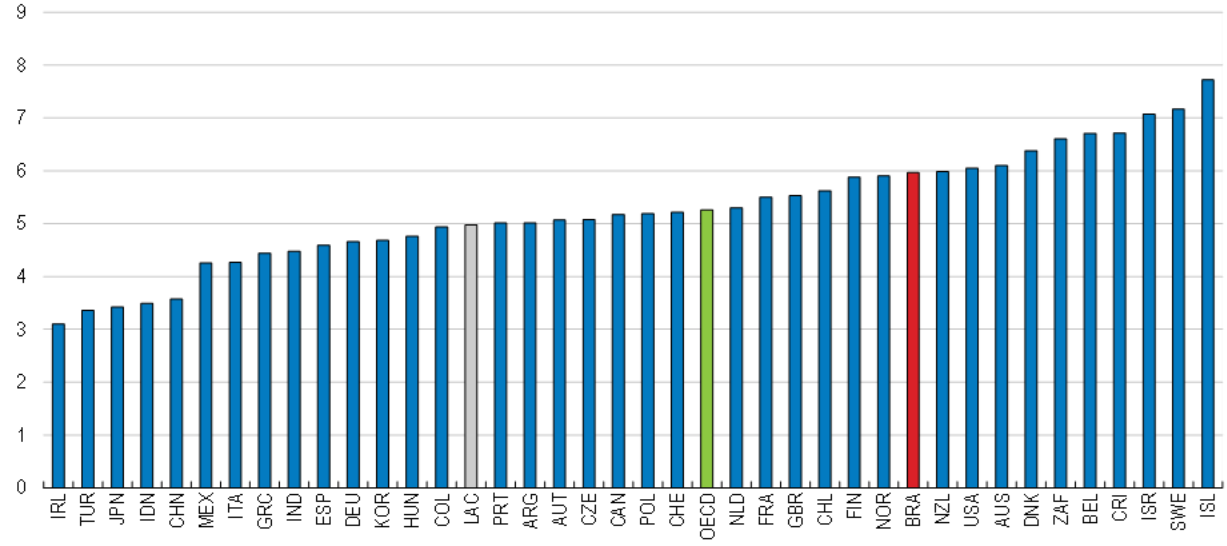
A stronger focus on early education would help to get more out of current public spending on education, which is well above the Latin American and OECD averages but have not necessarily translated into better educational outcomes (Figure 1.32; OECD, 2021c). Currently, resources are not always targeted towards

reducing inequalities. Brazil invests relatively more per student than OECD economies in non-compulsory tertiary education than in compulsory lower educational levels (Figure 1.33, Panel A), while completion rates in tertiary education remain lower than the OECD average (Figure 1.33, Panel B).

Students from wealthier backgrounds are more likely to progress to advanced levels of education and benefit from fully subsidised higher education (OECD, 2021d). One reason is that public universities do not charge tuition fees, but the competitive entry exams make it easier for students from high-quality private secondary institutions to access public universities. The introduction of specific quotas for students from minority or socially disadvantaged backgrounds, however, has significantly improved this situation over the last years.

Figure 1.32. Public expenditure on education is high in international comparison

% of GDP, 2021 or latest



Source: World Bank.

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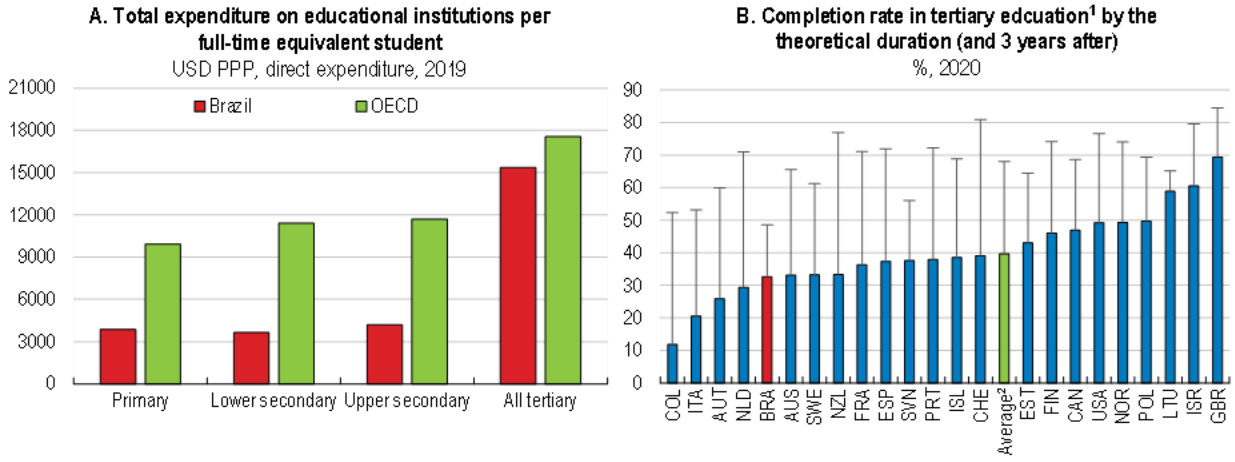
To improve equality of opportunity, Brazil should consider introducing means-tested tuition fees for public universities along with targeted subsidies for disadvantaged students. Public universities in three-quarters of OECD countries charge annual tuition fees (OECD, 2022d). Means-tested tuition fees, combined with grants for students coming from low-income households, can help to meet the increased demand for higher education, promote equity, while sharing the costs of higher education between the state and students. In Italy, for example, full-time undergraduates are required to contribute with an income-dependent annual tuition fee. In France and Germany, the government meets the balance of tuition costs with income-dependent grants, covering proportionately more of those costs for students from lower income families.

Figure 1.33. Higher public spending on tertiary education has not improved outcomes



Note: 1. Full-time bachelor's students. 2. Average of countries for which data are available.
Source: OECD education at a glance database; and OECD calculations.

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Increasing opportunities to enrol in advanced technical programmes with professional training content, both at the upper secondary and post-secondary level, would help increase the labour market focus and could strengthen students' engagement. Professional tertiary programmes, including professional bachelor qualifications, are well suited to ensure a smooth entry into the labour market (OECD, 2022e). They provide an alternative to academic higher education for those who want to acquire more specific technical skills and to quickly enter the labour market. In Brazil, participation in vocational education programmes remains limited by international standards (Figure 1.34). Post-secondary vocational education opportunities are extremely limited.

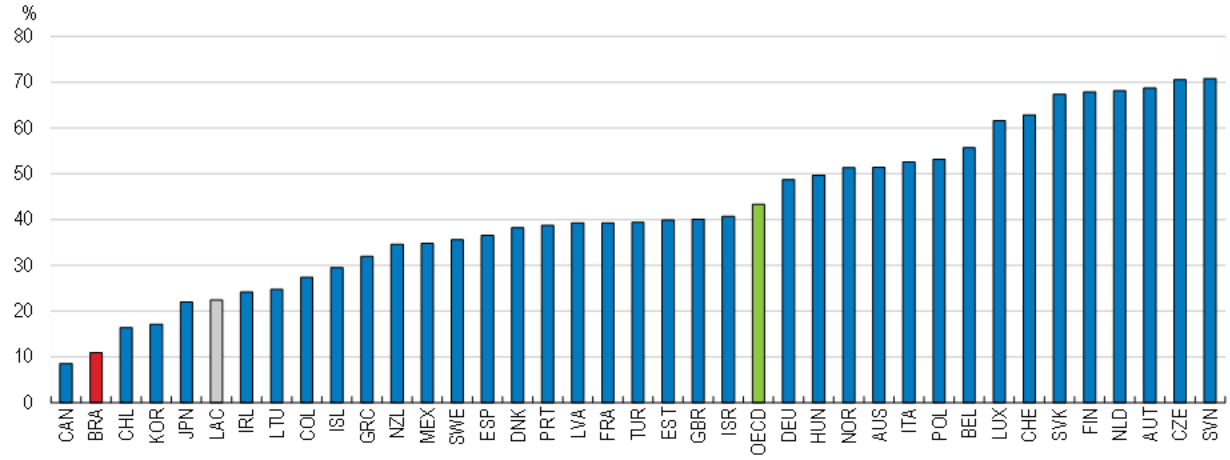
Brazil is currently reforming its Vocational Education and Training (VET) system. The reform aims at expanding enrolment by making vocational education an optional component of upper secondary programmes. It also intends to increase the diversity of options students can choose from and the flexibility for schools to adapt their programmes and curricula to local needs. However, states and municipalities in charge of delivering public vocational education have been implementing the reform at different speeds (OECD, 2022f; Salas, 2021). The government should provide adequate support to subnational governments to accelerate the reform implementation, including for example, organising workshops and seminars sharing positive experiences and good practices. Local partnerships between schools and employers in defining Vocational Education programmes' curriculum could also facilitate subsequent work-based placement.

Beyond the smooth integration of young workers in the labour market, local partnerships between schools and employers in defining Vocational Education curriculums would bring broad-based benefits for employment and incomes. OECD research shows that training programmes disconnected from local demand were largely ineffective in the past. On the contrary, training programmes designed to meet local skills demand were effective in reverting the negative effects of trade opening on employment growth between 2013 and 2018, particularly among low-skilled workers (Bueno et al., 2022).

Work-based learning should become a systematic part of Vocational Education and Training programmes. In fact, workplace training is a cost-effective way of familiarising students with modern technologies and working processes, as well as helping them develop soft skills. Many OECD countries make work-based learning a mandatory part of Vocational Education programmes.

Figure 1.34. Enrolment in vocational education is lower than most Latin American countries

Share of vocational students over all upper secondary students, 2020



Source: OECD education at a glance database; and OECD calculations.

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Table 1.11. Past OECD recommendations on education policies

Recommendations	Actions taken since the 2020 Economic Survey
Continue expanding access to early-childhood education, prioritising access for low-income families and single mothers.	No action.
Scale-up resources for professional training courses but ensure their alignment with local labour market needs.	The Vocational Education and Training system is currently being reformed with the objective of increasing students' enrolment.
Establish systematic evaluations and certifications of training programmes.	No action.

Greening growth requires reining in deforestation and reforming agriculture

Brazil's greenhouse gas (GHG) emissions decreased between 2004 and 2009, along with the reduction of deforestation. Between 2018 and 2021, the last year for which data are available, greenhouse gas emissions increased in line with rising deforestation (Figure 1.35) This increasing trend in deforestation has reverted since 2023, in the context of stronger policy efforts to halt illegal deforestation (INPE, 2023). Emissions from agriculture, the second-largest contributor, have been constant in recent years. In 2023, Brazil renewed its nationally determined contributions (NDCs), in the context of the Paris accord, including cutting GHG emissions by 48% of 2005 emissions by 2025 and by 53% by the year 2030. Achieving these commitments will imply strong changes in policies and practices in the three largest emission components, namely, land use and forestry (38%), agriculture (28%) and energy (23%).

Brazil has recently designed a comprehensive strategy to reduce GHG emissions, beyond the remarkably clean energy mix, and to adapt to climate change (see Chapter 2). The Ecological Transformation Plan, announced in August 2023, is meant to mainstream climate policies across ministries and aims to reduce the country's environmental footprint, increase productivity, and improve equity (Box 1.6). The plan has also been aligned with the government's Growth Acceleration Programme, as a further step to integrate the conservation and sustainable use of biodiversity across different sectoral policies. Tackling the main sources of GHG emissions (land and forestry uses, agriculture and energy) while developing alternative sources of energy and revenues, and new technologies, will be key for decarbonising the economy. Better targeting current subsidies and tax instruments, for instance in the agriculture sector, is a first step to drive

changes in production technologies and energy sources. Furthermore, there is room to mobilise green financing at the local and international levels to accelerate the green transition (see chapter 2).

Energy-related per-capita emissions are approximately one third of those in the European Union, and one seventh of those in the United States as 48% of overall energy use comes from renewable sources compared to a world average of approximately 15%. Nonetheless, there is room to further reduce energy-related emissions.

Developing market mechanisms could provide guidance and incentives for the reduction of GHG emissions. Brazil already has a voluntary carbon market in which firms emit carbon reduction credits. The Ecological Transformation Plan encompasses a regulated carbon market (cap-and-trade) with a primary focus on sources emitting more than 25,000 tons of CO_2 equivalent. A draft law has been submitted to Congress. This is a useful first step. However, including the forestry sector and parts of agriculture - the two major sources of carbon emissions - could boost incentives for carbon sequestration and the restoration of pastures. In addition, the government could consider developing a carbon pricing mechanism for emissions of sectors not covered by the carbon trading market. A progressive introduction of a carbon pricing mechanism -following the example of South Africa- can create incentives to adopt low-emission technologies and production processes with little impact on firms' competitiveness (OECD, 2022g).

Box 1.6. The Ecological Transformation Plan

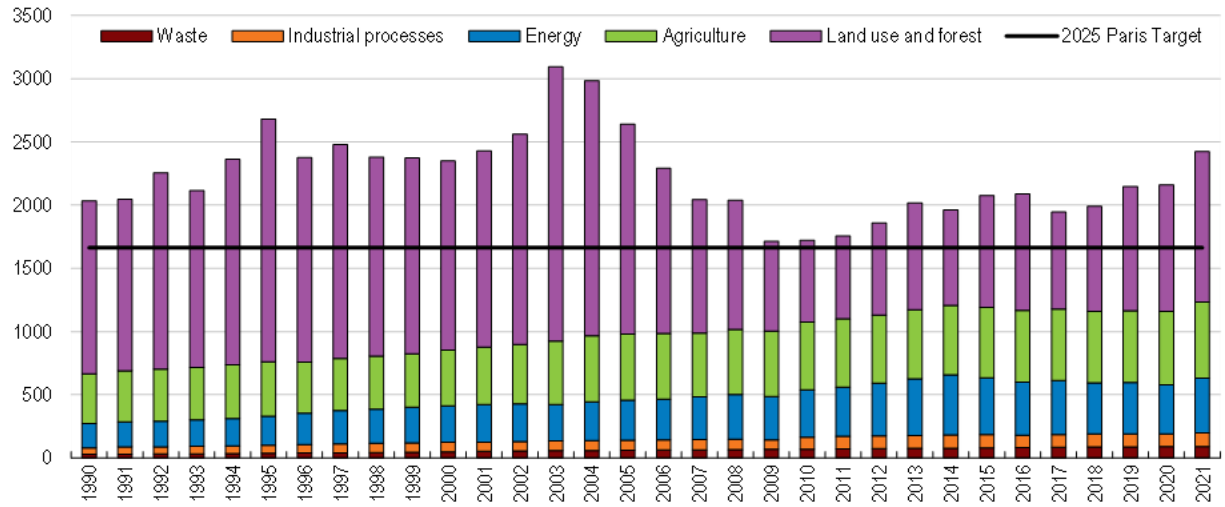
The new policy plan is meant to guide the green transition of Brazil's economy. Prepared under the leadership of the Ministry of Finance, it will be implemented across departments and subnational governments. The main axes of the plan are:

- Promoting sustainable finance, including a regulated carbon market (cap-and-trade), a national sustainable taxonomy, sustainable sovereign bonds, and decarbonising financial regulations.
- Promoting the technological consolidation of the productive sector, including the redesign of R&D policies, use of public procurement for innovation and training of qualified labour.
- Promoting the bioeconomy, involving measures to boost biotechnology activities, use of low-carbon agricultural techniques, forestry concessions and payments for environmental services.
- Promoting the energy transition, including the expansion of renewable sources, the electrification of the transport fleet, the use of new fuels from biomass and energy storage and transport solutions.
- Promoting the circular economy, which includes solid waste treatment (especially via recycling and biodigesters), sewage treatment and reverse logistics actions.
- Promoting new green infrastructure and adaptation, including a public works programme in areas most affected by climate change as well as new infrastructure with a reduced environmental footprint.

Source: Communication from the Ministry of Finance.

Figure 1.35. Greenhouse gas emissions have been increasing in recent years

Million tonnes of CO2eq (GWP-SAR)



Source: Observatório do Clima (SEEG), http://plataforma.seeg.eco.br/total_emission. Brazil's NDC submitted to UNFCCC as of 21 March 2022.

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Further developing biofuels to reduce transport emissions

Brazil has also been an early developer of biofuels technology, which plays a significant role in the reduction of transport emissions. Brazil has managed to cover 20% of the energy consumption in the transportation sector from ethanol derived from sugar cane, in addition to the 5% from biodiesel derived from soy and cattle by-products. Biofuels play a role in reducing transport emissions both through mandated mixing of typically low shares of biofuels into regular fuels and through engines that can run entirely on biofuels. Brazil has been a pioneer on both fronts. This has kept a lid on transport carbon emissions despite a large expansion of the car fleet, which more than doubled in the last two decades following the growth in income per capita (EPE, 2020). Regular gasoline is mandated to contain 27% ethanol, while diesel is mandated to contain at least 10% of biodiesel, following temporary reduction of biodiesel obligations from 13% to 10% in response to a spike in biodiesel prices, largely on account of rising prices for the soybeans that are used to make biodiesel (IEA, 2021). Further increasing the biofuel content of regular gasoline will boost biofuel production while reducing transport emissions, in line with a recent draft law submitted to Congress.

Brazil's new national biofuels policy, *RenovaBio*, introduced a market mechanism, with the aim to further stimulate biofuel production and is expected to reduce fuel emissions by 10% by 2030 (OECD/FAO, 2021). Based on long-term national targets, the government sets annual mandatory carbon emission reduction targets to individual fuel distributors, which can be met by acquiring decarbonisation credits, CBIOs, emitted by certified producers and importers of biofuels. The credits started to be traded on the stock exchange in 2020 and the market is set to gain traction soon through a strengthening of the targets. The logic is to reward the most efficient ways of reducing carbon emissions and biofuel producers that can demonstrate stronger emission reductions will reap greater financial rewards. The national development bank, BNDES, has also boosted the policy by introducing an ESG credit line of BRL 1 billion for biofuel producers under the *RenovaBio* policy, expected to be implemented in 2022. However, Brazil does not levy an explicit carbon price. Fuel excise taxes, an implicit form of carbon pricing, cover 5.9% of emissions in 2021 (OECD, 2022h). Increasing fuel excise taxes will incentives car makers and users to opt for biofuel cars and boost Brazil's lead in this area.

Reining in deforestation

Most of the gross emissions in land use, land use change and forestry – 90% on average in the past decade – are the result of deforestation (OECD, 2023c). Brazil made considerable progress during the first decade of the millennium in reining in deforestation and reducing related emissions, driven by strong and deliberate policy efforts. Between 2018 and 2021, however, this trend reversed and annual gross GHG emissions from deforestation rose again, reaching as high as 70% above their 2010 level in 2019. Preliminary data for 2023 suggest that deforestation is now declining again, likely related to stronger enforcement efforts (INPE, 2023). Most of the deforestation takes place in the Amazon biome, driven mainly by illegal deforestation associated with a complex cycle of land grabbing of public land (Hanusch, 2023).

Brazil has a strong legal protection framework in the form of its 2012 Forest Code and well-developed designated natural reserves and indigenous areas that limit legal deforestation (OECD, 2015). Since 2012, almost all deforestation has been illegal. Deforestation has risen significantly from 2019, mostly in the form of forest fires (Figure 1.36; Barlow et al., 2019). This increase has driven the recent rise in GHG emissions (Figure 1.35) and was favoured by weaker enforcement of the Forest Code, including budget cuts for the main agency in charge of forest management and protection (IBAMA). In the Amazon region, this trend reversed in the period from January to July 2023 with a 45% drop, which resulted in an aggregate drop of 7%, compared to the same period in the previous year (INPE, 2023). Moreover, an estimated 12 million deforested hectares in the Amazon region are completely unused, often leading to soil degradation.

Brazil has a wide array of policy instruments to combat illegal deforestation. Command-and-control policies have been successful in the past to counter illegal deforestation. The first phase of the Action Plan for the Prevention and Control of Deforestation in the Legal Amazon (PPCDAm) reduced deforestation drastically through real-time satellite detection of deforestation, capacity building at the national environmental protection agency IBAMA and better coordination across ministries and different levels of government in implementing the plan (Assunção et al., 2022; Assunção et al., 2019). In addition, improved territorial management also contributed to reducing deforestation by expanding the protected forest area by over 50% and improving land tenure (Assunção, Gandour and Rocha, 2019.; Assunção et al., 2022). A strengthening of the legal framework for investigating and punishing environmental violations translated into wider and faster sanctioning. The deployment of fines, embargos, seizure of production inputs, imprisonment, and prohibition of lending to those non-compliant with environmental laws significantly raised the expected costs of engaging in illegal deforestation (Assunção and Bragança, 2018 and 2015 ; Assunção, Gandour and Rocha, 2019).

Moreover, an important innovation was the introduction of a priority list for deterrence efforts. Through this policy, municipalities with higher deforestation rates were subjected to more rigorous monitoring and enforcement by IBAMA and to stricter administrative surveillance of land titles, local plans for sustainable production and concessional credit lending. The prioritisation strategy is estimated to have reduced deforestation by 40% (Assunção et al., 2022). Completing the mapping and designation of all undesignated public rural lands and reforming agrarian settlements will reduce illegal occupation of land and deforestation. Restoring the priority interventions in municipalities with the highest deforestation rates would limit illegal deforestation and avoid the expansion of the deforestation frontier.

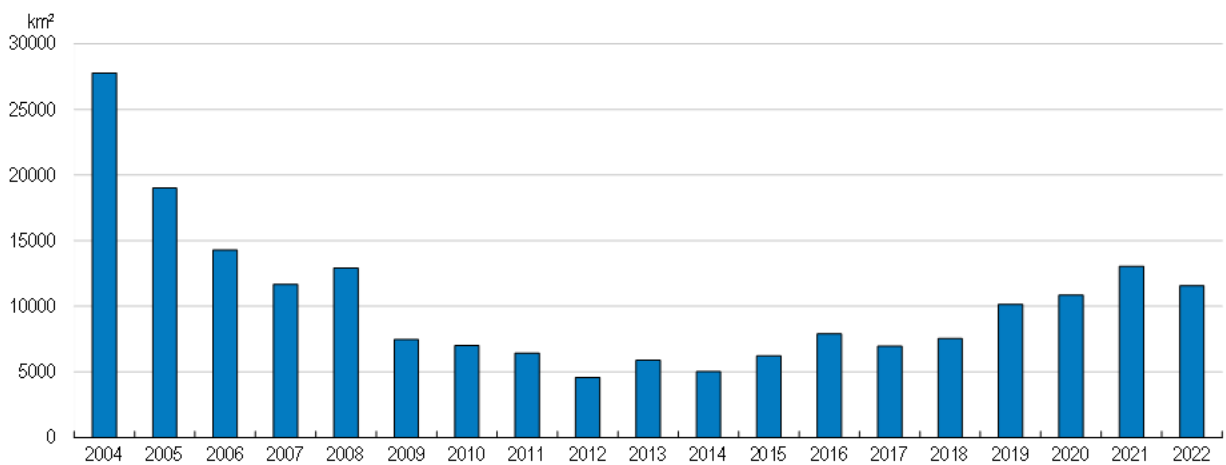
Finally, restoring the enforcement of the environment protection law and Forest Code will be key to counter deforestation, although it allows for legal deforestation. The resurgence of deforestation since 2019 coincides with some elements of institutional weakening and tighter funding constraints. From 2017 to 2020, spending by the Ministry of Environment and its affiliate institutions was halved in real terms (Observatório do Clima, 2021). Enforcement staff at IBAMA has decreased by 55% since 2010, as retirement-related vacancies have been left unfilled. However, in 2023, a new recruitment process has started. Enforcement instruments contained in the PPCDAm have been employed less, which may have affected the threat of prosecution as perceived by those responsible for deforestation and wildfires. Since

2023, important policies contained in the PPCDAm and its sister programme for the Cerrado biome, the PPCerrado, have been gaining momentum. The launch of the new PPCDAm for 2024-2027 in June 2023 is an important step in the right direction. The new plan contains a pledge to achieve net zero deforestation by 2030 and a fivefold increase in surveillance efforts in illegally deforested areas. Restoring adequate funding for IBAMA is essential to ensure strict enforcement of the Forest Code.

Deforestation in officially recognised indigenous lands has been historically low, particularly if compared to adjacent lands. Brazilian legislation establishes strict protections for indigenous lands, including restrictions on land uses and mandatory consultations with local communities. These areas have come under pressure since 2016, as enforcement weakened, new legislation to relax restrictions was proposed, and no new indigenous lands were recognised. This trend has been recently reversed. In January, the government launched a multi-ministerial operation to expel illegal miners and loggers from the Yanomami land and improve the health condition of the Yanomami people. In September, the Supreme Court ruled against an interpretation of the Constitution that would have implied more strict conditions for recognition of indigenous lands. A new Ministry of the Indigenous People has been created and is in the process of recognising at least two new indigenous lands.

In addition to prohibition and sanctions, developing the forest economy in association with communities around would create incentives and market-based mechanisms that reduce deforestation. For instance, the payment for environmental services has been efficient for the reduction of emissions from deforestation and forest degradation (Amazon Fund project). Support for other than wood forest products, fisheries, and agroforestry by developing market access, improving logistics and facilitation of private community partnerships in the Amazon will provide a sustainable income to communities as an alternative to illegal exploitation of natural resources (Hanusch, 2023). Developing the traceability of legal forest products could be an argument to promote their access to foreign markets.

Figure 1.36. Recent increases in deforestation seem to be reversing



Note: Data refer to the legal definition of the Amazon region, comprising the states of Acre, Amapá, Amazonas, Pará, Rondônia, Roraima and Tocantins, most of Mato Grosso and the western part of Maranhão.
Source: Prodes, Instituto Nacional de Pesquisas Espaciais (INPE), http://www.obt.inpe.br/OBT/assuntos/programas/amazonia/prodes.

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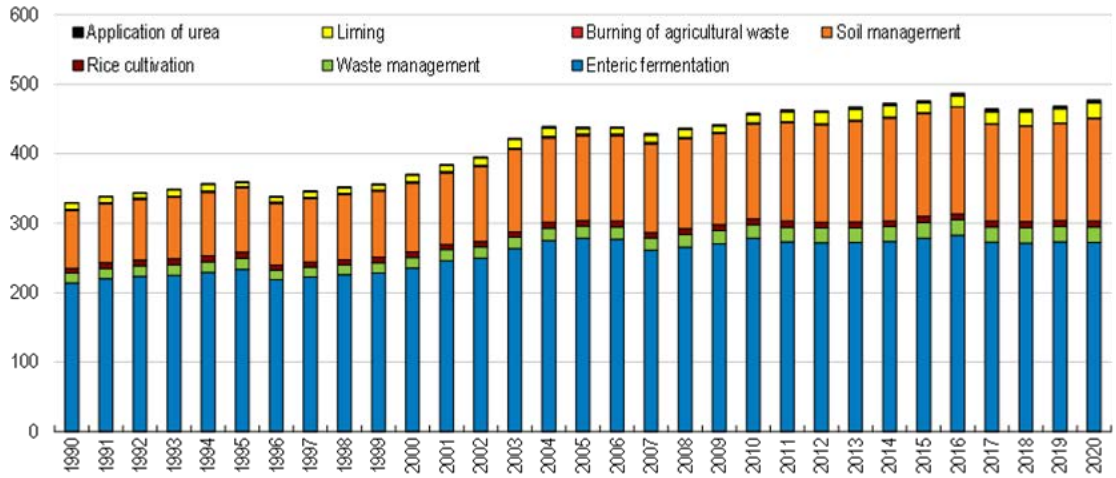
Greening agriculture

The agriculture sector is the second-largest direct source of GHG emissions in Brazil (Figure 1.35). With the largest cattle herd in the world, two thirds of direct agricultural emissions come from livestock natural emissions, most of which from enteric fermentation (Figure 1.37). The increase of agriculture emissions is lower than the growth of agriculture production, suggesting significant efficiency improvements and advances in low-carbon agriculture (OECD, 2020a). The Plan for the Consolidation of a Low Carbon Economy in Agriculture, the ABC Plan, implemented from 2010 to 2020, was the main instrument to ensure the continuous improvements in agricultural practices that reduced greenhouse gas emissions.

The ABC plan targeted efficiency improvements in the use of natural resources, better adaptation to climate change in the agribusiness sector and the adoption of specific technologies, such as degrade pasture recovery, crop -livestock-forestry integration and agroforestry systems, no-tillage practices, and biological nitrogen fixation. It also included technical training of farmers and stakeholders and financial support and monitoring of carbon capturing activities. The ABC plan is deemed to have been successful, despite further scope for improvement in the training, research and financial support components (World Bank, 2022; Piao et al., 2021). The ABC plan should be scaled up to enhance existing incentives, R&D and technical assistance. It should also be tailored to benefit different biomes and farm sizes. Supporting farmers to register in the Rural Environmental Registry (Cadastro Ambiental Rural – CAR) is an important complementary measure to help them in adhering to the Forest Code and to access climate-smart rural credit facilities.

Figure 1.37. Direct GHG emissions from the agricultural sector are driven by cattle emissions

Kg CO2eq



Source: Emissões de GEE por Subsetor, Ministério da Ciência, Tecnologia e Inovação; and Estimativas Anuais de Emissões de Gases de Efeito Estuda no Brasil (6ª Edição), Ministério da Ciência, Tecnologia e Inovação.

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Complementary options to green the agriculture sector include the restoration of pastures, development of carbon sequestration and scaling-up climate smart agriculture. The restoration of pastures in the country, which comprises 40 million hectares of degraded pasture, would increase beef production from 30kg/ha per year to 180 kg/ha, and decrease the pressure on expanding agriculture into the Amazon area (Piao et al., 2021). Financial public support to the agriculture sector could be linked to compliance with the Forest Code.

Brazil has an important potential to abate or sequester carbon from the atmosphere using natural climate solutions. These solutions involve the preservation and restoration of biomes and the improved capture of carbon in the soil by agriculture.

Finally, improving the implementation of innovative solutions for climate-smart agriculture will improve the productivity, efficiency, and climate resilience of the sector. Consolidating and increasing the research and services of EMBRAPA (the agriculture innovation agency) will be key for the adoption of innovations in integrated agro-sylvo-pastoral systems, agroforestry, and reduction of methane emissions from cattle. Increasing the diffusion of these innovations towards a wider range of farmers, notably family farmers, would be key for scaling-up climate-smart agriculture through more efficient extension and technical assistance services. Technical assistance and effective extension services can also help leverage private investment.

Table 1.12. Past OECD recommendations on green growth

Recommendations	Actions taken since the 2020 Economic Survey
Build on past success in fighting illegal deforestation by strengthening enforcement efforts to combat illegal deforestation and ensuring adequate staffing and budget of environmental enforcement agencies.	Budget and staff numbers of the main agency responsible for the fight against deforestation have increased in 2023.
Avoid a weakening of the current legal protection framework, including protected areas and the forest code, and focus on the sustainable use of the Amazon's economic potential.	The legal protection framework is being restored in 2023.
Consider raising borrowing limits in rural credit programs for companies that are fully compliant with the forest code, or to finance the move towards low-carbon agriculture.	No action.

Table 1.13. Policy recommendations from this chapter

MAIN FINDINGS	RECOMMENDATIONS
Keeping the robustness of monetary policy and improving fiscal policies	
Inflation and inflation expectations have been above target but are coming down as monetary policy has tightened substantially.	**Continue the gradual easing of monetary policy provided that the ongoing convergence of inflation with the target continues**.
Financial system seems robust, but credit has been increasing.	Monitor closely the development of revolving credit, especially those linked to credit cards, and strengthen macro-prudential policy.
Fiscal rules have been overly focused on the short-term. The ceiling spending rule has not been respected in recent years.	Implement the new fiscal framework and reduce the public deficit to ensure the sustainability of public debt. Develop medium-term budget plans, with a rolling four-year horizon, and annex them to the annual budget law.
The budget process is constrained by widespread revenue earmarking and mandatory spending floors, coupled with strong automatic indexation.	**Reduce mandatory spending floors and earmarked revenues.** **Index social benefits to inflation rather than the minimum wage.**
Some states and municipalities have built-up large debt over time and fail to comply with the Law of Fiscal Responsibility.	Extend the new multi-year primary balance target and limit on spending growth to subnational entities. Use the CAPAG ratings to determine the extent of permitted new borrowing of subnational governments.
Budget amendments from individual parliamentarians lack efficiency **and systematic audits and exacerbate the disconnect between policy strategies and effective budget allocations.**	**Put stricter limits on and audit systematically expenditures financed through budget amendments from individual parliamentarians.**
A fragmented system of overlapping indirect taxes generates extraordinarily high compliance costs.	**Consolidate all federal and subnational consumption taxes into a unified value added tax.**
Frequent tax litigation adds to court congestion. The value of outstanding tax appeals in administrative courts has exceeded 7% of GDP.	Increase internal audits and early engagement with taxpayers before litigation procedures.
There is scope to consolidate various social protection programmes to reduce duplication and save resources that could be redirected to protect the most vulnerable.	Integrate all social benefit programmes into a single consolidated programme, building on *Bolsa Família*. Merge the two unemployment benefit schemes. Use the unemployment schemes as a top-up mechanism for *Bolsa Família*, providing complementary insurance in the case of job loss.
Spending on pensions remains high relative to the size of the elderly population.	Align the subnational pension regimes to the 2019 pension reform and general provisions.
Boosting productivity growth by facilitating the reallocation of resources across jobs, firms, and sectors	
Mandatory ex-ante Regulatory Impact Assessments can only lead to non-binding recommendations and practical implications are not clear.	Require a systematic follow-up for Regulatory Impact Assessments to monitor whether solutions have been implemented.
Regulatory barriers in service sectors are high. Professional services, including some ancillary tasks, are often reserved to members of professional associations.	**Reduce market entry barriers in professional services, including by abolishing exclusive rights for certain ancillary tasks.**
Despite recent progress, openness to trade in Brazil is still lower than in other emerging economies. Integration into GVCs remains concentrated in commodities. Trade barriers are high in international comparison.	Continue efforts to promote bilateral trade agreements with major economies and to reform Mercosur's external tariffs. **Pursue further reductions of tariffs and non-tariff barriers together with Mercosur partners, announced in advance and subject to gradual implementation.**
Female labour force participation and employment are about 20 percentage points lower than for men.	**Prioritise educational investments in the early years of schooling and expand access to early childhood education, giving priority to low-income women and single mothers**. Implement the new law on equal payment for men and women. Encourage a more equal use of parental leave between mothers and fathers by increasing the number of days of paid leave reserved specifically for fathers.
Labour informality is high at around 40%. The cost difference between informal and formal employment contracts contributes to informality.	**Devise a comprehensive strategy to foster formalisation, including through lower non-wage labour costs, better skills and stronger enforcement.**

Online platform-mediated work has gained importance recently in Brazil and more than five million workers derive their main source of income through these platforms. Working conditions, however, are not always fair.	Require platforms to introduce a working hour limit and a minimum working hour wage. Revise competition laws and enforcement practices to adapt to the expansion and development of digital markets. Introduce a flat social security contribution rate for platform workers, entitling them to the same benefits as regular employees.
Spending on active labour market programmes in Brazil is close to the OECD average, but it is mostly focused on less effective employment subsidies rather than training.	**Shift active labour market spending from employment subsidies towards high-quality training programmes that respond to labour market needs.**
Educational attainments are strongly related to socio-economic backgrounds, including race. Students from wealthier backgrounds are more likely to progress and benefit from fully subsidised higher education.	Prioritise educational investments in early years of schooling. **Consider introducing means-tested tuition fees in public universities combined with targeted grants for disadvantaged students and other strategies to improve access to higher education.**
Greening growth	
Since 2004, greenhouse gas emissions have been increasing, driven by the recent upward trend of deforestation.	**Implement plans to establish a regulated carbon market (cap-and-trade) with a primary focus on industrial and agriculture sectors.**
Deforestation has risen since 2019, amid weaker enforcement including budget and staff cuts. These trends are now reversing, and deforestation has come down.	**Continue to strengthen enforcement efforts to combat illegal deforestation. Ensure adequate staffing and budget of environmental enforcement agencies**. Restoring the priority interventions in municipalities with the highest deforestation rates.
The forest economy and payment for environmental services are underdeveloped. **Communities leaving around forests lack alternative sources of income.**	**Restore and further develop payments for environmental services.** Develop market access and improve logistics for other than wood forest products, fisheries, and agroforestry to provide a sustainable income to communities.
The agriculture sector is the second-largest direct source of GHG emissions. The Plan for the Consolidation of a Low Carbon Economy in Agriculture, the ABC Plan, implemented from 2010 to 2020, has been the main instrument to ensure the continuous improvements in agricultural practices that reduced greenhouse gas emissions.	**Scale up the ABC plan to enhance existing incentives, R&D and technical assistance to reduce GHG emissions from agriculture.**
Brazil has 40 million hectares of degraded pasture and two thirds of direct agricultural emissions come from livestock natural emissions.	**Strengthen incentives for the abatement and soil sequestration of carbon and the restoration of degraded pastures, for example through developing carbon credits.** Consolidate and increase the research and services of EMBRAPA for the adoption of innovations in integrated agro-sylvo-pastoral systems, agroforestry, and reduction of methane emissions from cattle.

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2 Scaling up infrastructure investment to strengthen sustainable development

Infrastructure investment has been low in Brazil over the last decades, leaving significant gaps in all infrastructure sectors. To close these gaps, public investment will need to increase and become more effective, while additional private resources need to be mobilised. Improving strategic planning and effectively translating it into budget allocations over time would increase the quality of infrastructure projects. Promoting foreign participation in public procurement would raise competition and value for public money, while strengthening the governance of SOEs would enhance the quality of infrastructure services. Minimising policy and judicial risks would help to leverage more private infrastructure financing, including at longer maturities. To the extent that state guarantees are used, they should only cover risks that the private sector cannot manage, while ensuring an adequate risk sharing between public and private actors.

Over many years, Brazil's growth has been driven by private consumption, while investment has regularly fallen victim to fiscal consolidation needs, as discussed in Chapter 1. This has contributed to stagnant productivity growth and the capital stock has reached a historic low. In 2021, total investment in Brazil was 19% of GDP, lower than in most peers and the OECD average (Figure 2.1, Panel A). Infrastructure investment is one area of investment with particularly wide ramifications into all parts of the economy, not only with respect to growth, but also social progress and sustainability.

Infrastructure investment has been particularly low in international comparison and has even declined (Figure 2.1, Panel B). On average, emerging market economies spend 5 to 7% of GDP per year on infrastructure, whereas Brazil has spent under 2% of GDP over the past decade (Raiser et al., 2017). This decline, driven by falling public investment that has not been sufficiently compensated by private investors, has left significant gaps in all infrastructure sectors, with current total investment needs close to 3.7% of GDP per year to close the infrastructure gap by 2030 (World Bank, 2022a). The transport, energy, and water and sanitation sectors have been particularly affected (Figure 2.1, Panel C). Brazil's infrastructure now performs worse than that of its regional peers and other emerging countries (Figure 2.1, Panel D).

Infrastructure investment can have a significant impact on growth, especially when accompanied by reforms that increase the institutional capacity for planning, budgeting, and spending efficiently (New Climate Economy, 2016). Raising public investment by 2 percentage points of GDP would increase the capital stock by 8 percentage points and output by 2.5 percentage points in 25 years (OECD calculations based on the OECD Long-Term model, Guillemette et al., 2017). Factoring in the likely effect of higher public investment on total factor productivity, the growth dividend would presumably be even larger. Beyond improving incomes and employment opportunities, infrastructure investment can bring additional benefits in terms of poverty alleviation and social inclusion by increasing the availability of goods and services (Medeiros et al., 2019).

Public investment in infrastructure should increase. However, fiscal space to accommodate higher public infrastructure investment will continue be limited in the coming years (see Chapter 1). Therefore, to close its infrastructure gap, Brazil will also need to improve the efficiency of public investment, on the one hand, and leverage private sector participation, on the other hand, while carefully evaluating the risks for the public sector. In addition, new infrastructure projects should also take climate risks into account to minimise future maintenance costs and retrofitting needs over the project lifetime, and factor in the potential benefits of infrastructure investments for mitigating greenhouse gas (GHG) emissions.

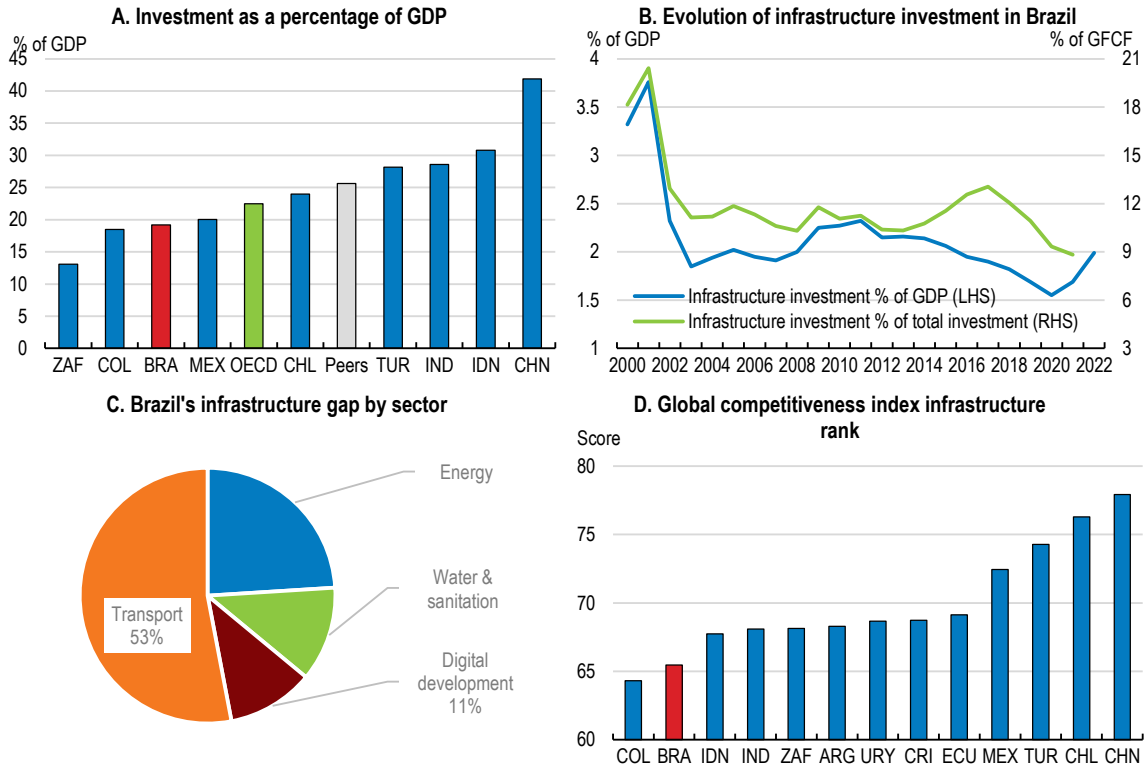
A sizeable new infrastructure programme called "New Growth Acceleration Programme" has been designed to address some of the infrastructure gaps. The large scope of the New Growth Acceleration Programme covers many Sustainable Development Goals (SDGs 6, 7, 8, 9 and 13). The programme will encompass over 2000 infrastructure projects, including public investment projects, private investments through concessions in roads, ports, airports, railways, cabotage maritime transport and private-public partnerships. Beyond the transport sector, it will also include measures to advance the energy transition and ensure energy security, improve urban and social infrastructure, support the digital inclusion and improve water and sanitation. The programme has the potential to reduce poverty and enhance economic opportunities for low income and disadvantaged groups.

This chapter analyses avenues to scale-up investment in economic infrastructure in a fiscally constrained environment. The main findings of the chapter are:

- Current infrastructure gaps vis-à-vis peer economies affect many different areas, particularly transport, water, and sanitation. Electricity and telecommunications investment should also increase for the catching-up with advanced technologies in telecommunications and climate-change related adjustment for electricity.
- More efficient use of scarce public resources will be key for maximising growth and social dividends from infrastructure investment. The project selection, planning and implementation phases show significant scope for making better use of existing resources.

- Leveraging private infrastructure financing will be key to complement public resources and can be facilitated by mitigating risks associated with infrastructure, developing long-term savings, and financing instruments and lifting the barriers to foreign investment.
- Building climate change mitigation and adaptation considerations into infrastructure planning from the outset will be key for an effective reduction of GHG emissions and to avoid costly retrofitting needs in the coming years.

Figure 2.1. Infrastructure investment is too low to close the infrastructure gap



Note: Data for Panel A are for 2021, data for Panel C are for 2019, and Panel D refers to infrastructure investment needs to bridge the gaps by 2030. Peers refer to Chile, Colombia, China, India, Indonesia, Mexico, Türkiye, and South Africa.
Source: Kroll 2022; World Bank; World Economic Forum; and OECD calculations.

StatLink https://stat.link/pgboaj

Infrastructure gaps are widespread

Although Brazil's continental size implies low population density in many parts of the country, Brazil's infrastructure falls short of the standards observed in many emerging market economies and gaps in quantity, quality and access can be identified in most economic infrastructure sectors. Many infrastructure facilities are 30-40 years old, and maintenance levels are low, leading to high operating costs and efficiency losses (Inter.B, 2022). According to the World Bank's most recent Logistics Performance Index, in 2018-2019, Brazil ranked 56th out of 160 countries worldwide in terms of quality of infrastructure. Infrastructure challenges are reflected in high logistics costs, for example, estimated at about 15% of GDP, compared to 8-10% in OECD countries (IDB, 2020). By some estimates, logistics bottlenecks add up to 7% to the cost of Brazilian exports (International Trade Administration, 2023).

Transport

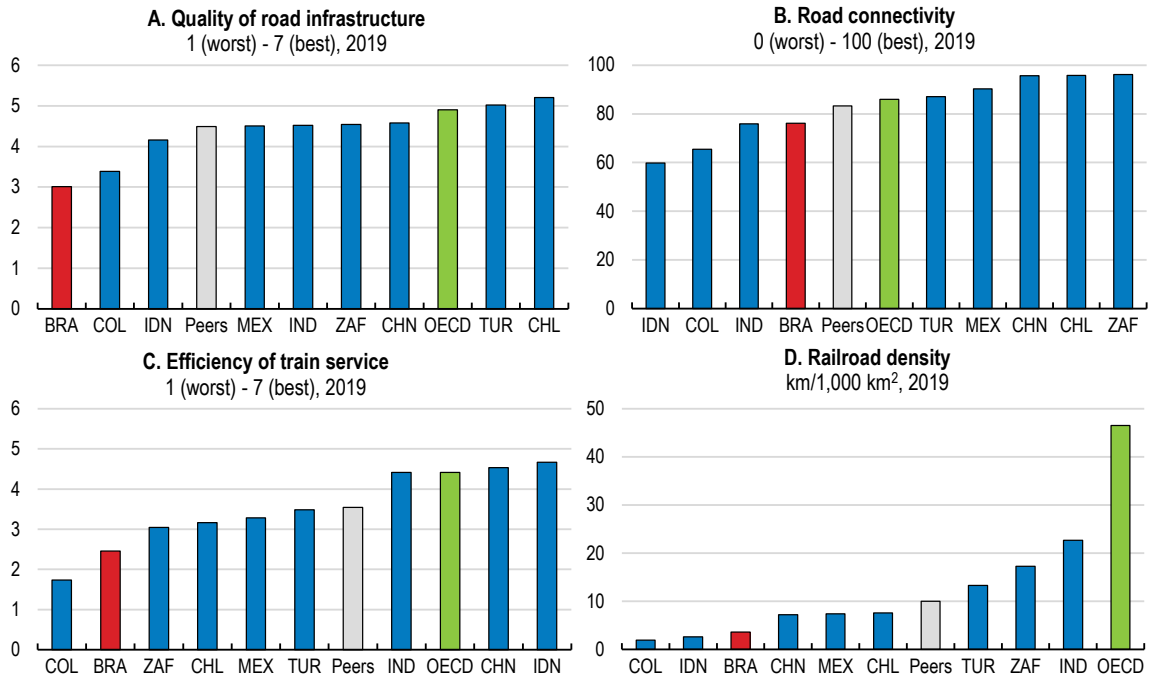
Road quality in Brazil reveals significant challenges, including when compared with peers (Figure 2.2, Panel A). Only 12% of roads are paved and 23% are in “bad” or “very bad” condition, according to the classification used by the World Economic Forum. Although many motorways are concessions and charge toll, and concession contracts include road maintenance obligations, road quality is nonetheless a widespread concern. Trucks are still the primary method of cargo transport, which increases logistics cost for some products, and with an existing fleet of over 2 million heavy-duty trucks, aged nearly 15 years on average, raises maintenance costs and air pollution (World Bank, 2022a). Furthermore, road connectivity, measured by the average time to connect the main cities, is low (Figure 2.2, Panel B). New highway concessions have increased since 2019, with an additional 7 sections auctioned, corresponding to 0.5% of GDP in private investments. Other projects are currently being prepared for auction, such as the highway connecting Belo Horizonte to Governador Valadares in Minas Gerais, or have been recently auctioned, such as the northern section of the beltway around São Paulo. However, improving the quality of existing roads and closing connection gaps will require additional efforts. According to some estimates, the current state of the road network may have increased overall transportation costs by as much as 33% in 2020 (CNT, 2022). Brazil’s accession to the International Transport Forum will help in the assessment of these gaps and a better design of future transport policies.

Rail infrastructure fails to keep up with growing demand from commodity exporters (Figure 2.2, Panel C and D). A third of rail tracks are abandoned and tracks have different widths across the country, making connections more difficult (Vendramini et al., 2020). The main railway terminals are far away from ports and agricultural regions (World Bank, 2022a). Furthermore, multimodal transport infrastructure, based on the interoperability of different transport modes, is lacking. Therefore, only 18% of cargo is transported via railways, with negative environmental consequences (Lo, 2018). Recent auctions to extend railways by over 20 thousand kilometers are welcome and further investments are expected in the coming years, which should help boosting the rail network.

The efficiency of ports has also scope for improvement (Figure 2.3, Panel A). Around 95% of export commodities flow through the port system, generating annual revenues of 14.2% of GDP and about 120 000 jobs. Still, slow turnaround including long waiting times for ships to load, and unload suggests that connections to global shipping networks are insufficient (Di Bella Filho, 2020; Costa et al., 2022; Figure 2.3, Panels B-D). Traffic bottlenecks along key road stretches leading to ports are frequent, resulting in higher logistics costs (Lodge et al., 2017; Oliveira et al., 2021). Insufficient capacity of the staging areas in ports exacerbates the congestion and increases truck waiting time. A new port terminal has been inaugurated in Açu in February 2023, relieving some of the congestion. In addition, the construction of six new port terminals has been authorized in 2022, which should generate more than BRL 10 billion of private investment in the sector.

Brazil has comparatively few public transport vehicles given its population size (Figure 2.4, Panel A). This affects some regions more than others, as urban mobility infrastructure is unequally distributed across regions. Adequate public transport options are often lacking in lower-income regions and suburban areas, where populations travel long distances every day to carry out basic activities. Waiting times are long, routes limited, and safety lacking, exposing users, and particularly women, to violence (ITDP, 2022). Nearly half of all municipalities do not have any public bus service and close to 80% of the bus fleet is not adapted to the requirements of people with disabilities or reduced mobility (NTU, 2023; IBGE, 2021). As a result, only 28% of urban trips relied on public transport in 2022 (Figure 2.4, Panel B). The implied intensive use of private vehicles generates high levels of congestion (Figure 2.4, Panel C). Indeed, Brazilian cities are among the 100 most congested cities in the world and among the top ten in Latin America.

Figure 2.2. Quality of land transportation infrastructure is low in international comparison



Note: Peers refer to Chile, Colombia, China, India, Indonesia, Mexico, Türkiye, and South Africa.
Source: World Economic Forum; and OECD calculations.

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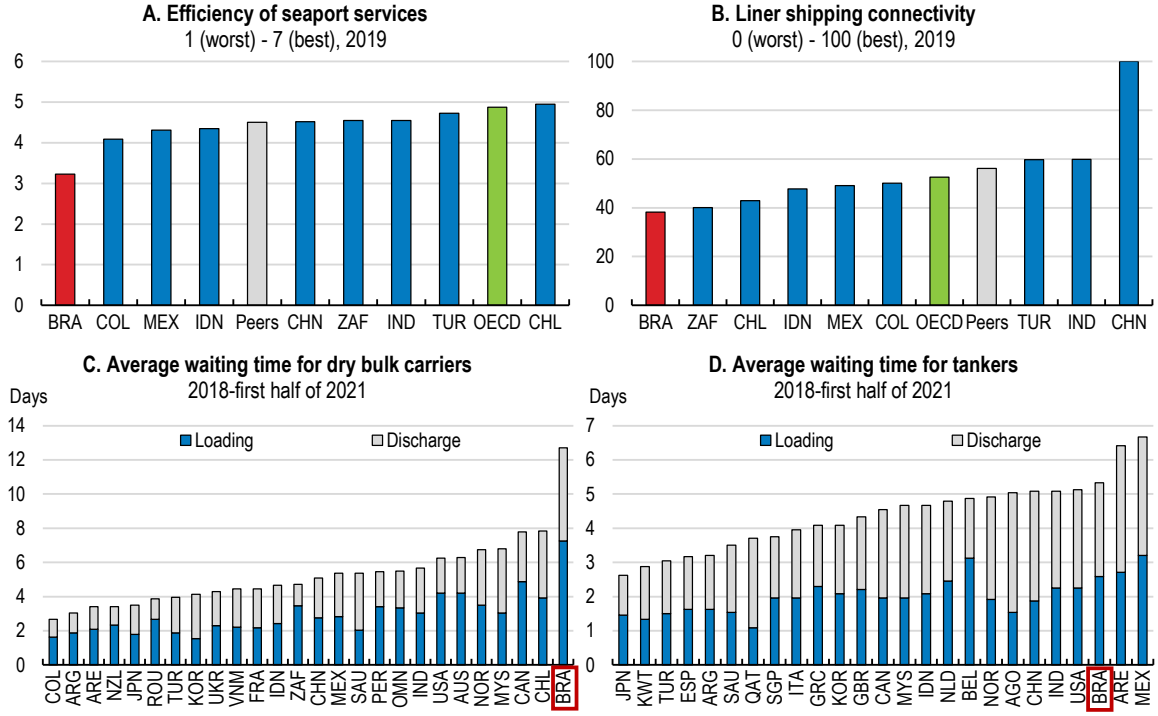
Figure 2.3. There is room to improve the performance of port services



Note: Peers refer to Chile, Colombia, China, India, Indonesia, Mexico, Türkiye, and South Africa.
Source: World Economic Forum; UNCTAD; and OECD calculations.

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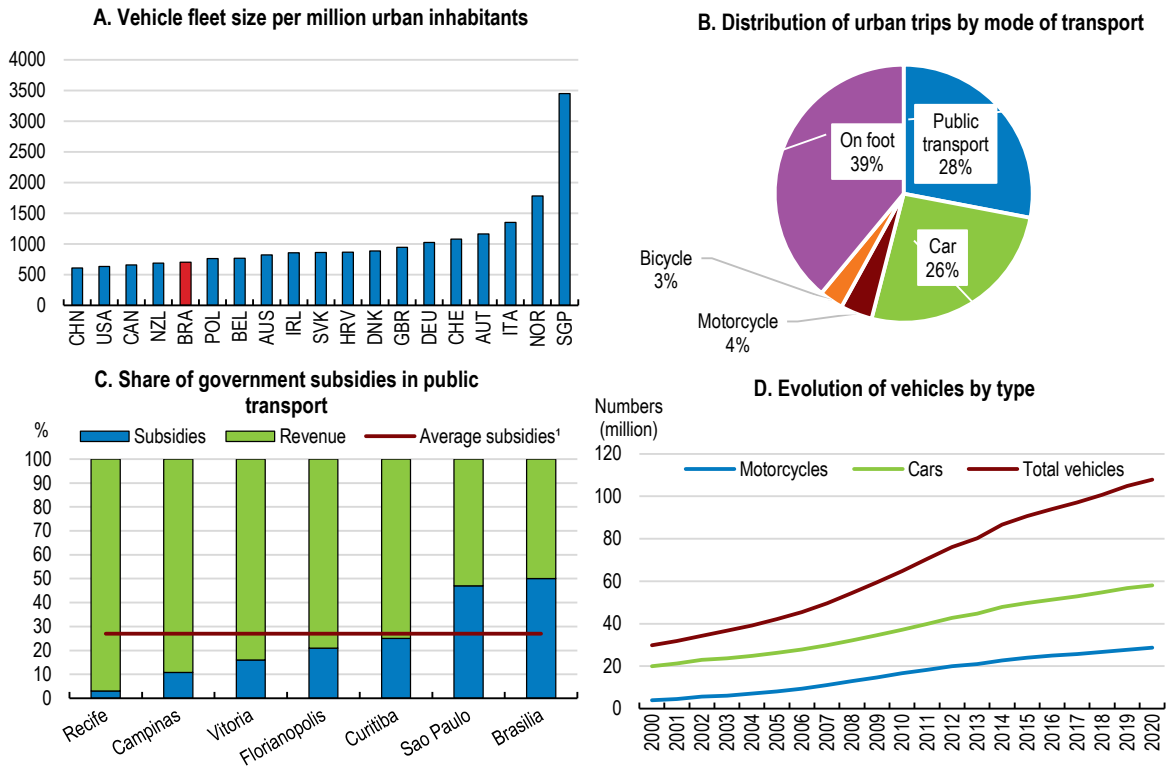
Figure 2.4. Urban public transportation remains underdeveloped



Note: Data in panel A are from the UITP (Union Internationale des Transports Publics) public transport and urban mobility database. Vehicle fleet size refers to the number of public transport vehicles as a measure of public transport supply, and the data are for 2015. In panel B, data are for 2018.

Source: NTU, 2023; UITP (2017). Urban public transport in the 21st Century, Brussels.

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Water, sanitation, and solid waste disposal

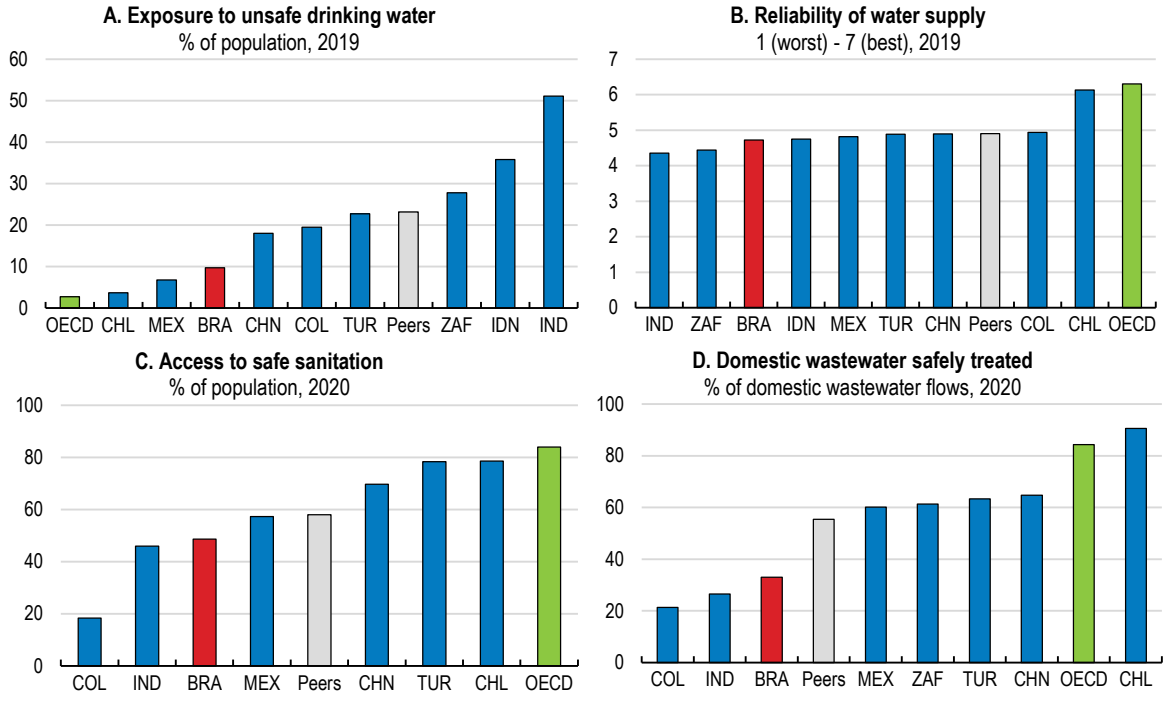
Access to safe water, sanitation and hygiene is a basic human need for health and well-being. Still, 10% of Brazil's population does not have access to safe drinking water at home, compared to 3% in OECD countries (Figure 2.5, Panel A). The share of the population exposed to unsafe drinking water goes up to 30% in rural areas (OECD, 2022a). Moreover, water supply interruptions and flow fluctuations are frequent (Figure 2.5, Panel B). Almost a third of all water produced is lost due to low investment in technology upgrade and asset maintenance (World Bank, 2022a). In 2019, the government established a Water Security Programme, with investments planned of about BRL 27.6 billion up until 2035 (about 0.4% of GDP), doubling current investment levels (OECD, 2022a). If executed, the plan should partly address current gaps.

Waste recycling rates are low, as nearly all solid waste goes to landfills or garbage dumping sites (Grottera et al., 2017). Water pollution, caused by poor treatment of industrial waste and sewage, leaking landfills, and diffuse pollution, endangers public health and ecosystems, with a disproportional impact on the poor living in the slums surrounding the largest cities (OECD, 2022a; Water Action Hub, 2020).

More than 100 million Brazilians, or 47% of the population, live in households that are not connected to the sewage system or have other forms of access to safe sanitation (PAHO, 2019; World Bank, 2020a, Figure 2.5, Panels C and D). Young people are particularly affected, with 39% of schools lacking basic hand-washing infrastructure (WHO/UNICEF) and 3% of children and adolescents having no bathroom at home (Trata Brasil, 2023; World Bank, 2020a).

Access and quality of water and sanitation facilities, which falls under the jurisdiction of subnational governments in Brazil, vary considerably across regions and urban-rural areas (Table 2.1). Coverage of the public water network is much lower in rural areas, where other forms of water supply, such as spring or rainwater, are used as substitutes (Trata Brasil, 2018). Loss rates in water distribution are lower in southern regions, where the distribution systems are more efficient, with better operations planning and management. Similarly, public sewage services are provided predominantly in urban areas. In rural areas, alternative solutions are used, such as septic tanks, rudimentary cesspits, open ditches, and discharge into waterways (SNIS, 2021). Midwestern and southeastern regions have above national average incidences of sewage overflows into public roads, often caused by rupture or obstruction of sewage collection networks.

Figure 2.5. Access to water and sanitation is far from universal



Note: Peers refer to Chile, Colombia, China, India, Indonesia, Mexico, Türkiye and South Africa.
Source: World Economic Forum; Our World in Data; United Nations Water; and OECD calculations.

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Table 2.1. Access to water and sanitation services is highly unequal

	Share of population served by public water system (%)			Loss rate in water distrib. (%)	No. of systemic shutdowns and disruptions per 100 residents	Share of population served by public sewage system (%)			Treatment rates of sewage generated (%)	Treatment rates of sewage collected (%)	Incidence of sewage overflows per 100 residents
	Total	Urban	Rural			Total	Urban	Rural			
North	58.9	72.0	16.9	51.2	11.0	13.1	17.2	2.4	21.4	85.8	7.5
Northeast	74.9	89.7	32.5	46.3	26.5	30.3	39.3	4.2	34.1	76.0	17.2
Midwest	90.9	98.0	29.6	34.2	6.9	59.5	65.8	5.8	58.5	94.3	43.5
Southeast	91.3	96.1	26.2	38.1	5.9	80.5	84.9	20.0	58.6	76.4	75.4
South	91.0	98.8	44.2	36.7	9.8	47.4	54.3	6.8	46.7	93.9	17.3
National	84.1	93.3	30.6	40.1	12.5	55.0	63.2	7.2	50.8	78.5	43.2

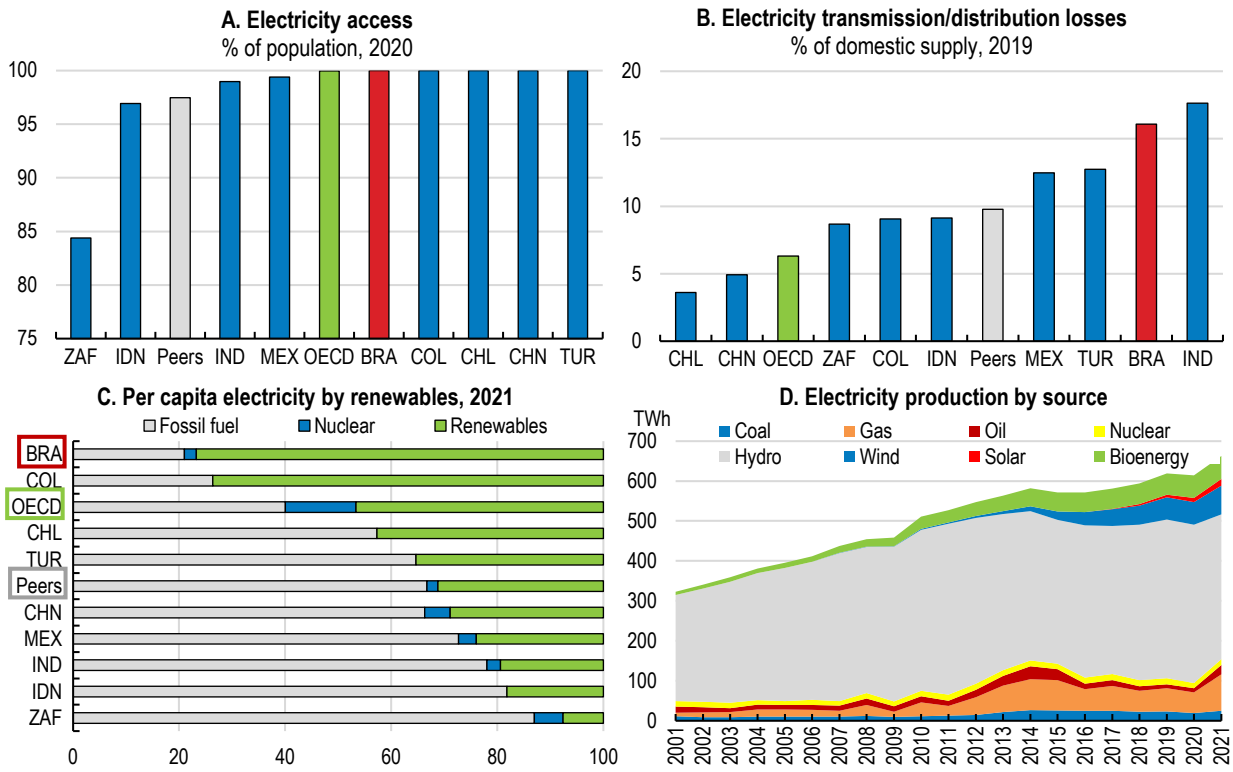
Note: Data refers to 2020. Data for rural areas were calculated using data for total and for urban areas as follows: Share of rural population = (total population served by the system - urban population served by the system) / (total population-urban population) * 100.
Source: National Sanitation Information System (SNIS); and OECD calculations

Electricity

In 2020, Brazil achieved universal access to electricity (Figure 2.6, Panel A). The Brazilian transmission network, which consists of four interconnected regional subsystems, constitutes one of the largest interconnected systems in the world (OECD, 2021a). However, electric power transmission and distribution losses remain considerably higher than in peer and OECD economies (Figure 2.6, Panel B). Losses occur through the transmission lines and distribution networks, during the process of electricity transportation, voltage transformation and measurement, but also due to theft (illegal connection or direct network diversion), fraud (meter tampering or deviation), reading and billing errors. In 2020, these losses represented over 15% of total consumption, more than the consumption of the North and Midwest regions combined, creating upward pressure on electricity prices (ANEEL, 2021).

Large hydropower plants have been the dominant source of electricity production, explaining Brazil's high share of electricity from renewable sources of over 70% (Figure 2.6, Panel C). Brazil's high dependence on hydropower is not without risks, however. In 2021, the depletion in hydropower reservoirs, due to a sequence year with below-average rainfall, threatened the electricity supply for 203 million people who rely on hydropower for two-thirds of their electricity consumption (OECD, 2022a). At the same time, the shares of other renewable sources, such as wind, solar and bioenergy, have increased, reflecting Brazil's massive potential for wind and solar power plants (Figure 2.6, Panel D).

Figure 2.6. Electricity generation relies highly on hydropower



Note: Peers refer to Chile, Colombia, China, India, Indonesia, Mexico, Türkiye, and South Africa.
Source: World Economic Forum; World Bank; Our World in Data; and OECD calculations.

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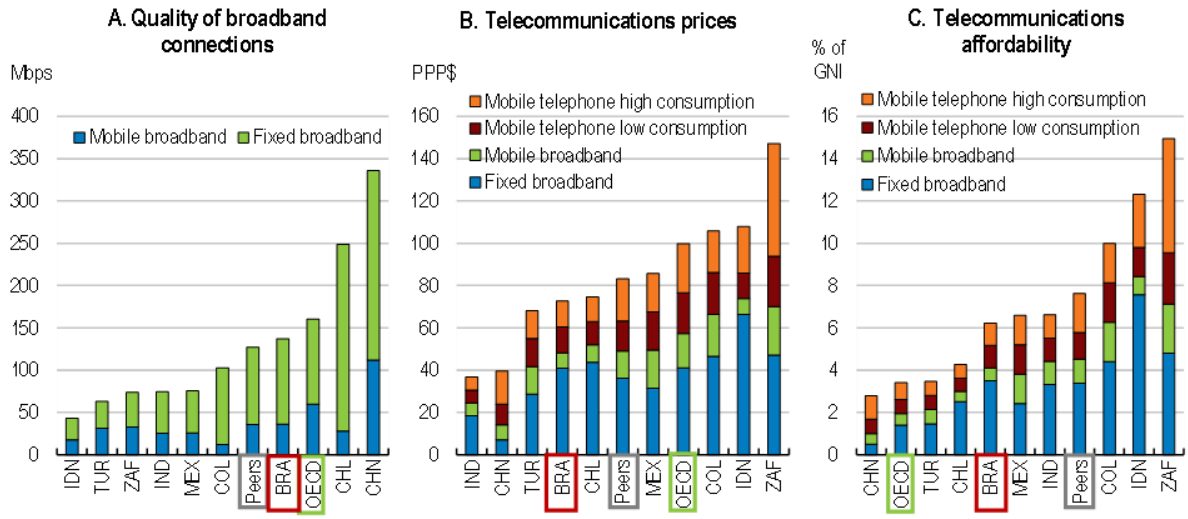
Telecommunications

Despite significant investments in telecommunications infrastructure over the past decade, particularly in residential internet and broadband speed (Figure 2.7, Panel A), facilitated by greater regulatory flexibility and the entry of smaller companies in the market, the availability of telecommunications services remains unequal. Across the country, nearly 5.5% of public schools do not have access to the internet, and 90% of these are in rural areas (Anatel, 2023). Rural areas also lag in mobile broadband coverage: only 54% of rural residents are covered by mobile services, compared to near universal coverage in urban areas.

High telecommunications prices are a key barrier to the adoption and uptake of services and new technologies, despite telecommunication services being considered essential and indispensable goods and services with reduced tax rates from 2022. A 2018 survey conducted by the Brazilian Network Information Centre found that among those that dos not yet have access to internet, 61% of households identified affordability as the main reason for not adopting the Internet (CGI.br, 2019, OECD, 2020a; Figure 2.7, Panel B and C). Taxes and fees applied to the telecommunications sector contribute to the comparatively high prices and low affordability, representing 40% of fixed and mobile broadband services prices (OECD, 2020b).

Figure 2.7. Quality and affordability of telecommunication services lag OECD countries



Note: Mbps refers to megabits per second. GNI refers to gross national income. Peers refer to Chile, Colombia, China, India, Indonesia, Mexico, Türkiye, and South Africa. Panel A shows median download speeds in December 2022. Data in panels B and C are for 2021.
Source: Ookla Speedtest Global Index; ITU World Telecommunication/ICT Indicators Database; and OECD calculations

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Improving the efficiency of public investment in infrastructure

Beyond its trend decline, public spending on infrastructure has delivered results that often fell short of expectations in the last decades. This has often been related to shortcomings in planning and project execution, suggesting significant scope to enhance the efficiency of public infrastructure investment. Between 2007 and 2015, only 37% of planned public infrastructure projects were executed (IMF, 2018). More recently, between 2018 and 2020, more than 30% of public infrastructure projects are, either temporarily or permanently, interrupted and paralysed (Figure 2.8). Furthermore, newly completed infrastructure projects often fail to meet expectations. There are several examples of newly built infrastructure where user demand falls short of projections, leading to financial difficulties and unexpected public subsidies (Abrão Costa and Carrasco, 2018; World Bank, 2022a). Publicly financed infrastructure projects that are paralysed waste scarce public resources, while failing to deliver much-needed services. Underperforming infrastructure assets lock in resources needed for their operation and maintenance, while providing services at a higher cost and of a lower quality.

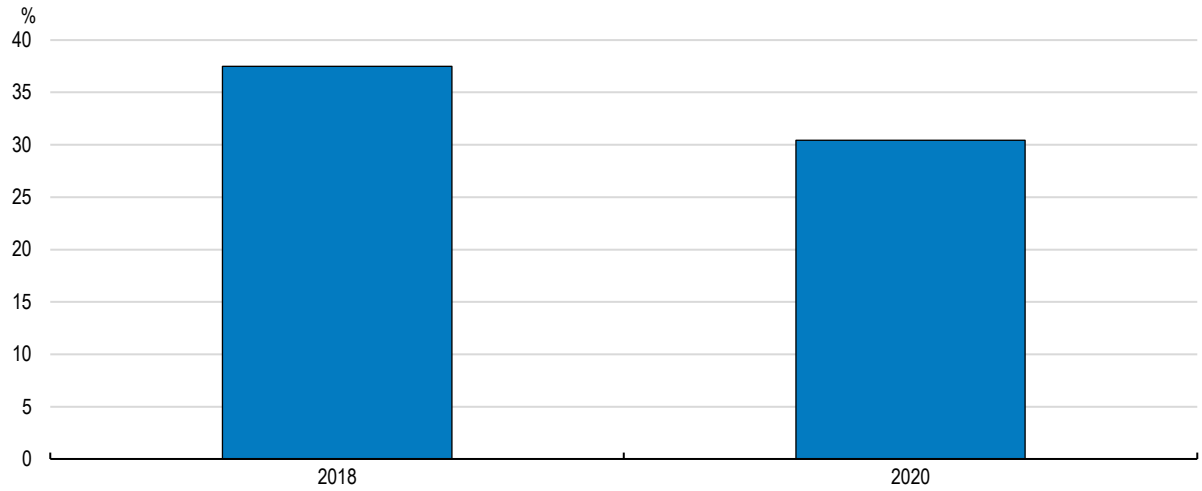
Many factors can influence the successful execution of infrastructure projects. Good quality projects generally start in the preparation phase, with adequate cost estimations over the whole life cycle of the infrastructure. The procurement phase can also significantly affect whether a project is successfully completed within the agreed terms and timeline. An efficient procurement process should be fair and provide equal treatment to bidders, it should promote healthy competition to obtain the best value for money, and it should be transparent to avoid corruption and bid rigging. Poor infrastructure service quality and overly high costs can also be linked with operational inefficiencies emerging after the project has been completed. Suppliers of infrastructure services, whether public or private, need incentives to continue investing in maintenance or capacity expansion, for example.

The broader business environment and regulatory framework also influence the ability to obtain good value for money. In fact, cumbersome and restrictive regulatory procedures, such as barriers to entry, limit competition, and therefore, restrict the quality of bidders, suppliers, concessionaires, and other available partners. Unstable and complex regulations also increase uncertainty and risk, lowering private sector

interest. On the contrary, a friendly business environment that encourages innovation contributes to higher quality standards, and sometimes even lower prices. In markets for infrastructure services, certain segments are often characterised by natural monopoly conditions as competition through a duplication of parallel infrastructure networks is not cost-effective. In these cases, regulation can separate the provision of a network from the provision of services over that network and ensure that service provision over the network remains competitive.

Figure 2.8. Many public infrastructure projects are paralysed

Share of publicly funded infrastructure projects that are temporarily or permanently paralysed



Note: Includes public infrastructure projects financed by Programa de Aceleração do Crescimento (PAC), Caixa Econômica Federal (CEF), Ministério da Educação (MEC), Fundação Nacional de Saúde (Funasa), and Departamento Nacional de Infraestrutura de Transportes (Dnit).
Source: Tribunal de Contas da União (TCU), "Diagnóstico sobre os principais Desafios Transversais da Infraestrutura (Caderno I)"; SeinfraUrbana.

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Strengthening the institutional framework for project planning, selection, and execution

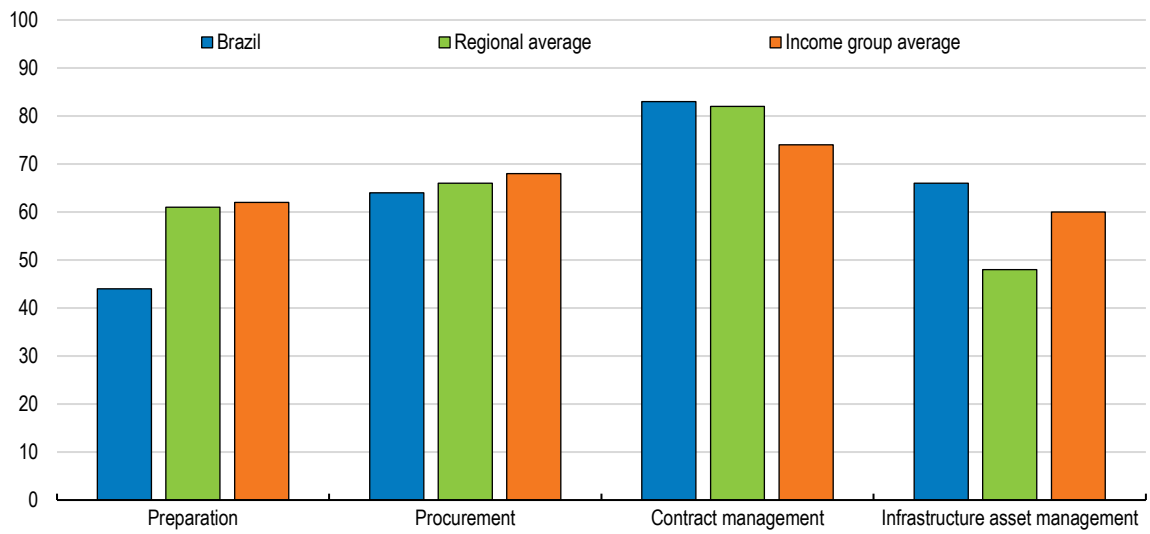
Brazil performs less well than other countries in the region or with similar income levels in the preparation phase of infrastructure projects, while it outperforms others in the areas of contract management and infrastructure asset management (Figure 2.9). Three preparation-related factors are systemically identified to explain cost overruns, long delays in execution, and poor-quality outcomes: imprecise project design, disputes with stakeholders or civil parties based on socio-economic or environmental impacts not duly anticipated, and funding discontinuity or uncertainty (TCU, *Fiscobras* 2015-2022).

Effective infrastructure planning involves prioritising and coordinating decisions at different levels (OECD, 2014). At the broadest level of coordination across sectors, strategic guidance for public investment in infrastructure is largely absent. Although, sectoral planning documents provide detailed guidelines over a long horizon, there is still little coordination across sectors. Some of these plans benefited from the participation of qualified technicians, firms, and research institutes, but cross-sector collaboration remains limited. For example, there was little participation from transportation operators in the design of the National Energy Plan, little participation from energy operators in the National Transportation and Logistics plan. In addition, civil society organisations are barely represented in any sectoral committee (Insper, 2015; World Bank, 2022a).

Previous attempts to coordinate infrastructure investment across sectors were hindered by scale. In the early phases of the first edition of the Growth Acceleration Programme ("Programa de Aceleração do Crescimento", PAC), between 2007 and 2010, the Federal government defined priorities and coordinated major infrastructure investments across different sectors and regions, consulting with different stakeholders. However, as the programme was progressively expanded and new sectors were added, the preparation and implementation of projects became increasingly more decentralised. Federal oversight and strategic coordination weakened, relying on varying degrees of technical capacity at the subnational government level instead, and the PAC project execution rate fell significantly (IMF, 2018).

Figure 2.9. Brazil performs worse than its peers in the preparation of public infrastructure projects

Scores in each infrastructure project cycle phase for public investment using conventional procurement methods



Note: Data collected by World Bank through standardised questionnaires designed to assess the regulatory quality for preparation, procurement, and management of large infrastructure projects. Survey responses were scored and normalised for international comparisons, with higher scores representing better performance. Peer countries in the upper middle-income group of 54 countries defined by World Bank.
Source: World Bank (2020b), "Benchmarking Infrastructure Development 2020".

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Failure to account for ongoing or planned developments in other sectors can result in unrealistic demand and supply estimations. The development of infrastructure in one area will have a significant impact on other sectors. The expansion of roads, rails, and waterways, for example, will have a meaningful impact on the demand for energy, sanitation, and digital services, as new infrastructure will likely direct the expansion of urban areas. The lack of coordination between sectoral investment plans also means that opportunities for cross-sector infrastructure sharing have not always been well identified and exploited. Digital and electricity networks, for example, both require wide distribution and strong cable infrastructure. By sharing infrastructure and working together, different sectors can help one another achieve wider access, higher service quality, and lower costs. Encouraging the participation of extra-sector agents in all sectoral planning committees can also lower the risk of dispute at later stages of infrastructure development, anticipating potential conflicts of interest and indirect undesirable effects.

Recent institutional developments look promising and should be pursued further. To improve long-term infrastructure planning and provide strategic guidance for public investment, the government created the inter-ministerial committee for infrastructure planning (CIP-Infra) in 2020, with representatives from the Presidency, several line ministries, as well as the internal audit court ("Controladoria-Geral da União", CGU). This committee published the first Integrated Long-term Plan for Infrastructure in December 2021 ("Plano Integrado de Longo Prazo da Infraestrutura", PILPI). Based on sectoral planning documents and additional technical studies, the PILPI brings together estimates of infrastructure investment needs in each

sector, on aggregate until 2050, and in further details until 2030. Importantly, the PILPI harmonises the methodology and underlying projection assumptions across sectors.

Inter-ministerial collaboration in the definition of a long-term infrastructure development strategy can bring multiple benefits. The involvement of the Ministry of the Environment and the Ministry of Integration and Regional Development guarantees that potential negative environmental and social effects are considered and identified at an early stage, enabling the development of adequate mitigation and adaptation actions. Through the Ministry of Integration and Regional Development, regional development plans can also be used as inputs to the national plan. Furthermore, local governments can benefit from and use the same projection scenarios as the harmonised national plan, thereby improving the coherence of national and subnational infrastructure investment plans. This is particularly relevant for the development of sanitation and urban mobility infrastructure, which fall under the jurisdiction of subnational governments. The government should continue to promote inter-ministerial collaboration to develop and update integrated infrastructure development plans.

Infrastructure plans should systematically be submitted for public consultation early in the process. Beyond the involvement of line ministries, organisations from the civil society also need to be implicated as early as possible. This includes worker and firm representatives and environmental protection organisations. Even if these organisations participated in some sectoral and local plans, they should also be consulted about an overarching national strategy, especially if this document is to serve as a basis for decision-making on budget allocations. The first version of the PILPI was not submitted for public consultation and the government should consider organising public consultations for future versions of the plan. Public consultations improve transparency, reinforce the legitimacy of strategic documents, and mitigate the risk of conflict (BID, 2020).

Strategic planning documents need some binding power to ensure that they are effectively translated into budget allocations over time. Up until 2023, the Federal government's main medium-term budget planning instrument was a four-year plan, "Plano Pluriannual" (PPA), which defines objectives for all policy areas, including capital expenditures. However, four years is a short horizon to efficiently plan for infrastructure with an expected lifetime of 20 years or more. Full life-cycle costs, including operating and maintenance costs, are not considered in the PPA. Furthermore, projects listed in the PPA are not systematically linked to annual budgets. An annual monitoring report on the PPA implementation is analysed in Congress, but it only includes projects from the current budget year and does not provide updated projections for the remaining period, making it difficult to assess progress on capital expenditures.

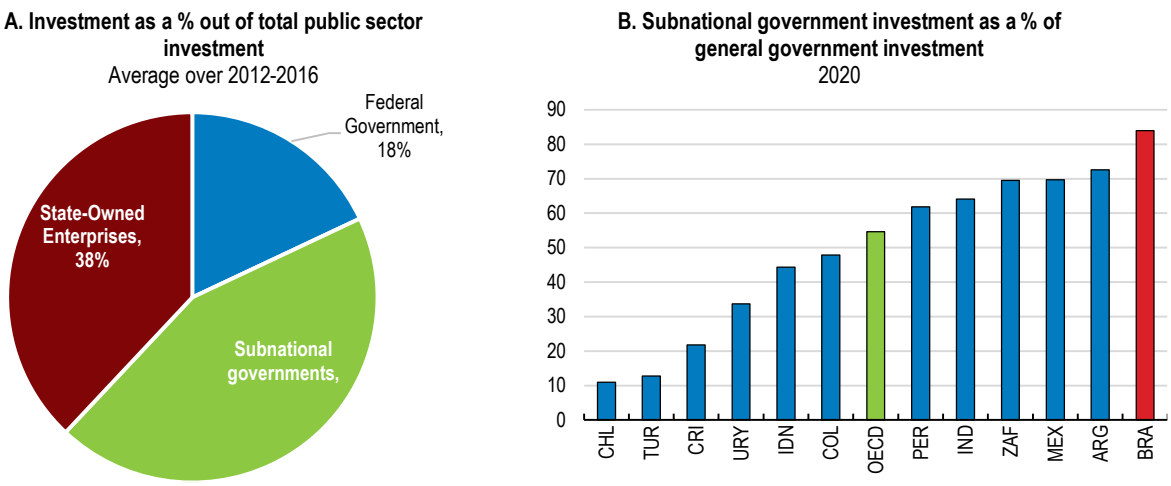
Going forward, Brazil needs to develop additional tools to promote the alignment between long-term infrastructure plans and budget allocations. The PILPI, or an equivalent integrated national strategic plan, could include annual milestones or objectives, and a project timeline, for example. This would facilitate monitoring. The integrated national strategic plan could even become a "project bank" and act as a pipeline of major projects that have been identified as strategic, assessed economically and environmentally, and discussed publicly. A central authority could verify that infrastructure investment using Federal funds reverts to projects identified in the integrated national strategic plan.

In addition, setting up a rolling medium-term fiscal plan, as currently envisaged by the government, would help allocate fiscal space to multi-year investment projects. The new fiscal framework, discussed in Chapter 1, specifies that a 4-year rolling budget should be included as an annex to the budget law each year, in compliance with the medium-term fiscal rules. Such medium-term rolling budget should increase the predictability of resources over time. To maximise its benefits, it should go beyond 4-years for major infrastructure projects, and systematically include life-cycle costs associated with these projects, such as operational and maintenance costs. Another advantage of this medium-term budget would be to facilitate monitoring and compliance with the new medium-term fiscal rules (see Chapter 1). Limiting the number of projects without a complete financing plan in the different line ministries would also lead to a better allocation of resources over multiple years.

Projects could be included in the rolling medium-term budget based on a clear prioritisation criterion. On top of having been identified in the PILPI as strategic and being backed by rigorous cost-benefit analyses, the government could require an assessment of the degree of innovation, the possibility for expansion, the risks involved, the extent of compliance with good governance practices and safety standards, or the level of local support, among other things. A Multi-Criteria Decision-Making (MCDM) tool could be used to determine the total score and ranking for each project (Hansen et al., 2018).

Most public sector investment is executed by subnational governments (Figure 2.10). However, local infrastructure plans are not always aligned with federal priorities and a consistent monitoring of infrastructure spending across different levels of government is difficult. Some financing flows for infrastructure spending can be easily monitored, such as automatic transfers from the Federal government to subnational governments. Line ministries can also decide on discretionary capital transfers to finance specific local infrastructure projects, often monitored by the public-sector bank "Caixa Econômica Federal". However, most subnational capital spending is financed from states and municipalities' own resources and borrowing, in which cases there is little federal oversight or coordination. Capital budgets of local governments are not even discussed by the central government and there is no consolidated view of total infrastructure investment by states and municipalities (IMF, 2018).

Figure 2.10. Subnational governments execute a large share of investment



Source: OECD-UCLG World Observatory on Subnational Government Finance and Investment 2022; and IMF (2018), "Technical assistance report: public investment management assessment". IMF Staff estimates based on official data.

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Adding to the issue, the Federal government has traditionally not provided any guidelines on how to assess the economic viability of infrastructure projects and decide on the best funding modality. Consequently, some line ministries prepared rigorous cost-benefit analyses and contemplated the risks of alternative projects to be included in sectoral plans, while others didn't. Similarly, at the subnational level, varying levels of technical capacity have meant that the economic and financial feasibility of some local projects was never assessed. Lack of proper appraisal has often led to non-viable projects reaching the bidding phase.

To address the concern, the government has worked on a series of publications providing detailed explanations on standardised cost-benefit analyses since 2021, based on the methodologies and guidelines that were already in use for national projects in some sectors, such as energy, transportation, and logistics. The guidelines provide recommendations on how to measure social benefits and negative externalities, such as greenhouse gas emissions. A guideline with parameters was also published to ensure that all entities responsible for infrastructure investment adopt the same social rate of return or internal price on carbon, for example. Furthermore, it was established that all projects identified in the

PILPI must necessarily present a cost-benefit assessment. These efforts have significant potential for achieving more consistent planning across all infrastructure projects and should be continued.

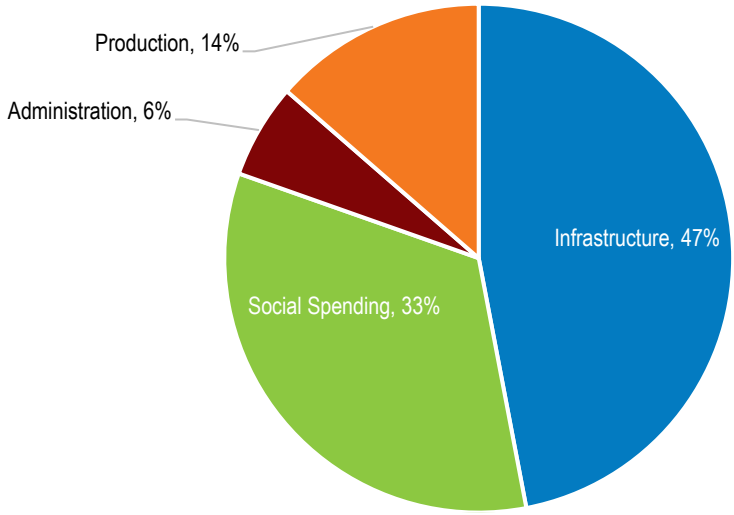
Beyond issuing guidelines, there is scope for more ambitious action, especially at the subnational level. The federal government should encourage line ministries to adopt these standardised methodologies before allocating funding to local projects. Cost-benefit analyses could be made mandatory before a ministry voluntarily transfers funds to a state or municipality, or yet, before it signs a grant or partnership agreement with local authorities and organisations. Additionally, the government should organise training programmes for civil servants at all government levels in applying these methods (OECD, 2014). Such training could be mandatory for subnational government officials dealing with local investment planning and preparation.

Current budgeting practices can at times lead to unpredictable outcomes and foster inefficient allocations. When confronted with multiple potential projects, current budgeting practices lack a clear selection criterion for inclusion in the Federal budget. If a project requires payments over multiple years, there is no mechanism to carry-over budget appropriations, increasing funding uncertainty. Unpaid committed expenditures will compete for resources with new projects in the following years. Moreover, budget sequestration, a practice of revising downwards budget commitments during the year to meet fiscal rules, also adds uncertainty (Figure 2.11). This creates incentives to skip or speed up the preparation phase and start the execution, undermining project quality. This could be remedied by excluding strategic infrastructure investment projects from budget sequestration.

Beyond the budget allocation phase, failure to assign clear responsibilities for project implementation is another recurrent issue. Local infrastructure projects financed by the national development bank “Banco Nacional de Desenvolvimento Econômico e Social” (BNDES) and the public bank “Caixa Econômica Federal” (CEF) are regularly monitored, and funds are only disbursed after implementation plans have been properly developed, with the technical assistance of experienced bank staff. Complex infrastructure projects financed by these public-sector institutions often benefit from the banks’ technical expertise in project structuring and implementation (Box 2.1). However, most infrastructure projects are implemented by government agencies, non-financial SOEs or subnational governments directly, who often lack project management capacity. Project managers, fully accountable for the implementation of the project, are not even always appointed, meaning that quality control is often lacking (IMF, 2018; World Bank, 2022a).

Figure 2.11. Budget sequestration affects the execution of infrastructure investment

Distribution of budget sequestration by budget item, average over the period 2010-2016



Source: Instituição Fiscal Independente, “Relatório de Acompanhamento Fiscal, Maio 2017”, based on budget laws.

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BNDES and local branches of CEF could further expand their project preparation services. Compared to other emerging markets national development banks, BNDES stood out for offering fewer consultancy services than its counterparts, although this has improved in recent years (Frischtak et al., 2017; Box 2.1). Given public banks' long-standing experience in preparing and managing infrastructure projects, such technical assistance could help filling gaps in project management capacity, especially at the local level. CEF has experience supporting subnational governments with preparing terms of references, terms of execution, engineering projects, monitoring progress, and verifying that the execution meets initial specifications.

Box 2.1. Examples of infrastructure projects that received technical assistance from BNDES

BNDES currently mobilises a specialised team of almost 100 experts to coordinate and support the development of public-private partnerships in several infrastructure areas. In 2023, the infrastructure project support team had an active portfolio of 120 projects: 44 at the federal level, 51 at the state level, and 25 at the municipal level.

In 2018, BNDES signed an agreement with EPL ("Empresa de Planejamento e Logística"), a State-Owned Enterprise in the transport and logistics sector, to provide technical assistance with several transport infrastructure projects, mostly roadways, that have been pre-selected by the government. BNDES provided funding for preliminary technical studies and its staff integrated the working group in charge of structuring the selected projects.

In 2019, BNDES provided technical assistance to the city of Macapá in the state of Amapá, to prepare the concession contract for the city's public illumination services. The concession contract included several requirements regarding investment in the illumination infrastructure and resulted in the modernisation of 100% of Macapá lighting poles, with investments up to BRL 99 million.

From 2020 to 2022, 12 sanitation projects structured by BNDES were auctioned. These projects will benefit around 55 million people, with investments estimated at around BRL 118 million.

In 2022, Amapá requested the technical assistance of BNDES to prepare the concession of the urban solid waste management services for 16 of its municipalities. BNDES assisted the state in selecting the contractor responsible for all technical studies necessary to the project preparation.

Also in 2022, BNDES supported the state of Minas Gerais with the development of the terms of reference and the editorial for the concession of more than 432 kms of roadways, which will require approximately BRL 2.6 billion of investment. The auction took place in early March 2023.

In May 2023, the state of Pernambuco required the technical assistance of BNDES to expand its sanitation infrastructure. BNDES will be responsible for hiring and supervising specialised consultants carrying out all the preliminary technical studies. This includes a diagnosis of the current situation in the sanitation sector, estimates of investment needs, an assessment of alternative financing options, economic viability studies for potential concessions, among others. BNDES will also assist with the organisation of public consultations, roadshows to potential investors, and the auction preparation.

Source: Agência BNDES de notícias: Agência BNDES de Notícias – Página inicial; Hub de projetos do BNDES: https://hubdeprojetos.bndes.gov.br.

Aligning public procurement procedures with international best practices

Public procurement planning has improved in recent years. In 2017, public procurement represented around 13.5% of Brazil's total government expenditure and approximately 6.5% of the country's GDP (OECD, 2021b). However, before 2019, public entities purchasing goods, services and contracting public works, such as public agencies, subnational governments, or State-Owned Enterprises, were not required to present public procurement plans. It is now mandatory for all public authorities to disclose in advance the products, services, and public works that will be purchased and contracted each year. Since January 2022, there is also an obligation to formally monitor and report on the execution of these plans. Procurement planning enhances transparency and predictability, facilitates budget and treasury management, and provides a good basis for monitoring.

The preparation of public procurement procedures has also improved. Up until 2020, infrastructure projects could be tendered without any preliminary technical study. Opening a tender when a project is still not clearly defined hurts competition as bidders will not be willing to take on the risk (Section 2.3). It may also increase the final project cost, as bidders factor in risk and uncertainty in the proposed price, or even worse, use materialised risk to renegotiate ongoing contracts. Therefore, making preliminary technical studies for infrastructure projects mandatory was a step in the right direction.

Despite the recent progress, there should be more detailed and standardised guidelines on what to include and how to conduct technical preliminary studies. For instance, market surveys, which aim at identifying possible market alternatives and respective prices, are not always included since it is not a mandatory item (OECD, 2021b). The government should develop a standardised procedure for conducting preliminary technical studies, including market and price research as mandatory items.

Environmental licenses are another key source of uncertainty in procurement processes. Applications for environmental licenses often take place after the public tender has been awarded to a bidder. This means that, in many cases, there is no guarantee that the project being procured will obtain the necessary environmental licence to proceed, which increases uncertainty, discourages potential bidders from participating, and inflates prices, as bidders' factor in the risk and the expected costs in their proposals. The additional construction costs potentially resulting from meeting environmental requirements are not known during the bidding stage, which is the only moment when competition can be harnessed. After the tender has been awarded, one-on-one renegotiations between the winner and the public authority cannot ensure the same value for money. Conducting a thorough environmental impact study on behalf of the public sector agency that contracts the project before entering the bidding phase would bring sizeable benefits. This is usually the case for land transportation infrastructure projects, which are required to conduct Technical, Economic and Environmental Feasibility Studies (EVTEA) and Environmental Impact Studies (EIA), as well as to obtain a preliminary environmental licence, before reaching the bidding phase (Climate Policy Initiative, 2021). This could also be a solution for tenders in the energy sector, for example, where the current practice is that all bidders must apply for an environmental licence as part of the bidding process, even though only one will win the tender, which results in an unnecessary duplication of expenses.

Procurement processes could be streamlined by using standardised procurement forms covering all stages of the procedure. The federal government has been developing standard electronic templates for several procurement documents, such as the terms of references and the editorial. Such templates have been progressively uploaded in the Federal government's on-line platform to manage all stages and documentation related to public procurement, the "Portal Nacional de Contratações Públicas" or PNCP, since 2022. The government should continue such standardisation efforts and consider making the templates mandatory for all types of procurement. This could significantly reduce administrative errors and legal loopholes which have been frequent (World Bank, 2017). By limiting unclear or incomplete tender terms, it could also attract a larger number of bidders.

Electronic procurement encourages participation and increases competition. E-procurement lowers tendering costs for potential bidders, in particular for foreign firms or firms operating in other parts of the country. It can also result in lower administrative costs. The new 2021 procurement law establishes that electronic procurement should be preferred over in-person procedures. However, electronic procurement is not mandatory. Also, there are several e-procurement platforms operating in Brazil. “Compras.gov”, the Federal government platform linked to PNCP, only covers part of the public procurement carried out. Many states and municipalities use other portals (OECD, 2021b). Consequently, procurement data and information about prices is difficult to gather and analyse. Brazil should make the use of e-procurement mandatory, unless the submission of physical samples is necessary, using a centralised and unique web platform (OECD, 2021b). At a minimum, it should be mandatory for projects that receive funding from multilateral development banks and from the Federal government to use the Federal government’s web purchasing portal “Compras.gov”.

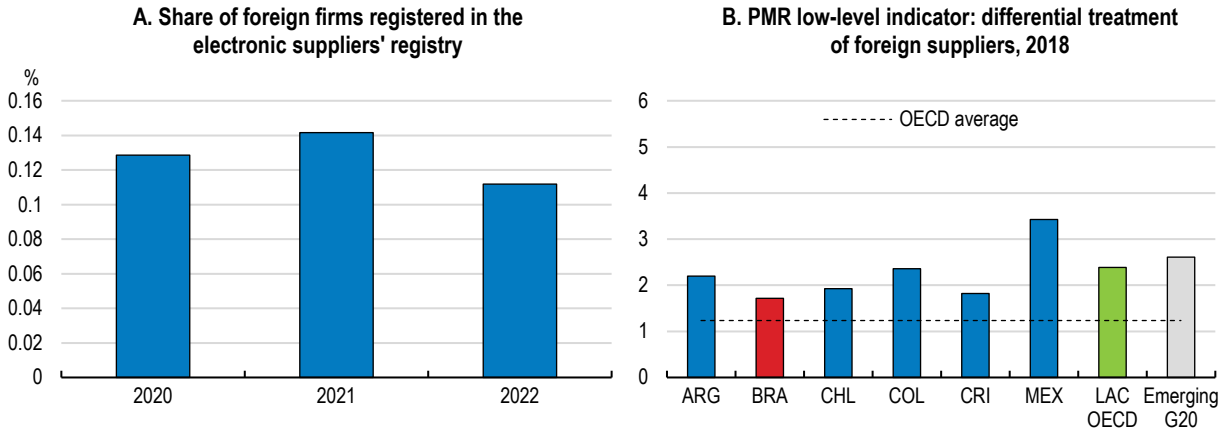
To maximise the participation of genuine competitive bidders, it is important to treat national and foreign bidders equally. Brazil has improved on that front recently. Since 2020, foreign companies can participate in all procurement processes and register in the electronic suppliers’ registry, provided they meet all the legal and technical requirements. The requirement to submit certified translations to participate in bids has also been abolished. However, foreign bidders are still required to form a consortium with domestic companies and these consortiums must necessarily be led by the domestic company. In addition, foreign participation is also hampered by high trade barriers, such as local content requirements (see Chapter 1; Figure 2.12).

Brazilian procedures can be excessively complex and make bidding less attractive for foreign companies with an informational disadvantage and small business owners (OECD, 2020e). The law regulating the general regime of public procurement is changing. A new law was adopted in 2021, but its full implementation has been postponed to the end of 2023. Until then, public entities are given the choice to apply either the old or the new regime, adding another layer of complexity. States and municipalities have been transitioning to the new regime with different speeds. The co-existence of the two regimes makes it particularly difficult for foreign firms to navigate the Brazilian procurement system on their own. It also discourages small firms, who do not necessarily possess the human resources needed to navigate the complex procurement system (OECD, 2020e). The government should accelerate the transition to the new regime by providing states and municipalities with technical assistance in developing the regulation needed to implement the new legal framework. Workshops disseminating the positive results obtained in the states that are well advanced in adapting the new law, such as Paraná, could be helpful.

Price is not necessarily the only suitable contract award criteria for complex infrastructure projects. Awarding contracts based on the technical performance, functional characteristics, aesthetics, operation and maintenance requirements, technical assistance provided, for example, leads to better outcomes (OECD, 2021b). Likewise, performance-based contracts can pre-empt low output quality. Performance-based contracts define schemes with penalties or rewards throughout the contract period, linking remuneration to the ability to meet pre-defined objectives. These objectives should be based on measurable quality standards and could include, for example, minimal road maintenance requirements.

In Brazil, most tender contracts are awarded based only on price and rarely provide performance incentives (Insper, 2015; World Bank, 2022a). The government should encourage the use of non-price award criteria and performance-based contracts, both when building new infrastructure and when contracting infrastructure services. This would increase concessionaires’ incentives to continue investing in infrastructure maintenance, modernisation, and expansion (OECD, 2021b). Non-price criteria and performance-based contracts, nevertheless, require highly qualified staff to assess the technical quality of bids, monitor contract execution, and compare the observed outcomes to well-defined quality standards.

Figure 2.12. Few foreign firms participate in public procurement



Note: In Panel B, index scale 0 to 6 from most to least competition-friendly regulatory framework. Latin America OECD economies is the average of Chile, Colombia, Costa Rica and Mexico. Emerging G20 economies is the average of eight countries: Argentina, Brazil, China, Indonesia, Mexico, Russia, South Africa and Türkiye.
Source: Portal de Compras do Governo Federal; OECD 2018 PMR database; and OECD calculations.

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Public entities often lack the time, human, and financial resources to conduct the procurement process properly. Procurement officials' salaries are low, and training is often inadequate. Developing a specific training and career path for public procurement officials and improving employment conditions could help to attract qualified individuals. Moreover, procurement officials who wrongly and intentionally apply procurement rules can be accused and prosecuted on the basis of penal law and sanctioned with heavy fines, even if such acts do not involve private gains (OECD, 2021b). Consequently, the profession is far from being popular among public officials and public procurers usually favour conservative solutions to innovating ones. Clarifying the interpretation of the procurement law would be a more effective correcting mechanism than applying penal sanctions to individual public officials. This could be achieved in the context of expanding BNDES' and Caixa Econômica's technical assistance services to support public entities throughout the procurement process, as discussed above.

Across the world, public procurement is typically an area that is particularly at risk of corruption. Brazil's complexity, multiplicity of stages and stakeholder involved make infrastructure projects highly vulnerable to corruption (OECD, 2017). Corruption leads to public funds being wasted through higher expenses and infrastructure with lower quality. Those paying bribes often seek to recover their money by inflating prices, billing for unperformed work, failing to meet contract standards, or reducing the quality of materials used (OECD, 2016). Tackling corruption requires strong and independent law enforcement institutions (Chapter 1, Key Policy Insights). The autonomy of the Federal police and public prosecutors should be strengthened. Political interference should be avoided through clear rules-based selection processes. Whistle-blowers and officials involved in anti-corruption investigations should be protected against retaliation and intimidation, as recommended in previous *surveys* (OECD, 2020c).

Beyond general measures to fight corruption, other measures could be implemented that are specific to public procurement. For example, to minimise political interference in public procurement, civil servants responsible for auctions should be permanent employees. In addition, each public procurement phase should be carried by a different public servant to maximise transparency and avoid decision-making by a single individual (OECD, 2021b). The committee in charge of managing and developing PNCP, and regulating public procurement, should have financial and decisional autonomy (Mohallem and Ragazzo, 2017). Currently, this system is managed by a team in the Ministry of Management and Innovation in Public Services, making it vulnerable to changes in political priorities.

Lowering the regulatory burden and increasing market competition

Brazil has made considerable progress in modernising its regulatory practices and aligning them with international good practice over the years (see Chapter 1), but efforts have been mostly at the Federal level, with more uneven progress at the level of subnational governments. Brazilian states have the power to pass rules and legislation with respect to protecting the environment, exploiting water and mineral resources, protecting historical, cultural, artistic, touristic heritages, and landscape, among other things. Municipalities legislate on urban transport and land use planning, for example. These are important areas that will affect the regulatory environment for executing infrastructure projects, and they can at times even give rise to duplication or conflicting regulations across levels of government (OECD, 2022b). Some countries have specific bodies that promote the use of good regulatory practices and alignment across levels of government, such as the National System for Better Regulation in Mexico (OECD, 2022b; Box 2.2). Brazil could consider the creation of a national regulatory body that would oversee subnational regulatory practices. Organising workshops to share lessons learned, successful cases, and promote the exchange of information, can also be an effective tool for ensuring policy consistency.

Box 2.2. The National System for Better Regulation in Mexico

In 2018, Mexico issued the General Law for Better Regulation, which aimed at harmonising regulations across three levels of government: federal, state, and municipal. The law institutionalised the National System for Better Regulation, formed by a national council, a national strategy, a national commission (CONAMER), a national observatory, and units for better regulation in every state.

The council meets at least twice a year and is responsible for co-ordinating with state-level entities in charge of better regulation to ensure that the national strategy is implemented at the subnational level. The commission is a federal agency, with technical and operational independence from the government, in charge of providing technical assistance and background studies towards better regulation. The observatory is an instance of citizen participation in charge of monitoring and evaluating the implementation of better regulation at the subnational level.

Source: OECD (2022b), "OECD Reviews of Regulatory Reform: Regulatory Reform in Brazil", OECD Publishing, Paris; Gobierno de México, CONAMER: https://conamer.gob.mx/.

At the federal level, regulatory agencies play a key role in defining the rules and incentives for infrastructure investment in several sectors. They can do so through interventions that tackle asymmetric information, reduce barriers to entry and set standards for portability or interoperability where appropriate. Empirical evidence shows that, when independent, i.e., when operating autonomously and with no undue influence from political forces or private entities, regulatory agencies can significantly improve the performance of infrastructure services delivery (World Bank, 2022a). Agencies that lack autonomy are less likely to publish basic data or perform public consultations. They may also have ad-hoc advisory committees or no committees at all, relying instead on a single decision-making individual.

The Regulatory Agencies Act of 2019 ("Lei das Agências Reguladoras") sought to increase the transparency and the accountability of regulatory agencies. This law made it mandatory for regulatory agencies to conduct ex-ante Regulatory Impact Assessments before introducing any new regulation or modifying existing rules. It also became mandatory to hold public consultations and hearings, to include interested parties in the development of new regulation, and to regularly report to Congress. Some agencies had already voluntarily adopted such practices, but the Regulatory Agencies Act standardised and harmonised processes across all economic sectors, reinforcing the credibility of Brazilian regulatory agencies (Ramalho et al., 2022).

Going forward, the government should continue its efforts to increase the independence of regulatory agencies. Political interference in the appointment of board members has been frequent (Cunha and Goellner, 2020). Delays in nomination processes are recurrent and interim directors tend to be more

vulnerable to pressure. Moreover, although regulatory agencies have some budget autonomy, their allocated funds each year have been volatile and can be affected by budget sequestration (FGV/CERI, 2016). Another recurrent practice is to delay the transfer of allocated funds, creating a gap between financial needs and available resources. Volatility, uncertainty, and delays in funding availability constrain the action of Regulatory Agencies. Regulatory agencies should have a direct mention in the annual Federal budget, separated from their associated ministry's budget line, and negotiate directly with the Ministry of Finance. Their budget should be excluded from budget sequestration. In addition, disbursements could be fractionated in one-twelfth for each month to increase predictability and reduce misalignments.

In some cases, regulatory agencies act both as regulators and authorities in charge of tendering and contracting infrastructure concession projects, which often leads to conflicts of interest (IMF, 2018). There should be a clear separation between the regulatory functions and the concession contract management functions within Regulatory Agencies.

Regulatory agencies can play an important role to promote cross-sector infrastructure sharing. Since 2015, telecommunications operators, working on expanding their cable network, can take advantage of roadways or railways exploited by other operators. Another Decree, in 2020, reinforced that any infrastructure construction works, with public interest, should be able to accommodate telecommunication cables. However, this added burden on transport operators (Benedeti Rosa, 2022). The lack of incentives for transport operators to accommodate the measure led to several judicial disputes. To improve the alignment of interests, the land transport regulatory agency should clarify cases in which fees for passage could apply and statute on their value.

Brazil has also made significant progress in some sector-specific regulatory frameworks, most notably water and sanitation. Before 2020, regulation was under the responsibility of more than 100 local regulatory agencies, who barely met the necessary conditions for developing good regulatory governance (World Bank, 2022a). There was very little regulatory oversight, and it was often subject to local political interference. Since the reform, called "Novo Marco Legal do Saneamento", the national water regulatory agency ("Agência Nacional de Águas e Saneamento Básico", ANA) has the responsibility to establish general guidelines that apply across all states and municipalities, harmonising the regulation and providing clarity and certainty (OECD, 2022a). This will contribute to increase the sector's attractiveness for private operators. For the reform to be effective, it is important to build adequate institutional capacity for ANA's extended mandate, ensuring the agency has appropriate funding, human resources, and competences (OECD, 2022a).

The new water and sanitation law also brought about several innovative developments. New concession contracts must now be attributed through a competitive public procurement process and include an objective of near-universal coverage. This aims to ensure that the most qualified operators, public or private, are selected, and that they have strong incentives to invest in expanding coverage. The new law also establishes that services should be auctioned, grouping several cities or municipalities together. This allows exploiting economies of scale, while ensuring that smaller and remote municipalities are covered. However, adhesion to this grouping has been voluntary, and so far, not many services have been jointly auctioned. The joint scheme was supposed to become mandatory in March 2023, but the deadline has been postponed to March 2025. The government should accelerate adoption of the joint auction scheme. Disseminating information about successful cases and promoting the benefits of collaboration across municipalities through workshops and seminars may improve the adoption of this new tool (OECD, 2022a).

In the railway sector, it is now possible for private investors to expand the network, or exploit idle railways, with a simple administrative authorisation. This should lower administrative costs and increase flexibility. The government, on the other hand, transfers the risk and the burden of infrastructure project preparation to the private sector. The new regulatory framework also states that surroundings can now be exploited to develop shopping malls, private parking, restaurants, or other commercial activities. By allowing private investors to exploit adjacent areas for commercial purposes, and for profit, the government aims to

minimise public subsidies. In early 2022, six months after the introduction of the new railway regulatory framework, more than 2.4% of GDP in private investments had already been authorised, corresponding to 6800 kms of new rail tracks. It is important, nevertheless, to clearly define the new authorisation regime to safeguard public interest and limit space for interferences. Without specific implementing regulations that define the exact terms for the use of this authorisation regime, it is hard to assess the new regime, and there is even a risk that it could lower transparency and accountability (Cozendey and Chiavari, 2021).

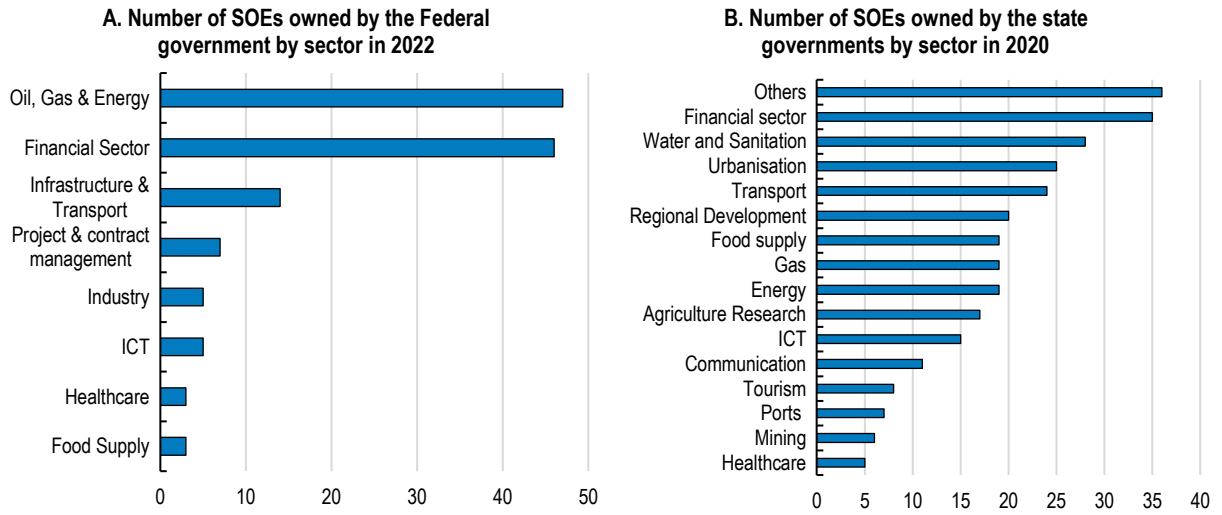
Another area where the regulation improved considerably is the natural gas sector. The government approved a new regulatory framework for natural gas in 2020 which separates the markets for production, transportation, and distribution of gas. Consequently, different firms can now operate in each market, fostering competition. The new gas framework also instituted the authorisation regime for private investors to develop new gas pipelines, which is administratively simpler than concessions. Increased competition in the gas sector is expected to reduce prices, and the new authorization regime to increase investments and the offer of natural gas in the next years.

Improving the governance of State-Owned Enterprises

To make the most of its infrastructure assets, Brazil could also address several bottlenecks in the governance of State-Owned Enterprises (SOEs) delivering public infrastructure services. Brazil has 130 SOEs operated by the central government (Sest, 2022), and another 260 operated by state governments (Tesouro Nacional Transparente, 2021). At the Federal level, SOEs are particularly present in energy sectors such as oil, gas and energy, infrastructure, transportation and logistics services, and Information Technology and Communication (Figure 2.13, Panel A). At lower levels of government, SOEs play a dominant role in the water and sanitation sectors of almost every state (Figure 2.13, Panel B). The performance of SOEs is therefore of great importance for the delivery of high-quality infrastructure services.

Public enterprises may help to further legitimate policy objectives and can be an effective policy tool, provided that they operate in a sound regulatory environment. Experience shows that market-led development is the most effective model for efficient allocation of resources. However, in areas where competition is not deemed feasible, where there are “natural” monopolies, like in many infrastructure sectors, there is a rationale for state ownership of enterprises (OECD, 2015a). Nonetheless, SOEs face distinct governance challenges. They may suffer from undue political interference or weak oversight due to distant ownership by the state. Compared to the private sector, SOEs in Brazil tend to underperform when confronted with negative shocks (OECD, 2020d). As a result of underperformance, annual fiscal injections to SOEs are, on average, 0.6% of GDP for the energy and transportation sectors alone (World Bank, 2022a).

Figure 2.13. State-Owned Enterprises are particularly present in economic infrastructure sectors



Source: Boletim das empresas estatais federais 23ª edição, 3rd quarter of 2022; Tesouro Nacional Transparente, "Raio-x das empresas dos Estados brasileiros", 2020.

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The "SOE Statute" of 2016 has helped reduce political interference in the management of Brazilian SOEs and advance the professionalisation of its boards (Vitale et al., 2022). The Statute established clear rules for the appointment of directors, including minimum experience, academic background, and morality requirements, as well as a minimum "cooling off" period if coming from political office. However, full implementation of the new Statute is still ongoing (OECD, 2020d; Vitale et al., 2022). Some national SOEs have not yet been able to prove that their senior corporate officers have the professional experience, knowledge and academic training required. Many SOEs at the subnational level are non-compliant. In fact, there is no federal agency to control nominations at the subnational level. The government should continue to implement the "SOE Statute" and enforce it at all levels of government.

Despite the progress, public authorities are still involved in the management of SOEs. Line ministers or the President of the Republic can nominate CEOs and other senior executives for national SOEs. Although the board of directors must approve the nomination, there is no known case where the board has denied the appointment (OECD, 2020d). Adding to the issue, the government is currently considering reducing the "cooling off" period between political office and an SOE management position from three years to one month ("Projeto de Lei 2896/2022" approved in the lower chamber in December 2022). Major corruption cases in the last years involved the political appointment of individuals to high-level positions in SOEs, often in exchange for parliamentary support, which can reduce the quality of their leadership (Hansen and Burdescu, 2020). Therefore, the government should maintain a reasonable "cooling off" period between political office and taking on a management position in an SOE.

SOEs are sometimes at risk of being used for political purposes that are not aligned with public policy objectives. For example, the government often imposes requirements for SOEs to source inputs from relatively costlier national suppliers. Such requirements can contribute substantially to delays and cost overruns in large-scale infrastructure projects (OECD, 2020d). Another practice has been to set regulated prices for goods and services provided by SOEs, impacting their ability to operate efficiently. This includes, for example, restrictions to increase energy and transportation prices (Vitale et al., 2022).

Not all SOEs have a structural separation between policy-related activities and commercial or competitive ones. Furthermore, most ministries have no clear separation between public officials responsible for ownership functions of SOEs, and those in charge of designing and implementing sectoral public policies (Vitale et al., 2022). This makes it difficult to estimate costs, fund, and compensate for the pursuit of public

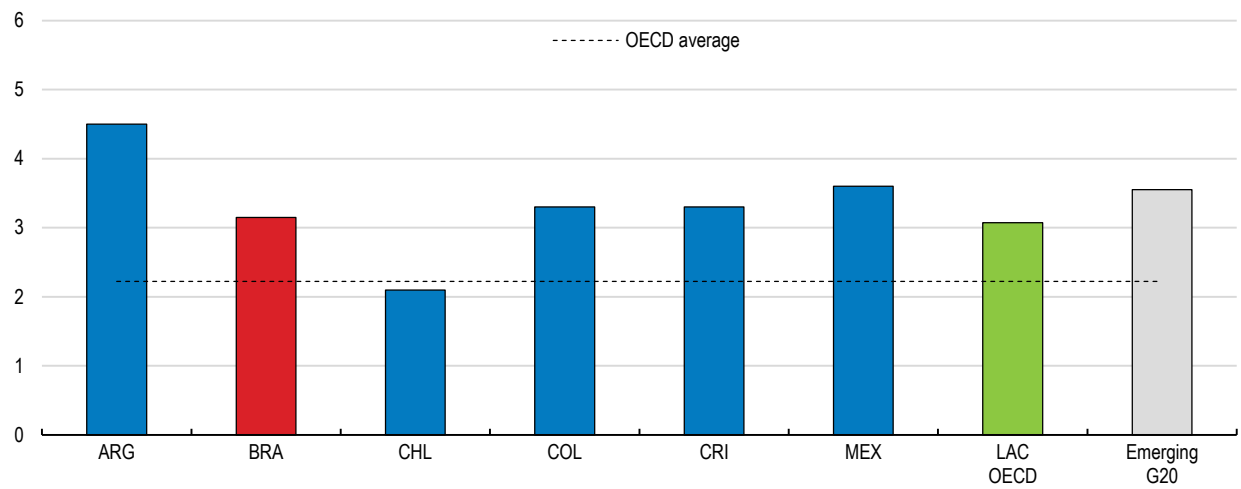
policy objectives. It also makes it complicated to assess whether compensation is adequate given the actual costs of fulfilling well-defined policy objectives, as opposed to offsetting financial or operational inefficiencies. Consequently, improvements in SOE performance are often hard to monitor.

SOEs may also be disadvantaged by their status when it comes to transactions on input and labour markets. For example, they must apply complex and burdensome state law for public procurement when purchasing any material and equipment, or when making capital investments. SOEs are also required to use official competitive examinations to hire employees and adjusting their workforce to changing needs in either direction may be bound by more stringent rules than those applying to private enterprises (OECD, 2020d).

The above-mentioned bottlenecks may explain why Brazil still compares unfavourably with the OECD average and the OECD Latin American average in terms of SOEs' governance quality (Figure 2.14). Against this background, further efforts to improve the governance of SOEs are warranted (Vitale et al., 2022). Public authorities should ensure the swift implementation of the 2016 "SOE Statute" at all government levels, including for subnational SOEs. Identifying the rationale that justifies the public ownership of SOEs and defining clear policy objectives in a transparent manner would help to minimise the scope for political interference as recommended in previous *surveys* (OECD, 2020c; 2018a). Boards of directors should have the power to appoint and remove the CEO, as well as senior executives (OECD, 2020d). Finally, setting financial and non-financial measurable goals would make it easier to improve SOEs performance. Compensation for SOEs' senior leadership should also be aligned with market practices, to attract and retain talented professionals that would otherwise move to privately owned corporations (OECD, 2020d).

Figure 2.14. There is still room to improve and align the governance of SOEs with OECD standards

Product Market Regulator, low-level indicator on the governance of SOEs, 2018



Note: Index scale 0 to 6 from most to least competition-friendly regulatory framework. Latin America OECD economies is the average of Chile, Colombia, Costa Rica and Mexico. Emerging G20 economies is the average of eight countries: Argentina, Brazil, China, Indonesia, Mexico, Russia, South Africa and Türkiye.
Source: OECD 2018 PMR database; and OECD calculations.

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Enhancing financing options for infrastructure projects

Gaps in the financing of infrastructure

Besides spending available funds more effectively, tapping into new funding resources will be key to address the observed shortfall in infrastructure investment. One key bottleneck has been the low infrastructure investment by the public sector, which has declined considerably over the past decade, both in relative and in absolute terms. In 2010, 57% of total investment came from the public sector, but this share decreased to 33% in 2022 (Figure 2.15, Panel A). Public investment is mostly concentrated in state-owned enterprises and highways built by the states, while the private sector has become the driver of around two thirds of total investment since 2019. Private investors account for nearly all investments in the telecommunications sector and over three quarters in electricity (Figure 2.15, Panel B). Public funds made up 80% of investment in the sanitation sector and just over half of the transport sector investments. Railways, roads and airports have seen strong increases in private participation in recent years. However, private investments have been more limited in sectors with high social returns as urban mobility and basic sanitation in rural areas, pointing to the need for public intervention to create the conditions for higher investment (Inter.B, 2022).

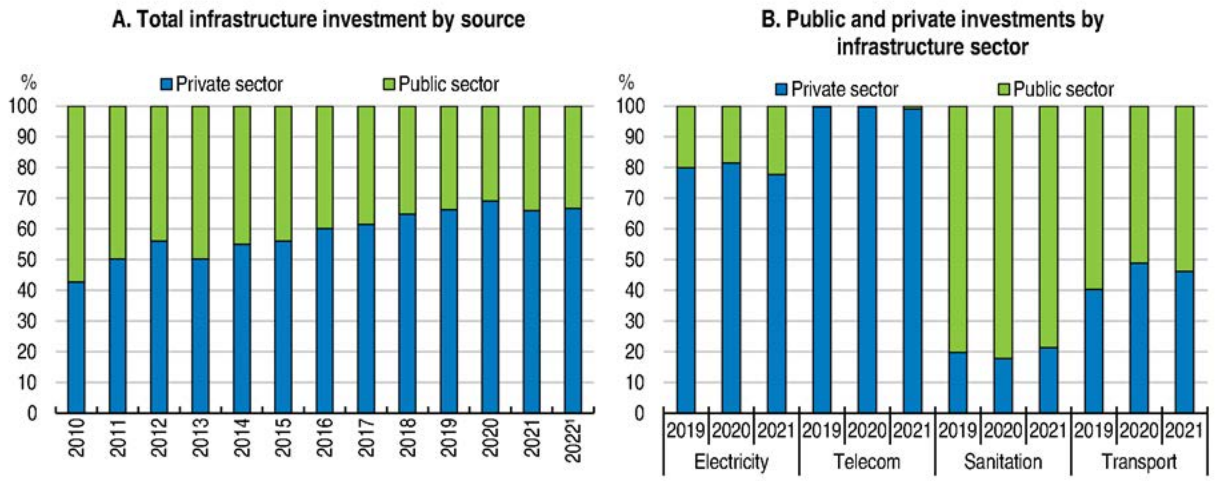
Against the background of budget rigidities and rising mandatory spending, discretionary public investment expenditures have proven to be the only remaining margin of fiscal adjustment. Fiscal consolidations have almost always resulted in cuts to capital outlays, significantly affecting spending on infrastructure. Although the new fiscal framework is likely to provide more flexible conditions for public investment, the current fiscal situation implies that the funds available for public investment in infrastructure are unlikely to increase much in the medium-term.

The lack of financial capacity at subnational levels of government, notably municipalities and states, has been one of the key reasons for under-investment in infrastructure, especially in urban mobility, water and sanitation. Subnational governments are subject to strict rules that limit their ability to take up debt, as a lesson learned from past experience. In particular, they cannot issue bonds, but are allowed to borrow from banks and multilateral lenders, subject to debt ceilings of 200% of net current revenues for states and 120% of net current revenues for municipalities (OECD/UCLG, 2022). Within these strict limits and conditional on the state of their fiscal accounts, states and municipalities can obtain guarantees from the federal government, which reduce their financing costs. The state of their fiscal accounts is evaluated through a rating based on a composite index called CAPAG and the criteria to obtain federal guarantees were significantly tightened (see Chapter 1).

While the case for caution regarding subnational government debt remains strong, there is substantial heterogeneity in the fiscal situation of subnational governments, and the current framework could do more to reward those with strong fiscal positions, not least to create stronger incentives for states to conduct prudent fiscal policies in the future. For example, states and municipalities with reimbursement capacities could be allowed to issue infrastructure bonds within new margins defined according to their rating under the CAPAG. This would open up access to capital markets for creditworthy subnational governments and allow some of them to finance additional infrastructure investments through capital markets, while distributing the financing burden across the future beneficiaries of such investments (OECD 2022c).

Even if some subnational governments would be able to tap into new financing options for infrastructure investments, opening up additional sources of private investment will be essential to fill infrastructure investment gaps in the medium run. In principle, additional private funds may well be available, both domestically and internationally, with further policy refinements. Private financing and management can also improve the risk allocation if exogenous demand risk is assigned to the public sector, while endogenous or internal project risks are assigned to the private parties, which provides strong incentives for efficiency.

Figure 2.15. Public investment has declined, and is concentrated mostly on the sanitation sector



Source: Inter.B. (2022); and OECD calculations

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However, the private sector will only mobilise new resources if the public sector is able to create the appropriate framework conditions for this investment. This will require minimising avoidable risks such as those related to policy or judicial uncertainty, while properly allocating the remaining risks to create attractive investment opportunities and efficient risk sharing. In recent years, Brazil has accelerated its concession programme to attract further private financing in infrastructure. Most of this private participation has flown into electricity and telecommunication. This provides hope that better policy frameworks, including at the sub-national level, can attract more private investment. Stronger fiscal sustainability incentives for subnational governments would also help to make these stronger partners for private investors (see Chapter 1).

Diversifying the current model for public-private partnerships

Most private infrastructure investments take the form of concessions, which are contracts whereby private partners are remunerated mainly from user charges or regulated fees. It is the main model of private participation in the management or development of public infrastructure in Brazil. Between 2016 and 2022, 295 projects have been finalised or auctioned for an expected amount of investment of BRL 1.2 trillion (around 12% of 2022 GDP) and around BRL 226 billion (around 5% of GDP) of grants and payment receivable by public entities (Ministry of the Economy, 2022a). The programme of concessions has been expanded significantly from 2019 with around 174 auctions and projects finalised. Among the 166 projects auctioned between 2017 and mid-2021 and compiled by the World Bank's PPI database (2022), 126 were in the energy sector and mostly for greenfield electricity generation concessions, 15 covered highways, among which 4 greenfield projects, 7 were in the airport sector and the rest involved natural gas, water and sanitation, ports, and railways.

Public-private partnership (PPP) projects in the energy and inter-state transport sectors are awarded by the federal government, while state and municipal governments are responsible for local road PPPs and the water and sanitation sector. The latter will likely provide new private investment opportunities following the new legal framework for water and sanitation investments, which enhances the scope for private engagement in the sector and establishes mandatory key performance indicators.

Improvements in the government's concessions programme have accelerated private engagement in infrastructure investment in recent years. The establishment of the PPI Secretariat in 2016 tasked with centralising, selecting, and prioritising projects and monitoring their implementation, has streamlined, and

increased the pipeline of infrastructure projects. The PPI secretariat is a dedicated agency attached to the Office of the Chief of Staff at the Presidency (Casa Civil) that manages priority infrastructure projects across all phases, from preparation to bidding and asset management. PPI decisions require approval from the Council of the Investment Partnership Programme, a body under the Presidency of the Republic with representation from several ministries and public institutions and with technical opinions from experts. This arrangement has led to significant improvements in transparency.

The PPI framework has improved the coordination of large infrastructure projects and PPPs at the federal level (World Bank, 2022a). Key improvements have been in the preparatory phase of projects where the PPI is leveraging the technical and financial capacity of the national development bank BNDES and multilateral organisations such as the International Finance Corporation (IFC) and the Inter-American Development Bank (IDB) to complete project reviews, technical appraisals, and project structuring. BNDES provides technical preparation of projects with the creation of a so-called "Project Factory" in charge of contracting with the PPI. The PPI framework is further strengthened by specific environmental and social provisions, as well as reporting on the quality of services of infrastructures and evaluation and auditing by the National Court of Auditors (TCU). The TCU has provided detailed sector appraisals of infrastructure and has proposed measures to improve PPPs governance and contracting (TCU, 2022).

The lack of technical capacity at the federal and subnational levels of government, notably in some municipalities and states, as discussed in section 2.2., is hampering the further development and appropriate use of PPPs. Planning and technical capacity to develop PPPs, especially at the subnational level, is often weak and concentrated in just a few states and municipalities. The federal government intends to create a new fund to support the development and implementation of PPP projects, including technical and financial studies, at all three levels of government. Congress has approved the creation of such a fund with a government participation of up to 0.1% of GDP. For instance, providing higher grants to municipalities with low financial capacity to cover the extra-cost for projects preparation could improve the pipeline of projects. Brazil could also tap more into technical support from international development financial institutions, as in the successful example of São Paulo roads involving the IFC, IDB and BNDES and auctioned in 2017-2018.

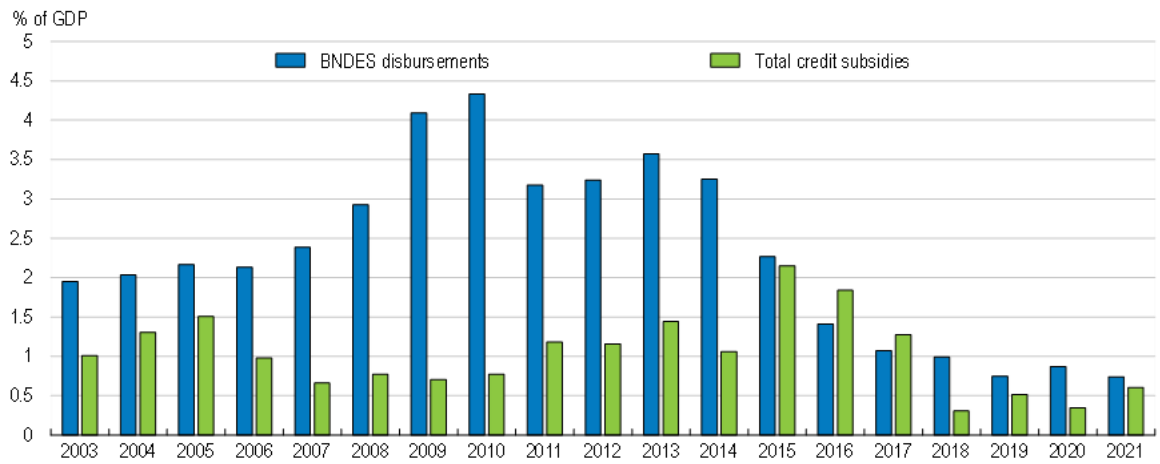
Outside the energy sector, most concessions and PPPs are brownfield investment, showing the underdevelopment of greenfield investment to reduce the infrastructure gap. The participation and awarding of contracts to foreign firms have increased, indicating that the PPI has improved the diffusion of information and the transparency. However, concessions awarded to Brazilian firms are mainly financed by BNDES, regional development banks as Banco do Nordeste do Brasil and to a lesser extent by other Brazilian banks. The diversification of infrastructure financing has not seen significant progress. Only 7 projects received support from multilateral development banks, who have the long-term financing capacity that Brazil needs and could tap into (World Bank PPP dataset).

Improving infrastructure financing

The National Development Bank BNDES has historically played a central role in the long-term financing of the Brazilian economy and has been the principal source of financing for infrastructure projects. In the past, access to financing resources below market costs and government transfers allowed the BNDES to provide credit at more advantageous rates than other financial institutions. This dominant role of one public-sector institution, and the associated high fiscal costs that have characterised this model in the past, has been widely discussed, with many studies hinting at the benefits of moving towards a more diversified and competitive structure of the credit market (World Bank, 2018; Byskov, 2019; Frischtak et al., 2017; Pazarbasioglu-Dutz et al., 2017).

In 2018, the previous long-term benchmark rate for BNDES lending that was far below market rates was replaced with a new benchmark interest rate based on market rates, the *taxa de longo prazo* (TLP), for new loans granted by BNDES. This has significantly reduced credit subsidies. The reform and the changes in the role of the BNDES in the financing of the economy have opened up more space for competition in the credit market. BNDES financing has receded substantially from 2015 (Figure 2.16).

Figure 2.16. BNDES disbursements and credit subsidies have decreased



Source: BNDES; Ministry of Economy; and OECD calculations

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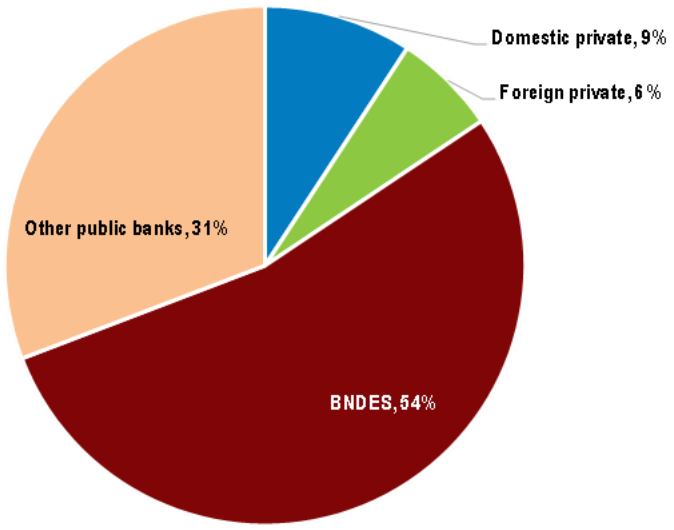
At the same time, indicators of market concentration and competition have been improving and in particular, the number of financial institutions offering infrastructure financing has increased (BCB, 2022). However, public banks remain the main provider of financing for infrastructure. BNDES alone accounts for 54% of infrastructure financing in 2022 (Figure 2.17).

Figure 2.17. Infrastructure finance is dominated by public banks, in particular BNDES

Stock of infrastructure loans by lender, March 2023



Source: Central Bank of Brazil.

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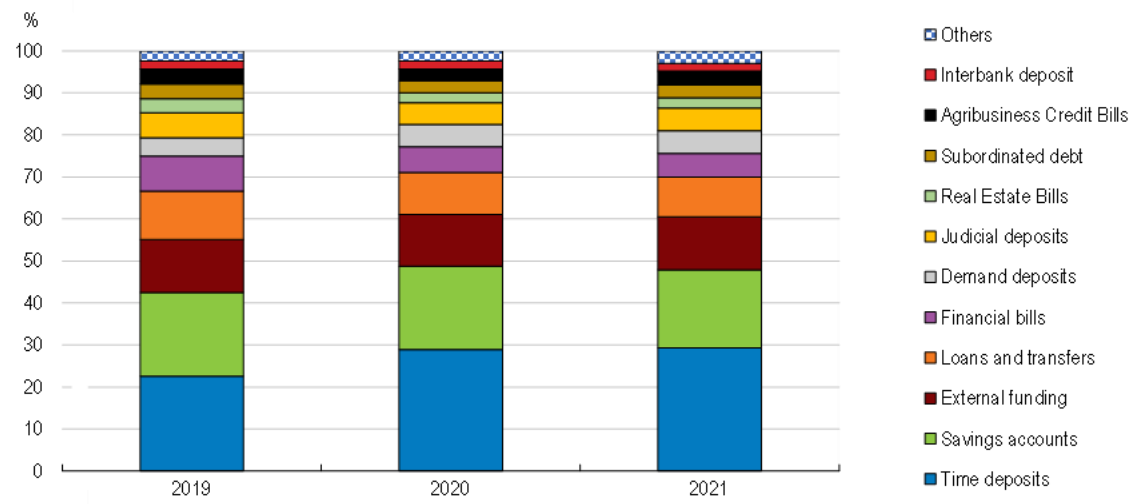
Globally, private bank lending is the dominant source of infrastructure finance, at least for the construction stage of an infrastructure project, with large project debt often syndicated among a group of banks. In Brazil, only 15% of infrastructure financing comes from private banks and lending by commercial banks has traditionally been mainly in the short-term segments, with maturities below 3 years. Moreover, it has mostly financed operations and working capital while infrastructure and other investments have represented the biggest borrowing component for large firms in recent years (BCB, 2022). One reason why domestic commercial banks are struggling to offer longer maturities is the short-term nature of their own funding, and the resulting risk of excessive maturity mismatch.

Short-term deposits represent the first source of financing for banks and are complemented by inter-bank borrowings, including overnight borrowing (Figure 2.18). Letters of credit (agribusiness, real estate, and the guaranteed real estate) and longer-maturity instruments, such as those exempt from income tax for individuals, are a relatively small source of financing compared to short-term vehicles.

Figure 2.18. The financing of the banking system is tilted toward short term resources



Note: Time deposits: bank deposit certificates, bank deposit receipts, time deposits with special guarantees from the Credit Guarantor Fund (FGC). Subordinated debt, bank deposit certificates with subordination clause, financial bills with subordination clause, and instruments eligible for capital composition. Others include repurchase operations with private securities, guaranteed financial bills, structure operations certificate (COE), bills of exchange, mortgage bills, box operations
Source: Central Bank of Brazil, 2022.

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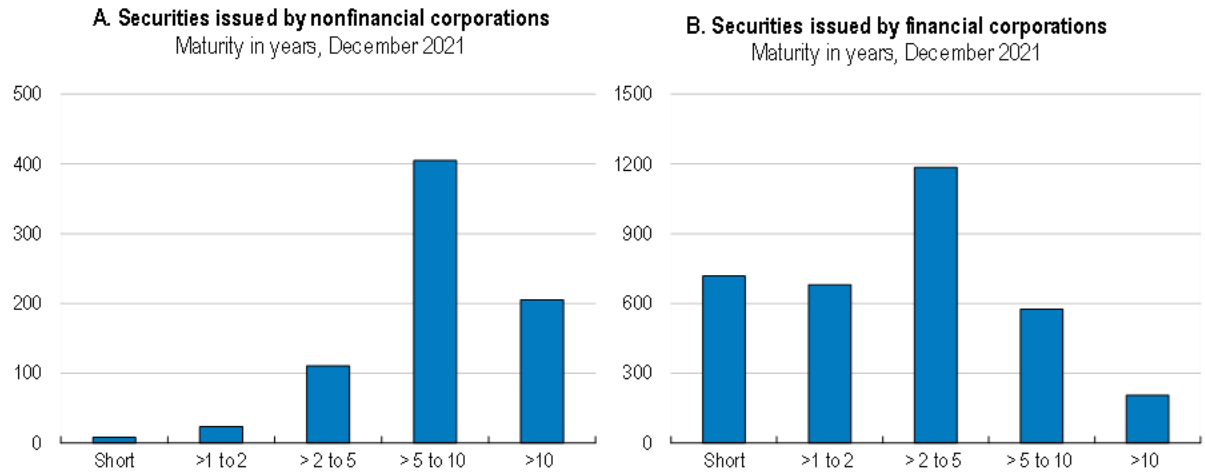
Access to longer funding resources is still challenging for financial institutions. The mismatch between funding of financial institutions and infrastructure financing needs is illustrated by an asymmetry in the level of securities instruments issued by financial and non-financial corporations across maturities (Figure 2.19, Panels A and B). In particular, financial institutions struggle to attract funding with maturities above 5 years, which is where the majority of funding needs from firms is concentrated.

Figure 2.19. Borrowings mismatch by maturity of financial and non-financial corporations



Source: Central Bank of Brazil, 2022.

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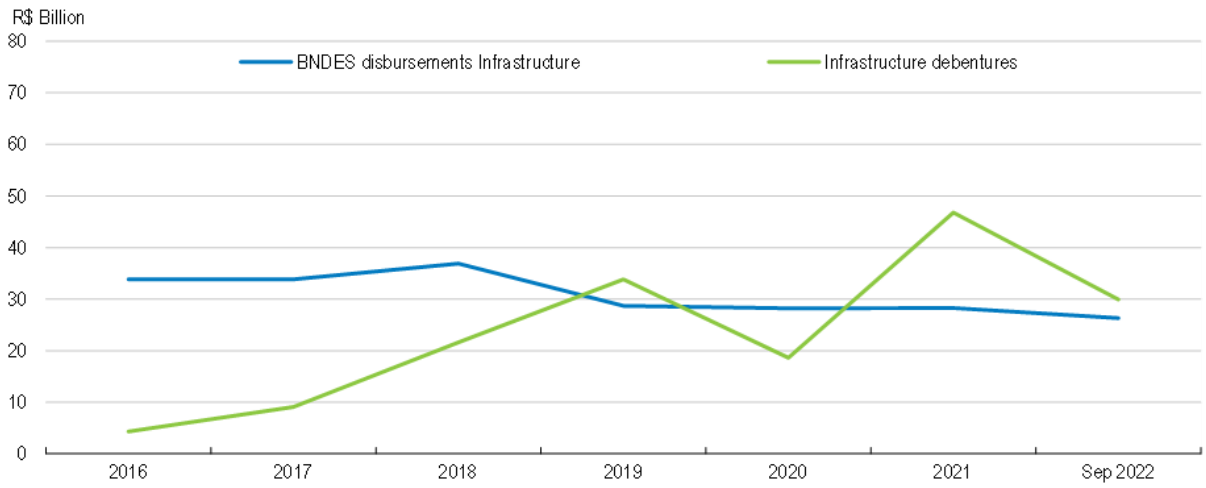
The difficulties that financial institutions face to obtain funding with longer maturities ultimately reflect a longstanding focus of Brazilian financial markets on short-term assets in a context of scarce overall domestic saving (BCB, 2022). The investors focus on liquid, short-term assets and the underdevelopment of long-term financial markets are a market failure that may have several reasons. A volatile macroeconomic history may be one such reason, but other countries have managed to put behind them a turbulent economic past and make progress in financial market deepening. By now, Brazil has enjoyed more than two decades of successful inflation targeting and relative price stability. Another reason for the reluctance to invest in longer-term assets could be a lack of market confidence in the sustainability of public sector accounts, as long-maturity public bonds would be an important pricing benchmark for other long-term assets. In this context, strengthening the confidence into the future of fiscal accounts, through efforts such as the recently proposed new fiscal framework, plays a key role for the future of Brazil's financial markets and investment capacity. The new fiscal framework is also meant to reduce the need for future public sector borrowing, and lower public net lending would leave more resources for the private sector, which would be channelled through the financial sector.

In recent years, the development of the bonds market has partly compensated the lack of long-term credit for the financing of infrastructure. Special infrastructure bonds called debentures were created in June 2011 to attract investors into infrastructure financing with longer maturities. The debentures are issued by companies or special purpose companies (SPEs) to finance infrastructure projects considered priority projects by the federal government. Infrastructure debentures surpassed BNDES loan volumes for infrastructure financing for the first time in 2019, after starting from low levels in 2016 (Figure 2.20).

Figure 2.20. Infrastructure bonds have become the first source of infrastructure financing



Source: Ministry of the Economy, (2022b).

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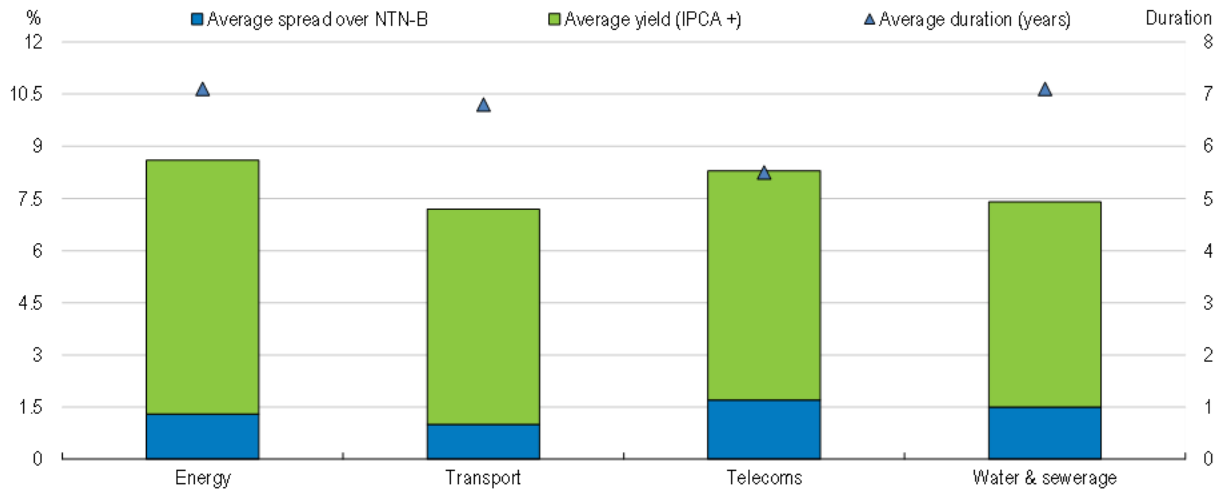
The rapid expansion of infrastructure debentures has been supported by their beneficial tax treatment, with income tax exemptions for individuals and reduced rates for corporate holders, which have been successful in attracting more funds into the longer maturities required for infrastructure projects. Incentivised bonds currently provide higher yields than government bonds (Figure 2.21).

The use of differential tax treatment to create longer-maturity financial instruments can be seen as a public intervention aimed at overcoming a market failure with roots in history. Once a stable and liquid market for these urgently needed longer-term bonds has been established and markets have gained confidence in this type of instruments, it is likely that public support could eventually be withdrawn. While this consideration has to be carefully balanced against other considerations, including the potential alternative use of these foregone tax revenues, the strategy has had visible success so far. Besides the tax incentives, the public sector through BNDES has itself been investing in infrastructure project bonds, which has contributed to the development of the market for debentures and ensured continuous liquidity on the secondary market.

Despite this progress, the development of debenture bonds has not covered the full financing needs of long-term infrastructure projects. The average tenure of infrastructure debentures is still below 7 years (Figure 2.21). Only 12 out of 186 debenture issuances since 2012 had a tenure of 15 years or more. Further improving the incentives for long-term saving instruments for individuals and corporates could be one way to boost the availability of long-term funds, and differential tax treatment of savings tied to a minimum duration of holdings could continue play a role in this. Additional tax benefits for infrastructure bonds with even longer maturities could push out the maturity of infrastructure bonds further. Better targeting the incentives of debentures to sectors where the infrastructure gaps are the highest such as water, sanitation and urban mobility and to projects that have a longer time span would increase the effectiveness of fiscal incentives for debenture financing.

Figure 2.21. Remuneration, spread and duration of infrastructure debentures by sector

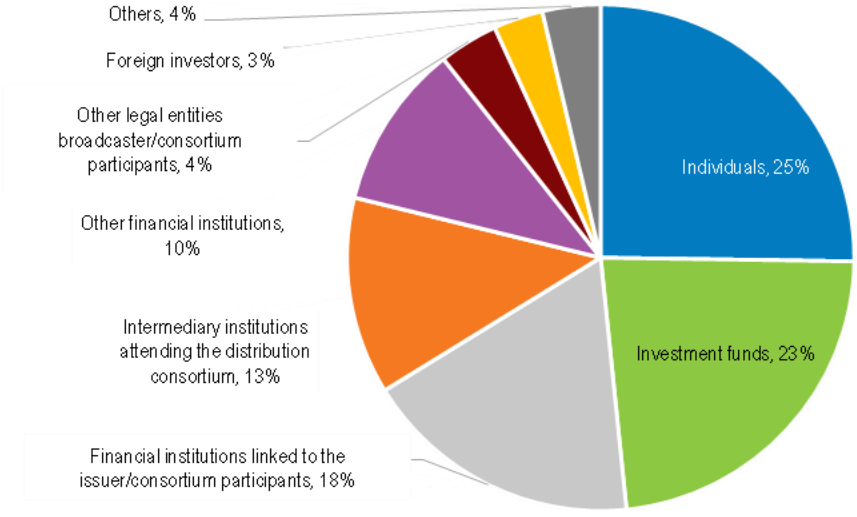


Note: NTN-B refers to National Treasury Notes Series B, inflation-linked government bonds. Yield refers to the remuneration of the bond. Duration measures the sensitivity of the price (value of principal) of an infrastructure bond expressed as the number of years.
Source: Ministry of the Economy, (2022b).

StatLink https://stat.link/xiuh56

Fine-tuning the current design of infrastructure debentures may help to attract more corporate institutional investors. Currently, individuals and investment funds represent almost half of incentivised-bond investors in terms of value, while private pension and insurance companies, and foreign investors, constitute less than 5% of investors (Figure 2.22). Individuals and investment funds are often attracted to debentures as short-term investments that have a high liquidity in the secondary market. By contrast, the current design of the tax benefits has been less successful in drawing institutional investors with a genuine long-term investment horizon into infrastructure debentures, as these institutional investors cannot benefit from the current income tax exemptions given that they are not subject to income taxes in any case.

Figure 2.22. Short-term investors and low maturity dominate the infrastructure bonds market



Source: Ministry of the Economy, (2022b).

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To improve the design of incentivised debentures and attract more genuine long-term investors, a legislative proposal was submitted to Congress in 2021 to reform the tax incentives for infrastructure bonds, but approval still pending in the Senate. The new infrastructure debentures modality aims to create a new type of debt security, improve the legal framework of incentivised debentures and correct barriers to the operation of infrastructure investment funds. Under the proposed setup, tax benefits, which previously accrued to investors, would instead accrue to issuing companies, which are subject to income taxes. These issuers would pass on the specific tax benefits for infrastructure debentures to buyers of the securities in the form of higher coupon interest rates or a lower issuing price. In this way, these new infrastructure bonds would attract institutional investors, including those who are not subject to income taxes. The proposed reform of infrastructure debentures has the potential to attract more institutional investors, as it would likely increase the net of tax return of these bonds.

In addition, the draft proposal provides a basis for specific infrastructure funds for individual investors, for which these would continue to get the same tax benefit as they currently do for infrastructure debentures. Ensuring the continuation of the current tax edge over alternative investment options for this class of investors would at this point still be key to maintain the current debenture funding sources, while at the same time tapping into additional funding pools.

Project financing is another financing model with potential to diversify the financing sources of infrastructure projects. After the construction phase, infrastructure projects have typically accumulated their own assets, generate a stable revenue stream and have less need for monitoring. In this more mature phase, global infrastructure financing often resorts to re-financing initial bank loans with project bonds. Project finance is primarily based on claims against the financed asset or project rather than the sponsor of the project (Figure 2.23). Project finance limits creditor recourse to the assets and cash-flows of the project, capping the downside risks for equity investors or project sponsors.

The development of the project finance model requires the availability of long-term investors, and its viability depends importantly on a comprehensive framework allowing to apprehend the different risks at the different stages (Makovšek, 2018). Reviewing the conditions and bottlenecks for the use of project finance can help to tap into usually less expensive financing sources for a wider range of infrastructure projects (Makovšek and Moszoro, 2018). Currently, sponsors of infrastructure projects in Brazil often have to provide a guarantee for risks associated with the pre-construction and construction phases as there is no external insurance market for these risks. This could be addressed by developing a comprehensive project financing model and the existence of a public-sector institution with the clout and experience of BNDES would give it an obvious role in leading such developments.

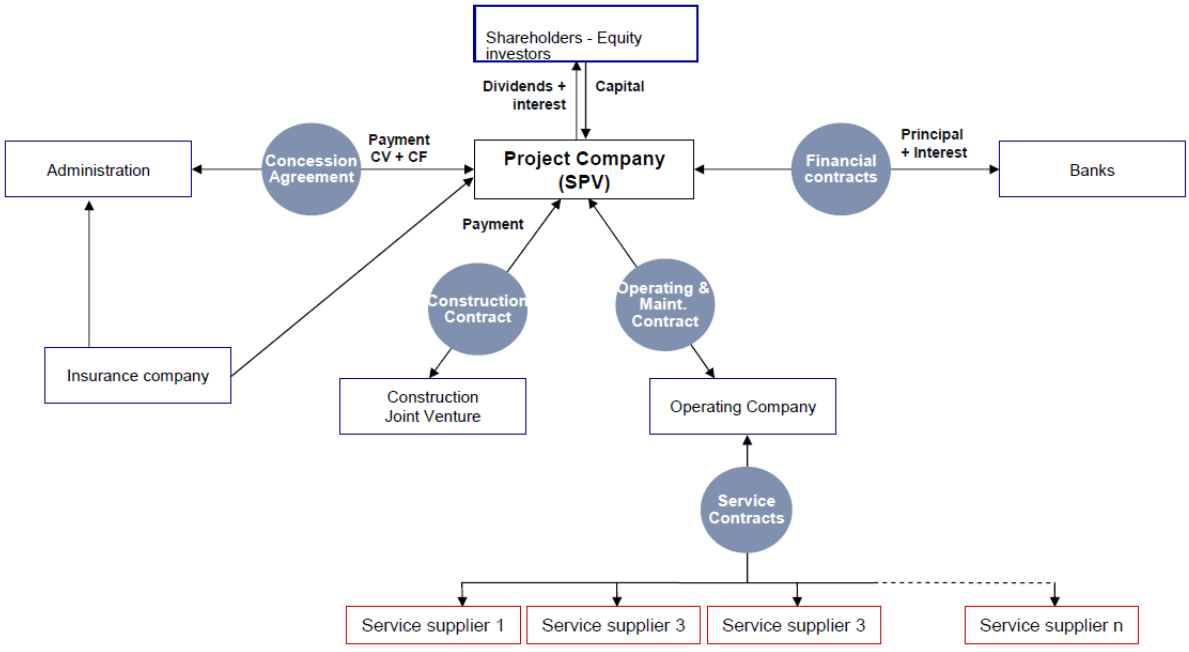
BNDES could also play a key role in mobilising financial resources from the private sector by taking a leading role in setting up syndicated loans among groups of banks. Its vast experience in the Brazilian market would make it a preferred partner for potential international investors for whom the cost of pursuing opportunities alone would be prohibitive.

In addition, BNDES could also make better use of its balance sheet by assuming more of the risks associated with infrastructure projects. For example, BNDES could lead the creation of structured financial instruments, which could allow creating tranches that could be purchased by a wider range of institutional investors, including those that are limited to investment grade assets. Mimicking the practices of multilateral lenders such as the IFC, EFSI or EBRD, BNDES itself could make smaller and more targeted commitments that reduce the risk profile for other investors, for example by investing in subordinate or mezzanine debt with loss absorption capacity.

Over the last years, BNDES has indeed increasingly moved away from its traditional role of providing the entire financing of infrastructure projects and ventured into a wider range of instruments to financially support infrastructure investments. For instance, from 2020 to 2022, BNDES has approved over BRL 40 billion in non-recourse or limited recourse projects in the roads, urban mobility, airports and sanitation sectors. Structuring capital market products, issuing guarantees and commitments for the purchases of

debentures, the Bank has been helpful in mobilising private funding to the infrastructure sector. BNDES can build on this substantial progress and continue to support infrastructure investments through innovative financing solutions that can eventually lead to substantial improvements in the structure of Brazil's financial markets.

Figure 2.23. An example of project finance structure



Source: OECD, 2018

Better managing risks and mobilising foreign investments in infrastructure

Greater private financing of infrastructure development and tapping into new funding pools will require rethinking the allocation of different risks, and creating tailored financial instruments aligned with the desired risk profiles of different groups of investors. Key project risks such as construction risk, demand and revenue risk, political risk, breach of contract, currency risk, and refinancing risk will be of particular concern for investors and lenders. Table 2.2 synthetises the different instruments available to mitigate these risks and the instruments that governments, or public sector entities like BNDES, have at their disposal to mitigate these risks and crowd-in private investment in infrastructure.

Table 2.2. Financial risk mitigants and incentives for infrastructure finance

Type of Measure	Instrument
1. Guarantees	1. Minimum payment, paid by contracting authority
	2. Guarantee in case of default
	3. Guarantee in case of refinancing
	4. Exchange rate guarantees
2. Insurance (private sector)	1. Wrap insurance, technology guarantees, warranties, commercial and political risk insurance
3. Hedging (private sector)	1. Derivatives contracts such as swaps, forwards, options etc.
4. Contract design, paid by contracting authority	1. Availability payment mechanisms
	2. Offtake contracts
5. Provision of capital, realised directly by Government or by its own controlled agency or development bank	1. Subordinated (junior) debt
	2. Debt:
	2.1 at market condition
	2.2 at lower interest rate
	3. Equity:
	3.1 at market conditions
	3.2 at more advantageous conditions
6. Grants, generally delivered by contracting authority, even if some dedicated fund at national level may exist. Tax incentives can be delivered by national or local authorities	1. Lump sum capital grant
	2. Revenue grant:
	2. 1 Periodic fixed amount (mitigating the demand risk)
	2. 2 Revenue integration (it leaves the demand risk on the private player)
	3. Grant on debt interests
	4. Favourable taxation schemes for SPV
	5. Favourable taxation schemes for equity investors

Source: OECD (2015b); OECD (2015c).

Private insurers can provide coverage for a range of political and business risks that can afflict infrastructure projects. However, investors, whether in Brazil or elsewhere, face many gaps in insurance coverage. For example, during the construction phase, it is possible to obtain insurance against damage to equipment or facilities because of an accident or unforeseen events (e.g., fire or flood) that are out of the control of the contractor. However, overruns or delays that are caused by the contractor will not be covered by an insurance policy. Similarly, political risk insurance (PRI) policies covering breach of contract will only pay out following a favourable dispute settlement procedure, which could often take years. For other risks, including that the risk of regulatory changes, there is typically no insurance coverage. Finally, tenors for political risk coverage available in the private insurance market are often shorter than the duration of the loans. All these gaps can result in a project company defaulting on its debt repayments.

Public sector providers of insurance including MDBs such as the Multilateral Investment Guarantee Agency (MIGA) and export credit agencies (ECAs) offer a range of political risk insurance products. The largest source of political risk insurance is ECAs (whose support is linked to the activities of home country exporters and investors). These public sector providers can play a crucial enabling role in terms of supporting Brazil's efforts to attract international investors into infrastructure. Public sector insurers offer a major advantage over private insurers since through their political clout they can also deter harmful actions by host country governments and facilitate dispute resolution. However, coverage from the public sector is meant to provide additionality, not substitute private coverage. These public sector providers intervene, in principle, only when private coverage is unavailable. In addition, public sector insurers often have more stringent terms and disclosure requirements, which may be a disincentive for some investors. In practice, public and private investors often operate jointly, and reinsure each other's risks.

While insurance provides protection against well-defined (and often narrowly defined risks), guarantees provide payment protection for lenders irrespective of the cause of default. The provision of a guarantee

from a multi-lateral development bank is often a pre-condition for the participation of international commercial lenders. The Inter-American Development Bank, for example, offers all-risk credit guarantees that protect commercial lenders against loan repayment difficulties.

Guarantees by national governments or public-sector entities are widely used to complement incomplete insurance and provide opportunities for fine-tuning the allocation of risks in infrastructure projects (Box 2.3). For example, reducing shareholders' guarantee requirements through public guarantees is a key factor for increasing investment in infrastructure, as it allows international and national investors to participate in a greater number of projects and limits the risk born by investors in such projects. In the case of PPPs whose revenues depend on payments provided by a granting authority, Brazil could explore providing guarantees that protect against the risk of non-payment by a government entity.

However, care must be taken in the provision of state guarantees given that they represent a long-term liability for taxpayers (see Chapter 1). They should therefore be used in a targeted manner to support projects that yield a strong positive net benefit, that would otherwise fail to obtain financing. Such changes require putting in place a transparent system for assessing, approving, and managing guarantees and monitoring the contingent liabilities they entail and should be embedded in a longer-term strategy that prepares the market, and addresses bottlenecks in the institutional and regulatory framework. Projects that benefit from a state guarantee should be subject to a transparent prioritisation process using objective criteria like what should be applied to any public investment decision (Section 2.2). The decision to opt for private-public partnership over traditional public investment financing should follow a thorough and realistic cost-benefit analysis taking into account all associated costs and risks over the entire life-cycle of a project. State guarantees should only cover risks that the private sector cannot manage, while ensuring an adequate risk sharing between public and private actors. In addition, the total liability arising from guarantees provided by the state should be capped through, for example, the establishment of a guarantee fund.

In 2016, the Brazilian government established the Infrastructure Guarantee Fund (FGIE) to guarantee, directly or indirectly, any risks, including non-manageable risks, related to concessions. PPPs implemented by the federal government or state governments are also eligible. The fund aims to directly guarantee risks for which there is no available insurance or reinsurance coverage. The government contributes a maximum of BRL 11 billion to the fund. The fund is managed by the Brazilian Guarantees and Fund Managements Agency (ABGF), Brazil's national export credit agency. However, uses of the Infrastructure Guarantee Fund have been limited by the fiscal responsibility law in conjunction with the PPP law. In Brazil, the 2004 federal PPP law initially sets a ceiling on current spending from PPP contracts of 1% of net current revenue, applicable to all levels of government. The limit was subsequently raised in 2009 to 3% and in 2012 to 5%. New subnational PPP commitments cannot be guaranteed by the federal government if (1) existing commitments already amount to 5% of net current revenue or (2) the new contract would entail commitments in excess of 5% of net revenues at any time during the forthcoming 10 years (Matsumoto et al., 2021).

Hence, states and municipalities with an active PPP portfolio in Brazil include only those with a portfolio below the fiscal ceiling established by the law. Although establishing a fiscal ceiling for PPPs is important, it has created a practical barrier for some subnational entities to develop their own PPP pipelines and portfolios. In practice, limited number of subnational governments meet the requirements to receive guarantees and transfers for the implementation of their PPP programme. The application of the fiscal ceiling rule to PPPs could be reformed to create more fiscal space for PPP guarantees within the fiscal limit as a priority budget spending programme.

Providing instruments to mitigate the currency risk could open access to sizeable international financing, but it will also imply fiscal costs and risks. The experience of financing infrastructure projects in other Latin American countries such as Chile, Peru, Colombia, and Mexico indicate that the provision of revenues in US dollars has allowed for cheaper and longer-term financing, particularly in renewable electricity

generation (IDB-WEF, 2019). The benefits of contracting in hard currency are lower borrowing rates for longer maturities, but it adds volatility in debt service costs in local currency. Most infrastructure project revenues are in local currency, and they are not easily hedged. As identified by IDB-WEF (2019), first, a portion of infrastructure project revenues could be indexed to US dollars. Second, foreign exchange rate hedges could be provided through clauses built into concession agreements or through measures to increase the long-term currency swap market liquidity.

The government could consider the tradeoff of offering power purchase agreements in US dollars covering part of concessionaires' receivables against lower ceiling tariffs in auctions, in specific sectors such as transmission lines and renewables. Revenues in hard currency would enable concessionaires to access longer-term and cheaper financing in international markets. Brazil has recently experienced some forms of currency hedging in airport concession (Gonçalves et al., 2017). In these arrangements, changes in the exchange rate in a period of one year that exceed a reference component are offset by a reduction or increase in the amount to be collected as a grant by the government. Thus, the grant payable to the government varies positively with the appreciation or negatively with the depreciation of the Brazilian currency, with caps applied in both directions. Finally, improving the liquidity of long-term currency swaps is needed to complement the options for hedging. The swap market in Brazil is highly liquid for terms up to five years, but efforts to increase liquidity in longer terms could be useful.

Box 2.3. Examples of guarantee and financing mechanisms

Danish State Guarantee Model (SGM) for infrastructure investment

The SGM was used for the development of the fixed links across the sea at Storebaelt (1987) and Øresund. It is characterised by transferring the responsibility for Design, Build, Finance, Maintain and Operate (DBFMO) in the PPP model contract to an independent state-owned company or a special vehicle. Financing is based on the company raising loans in financial markets or from the state and can also be equity supported by the state. The state guarantees the loans through a guarantee commission. With the Danish state's high credit rating, favourable loan terms are obtained. Toll charges are collected, which, after covering operating and maintenance costs, are used to pay interest and loan instalments. Compared to PPPs, the SGM's main advantage is that its financing costs are substantially lower. This is partly explained by the fact the state ultimately bears the risks (especially the demand risks) in the

project. But also, as private investors in transport infrastructure require an uncertainty premium, which makes the total financing costs too high compared to the real risk transfer from the state to the private sector (the risk-pricing failures of private financing). On a risk-adjusted basis, the financing costs in the SGM are therefore lower than in the PPP model.

European Fund for Strategic Investments

The European Fund for Strategic Investments (EFSI), otherwise known as the Juncker Plan, was instituted in 2015 in response to the decline in investment levels in Europe in the wake of the global financial crisis. It was prolonged in 2017 with a 26 billion euro guarantee fund provided by the EU budget and 7.5 billion from the European Investment Bank (EIB). The objective is to crowd in 500 billion private investments. The EIB uses these resources to invest in high-risk/high-return projects that would otherwise not receive funding. By making investments in equity or junior debt, the EIB seeks to attract private financing into the more senior debt categories.

EBRD-MIGA risk mitigation solution for infrastructure bonds

The European Bank for Reconstruction and Development (EBRD) and the Multi-lateral Investment Guarantee Agency (MIGA) have developed a joint risk mitigation solution that is designed to boost the credit rating of infrastructure bonds issued for PPP projects.

The mechanism combines two unfunded liquidity facilities provided by the EBRD with political risk insurance (PRI) provided by MIGA.

The Construction Support Facility ("CSF"): An unfunded credit facility designed to provide significant timely liquidity during the construction period in the event of contractor default. The Revenue Support Facility ("RSF"): Subordinated unfunded credit facility designed to credit enhance grantor risk during the operations period of the project. The facility is designed to provide timely debt service in the event of a default by the grantor bridging the period until the arbitration process is completed (usually 2 to 3 years) after which MIGA honours its payment obligation. The MIGA's PRI Guarantee: based on standard three-point coverage (Breach of Contract, Expropriations and Transfer Restriction). Under the "Breach of Contract" coverage, lump-sum insurance proceeds would be paid out following an arbitral award. Under the "Expropriations" coverage, PRI payment is not subject to arbitration award.

The facility was piloted in Turkey in a PPP transaction to build, design, finance and maintain a large integrated health campus located in Elazig, Eastern Turkey for a concession period of 28 years. Under the PPP agreement the Turkish Ministry of Health as the grantor is required to compensate the project company for the availability of the facility. The project was financed through the issuance of a EUR 288 million euro-denominated bond, structured into two tranches. As a result of the EBRD-MIGA risk mitigation facility, Moody's assigned the bonds a Baa2 rating, two notches above Turkey's sovereign rating ceiling, thereby making the bonds eligible for the portfolios of institutional investors.

IFCs Managed Co-Lending Portfolio Programme

The IFC has developed a mechanism, the Managed Co-Lending Portfolio Programme (MCPP) for Infrastructure that aims to mobilise institutional money for investing in infrastructure projects in developing countries. The MCPP for Infrastructure involves a three-way partnership between the IFC, a bilateral lender (Sida - Swedish International Development Agency), and a number of institutional investors. Institutional investors provide funding to a debt fund that will invest in a portfolio of projects that are originated and approved by the IFC. The IFC provides credit enhancement through a first-loss tranche. Sida provides a guarantee on a portion of IFC's first loss position in exchange for a guarantee premium. The fund thus provides institutional investors with an investment grade asset with good returns and excellent diversification benefits. The programme has mobilised up to USD 10 billion over eight years.

Source: ITF/OECD, EIB, Bruegel, EBRD, IFC and Moody's.

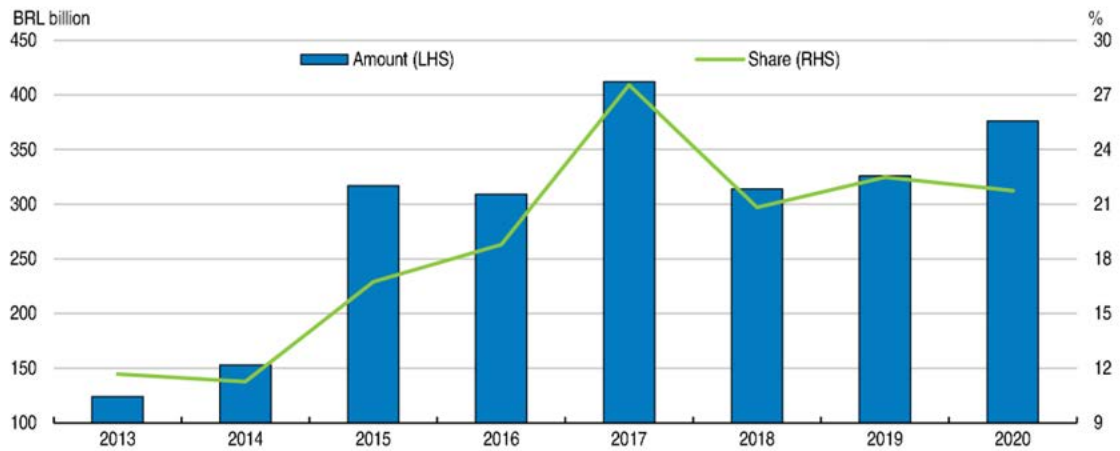
Further expanding green financing

Developing more long-term financing options will also be key for financing the decarbonisation of the economy. Efforts to develop green finance in Brazil have been intensified in recent years. Bank loans to green economy sectors have increased substantially since 2013, amounting to BRL 376 billion (3.2% of GDP) and accounting for 22% of total loan portfolio to corporations in 2020 (Figure 2.24). In 2021, 111 green, social or sustainability-linked bonds were issued totaling BRL 85.7 billion (0.9% of GDP) (Vendramini, 2022).

Companies and commercial banks in Brazil have shown an interest in Brazil's potential to develop the green agenda. In 2017, national and foreign institutional investors representing around BRL1.8 trillion (18%

of GDP) of assets in Brazil have signed the Brazil Green Bonds Statement, committing to contribute to the development of the green bond market in Brazil. Streamlining the green bond framework, harmonising the definition of green finance, and further developing green and climate-risk reporting would increase the scope for green financing nationally and internationally. The lack of a formally agreed green taxonomy and definitions leads to multiple indicators, weak comparability, reliability, and accountability, as well as higher transaction costs. Local banks should be accompanied by, for instance, BNDES to develop aggregate green projects financed in the green bond market directed toward small and medium-sized enterprises. The creation of the Sustainable Rural Credit Bureau in 2022 by the Central Bank is a useful step towards the certification of operations compliant with green bonds requirements (BCB, 2022).

Figure 2.24. Banks loans to green economy sectors have increased over time



Note: The bars refer to bank loans to green economy sectors in amounts, and the shares (%) refer to the bank loans to green economy sectors as a share of total loan portfolio to legal entities.
Source: FEBRABAN (2018); FEBRABAN (2021); and OECD calculations

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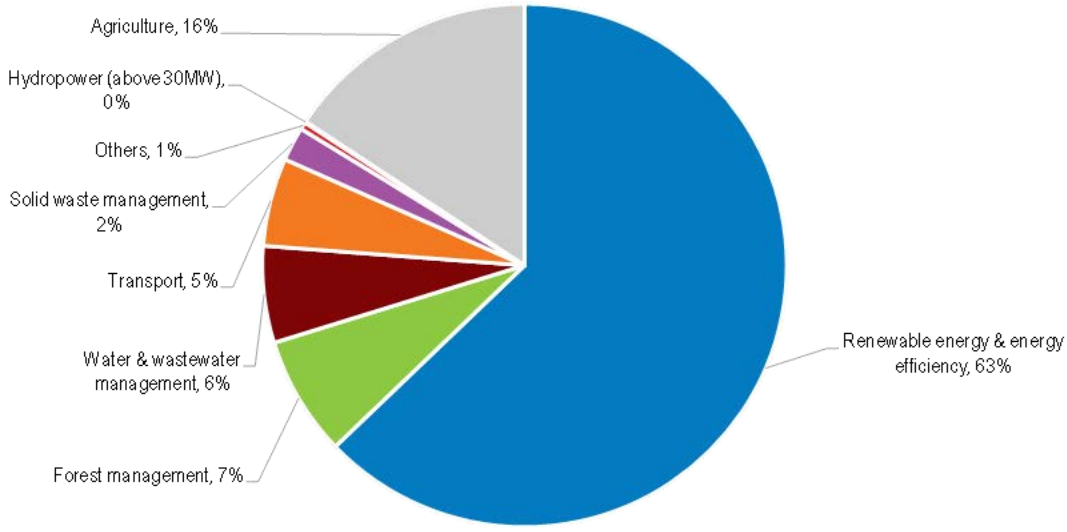
BNDES has been instrumental in developing green finance, in particular for the wind power industry (OECD, 2019). Green finance disbursements of the BNDES have targeted mostly sustainable infrastructure projects such as renewable energy, energy efficiency and low-carbon transportation (Figure 2.25). In 2017, BNDES issued a USD1 billion green bond to raise resources in the foreign market to fund power projects in Brazil (BNDES, 2018).

Figure 2.25. BNDES's green finance disbursements largely targeted sustainable infrastructure



Note: Data for 2021.
Source: BNDES; and OECD calculations.

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Better infrastructure to support climate change mitigation and adaptation

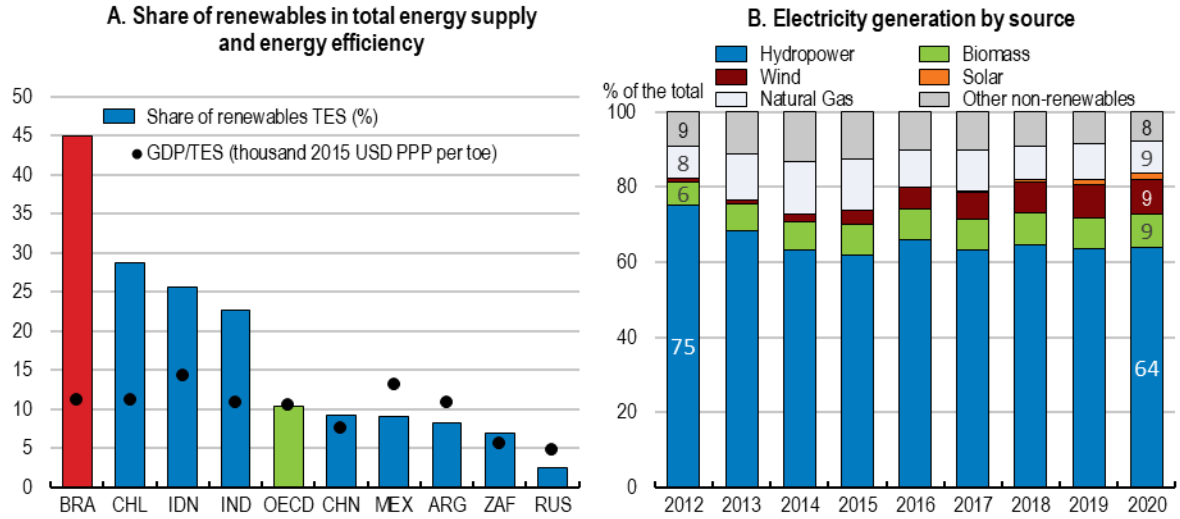
Climate change is an increasingly important factor for infrastructure investments. From a perspective of mitigation, today's infrastructure decisions are almost sure to affect a country's ability to achieve emission reduction targets in the future. From a perspective of adaptation, climate change poses new risks to infrastructure and requires additional investment into making current and future infrastructure more resilient against extreme weather events and natural disasters.

Developing low-carbon infrastructure to mitigate climate change

Low-carbon infrastructure will play a key role in Brazil's transition toward carbon neutrality. This holds particularly for energy infrastructure, which is not only a major emitter, but also determines the scope for emission reductions in downstream sectors. A remarkably clean energy mix and moderate energy efficiency levels underpin Brazil's relatively low carbon intensity (Figure 2.26, Panel A). Energy-related per-capita emissions are approximately one third of those in the European Union, and one seventh of those in the United States. 48% of overall energy use comes from renewable sources compared to a world average of approximately 15%.

Electricity, which currently accounts for 18% of total energy supply, has an especially low carbon intensity, with 85% of the current domestic supply coming from renewable sources compared to a world average of approximately 27%. The current electricity matrix is based mainly on hydroelectric sources, with thermal power plants used as back-up and to smooth out supply fluctuations from hydroelectric energy, although wind, solar photovoltaic and biomass energy are also gaining weight (Figure 2.26, Panel B). Brazil is currently the country with the second and seventh largest installed capacities for biomass and wind electricity generation, respectively (EPE, 2021a). Official plans to continue decarbonising the energy sector over the next two decades include the national biofuel strategy, new frameworks for the electricity and gas sectors, and a national green hydrogen strategy.

Figure 2.26. Energy-related emissions are relatively low



Notes: Panel B: Hydropower includes self-generation, biomass includes wood, sugar cane and resins, others include petroleum derivatives, coal, nuclear, gas, other non-renewables and other renewables.
Source: IEA World Indicators (2020 Edition), Balanço Energético Nacional, 2021, EPE.

StatLink https://stat.link/lde2o7

Expanding the use of electricity as a source of energy will be key to decarbonise other sectors, such as industry and transportation. According to Brazil's Ten-year Energy Expansion Plan, 65% of future energy-related emissions will come from these sectors (Ministry of Environment, 2021). The necessary electrification will lead to rising demand for electricity.

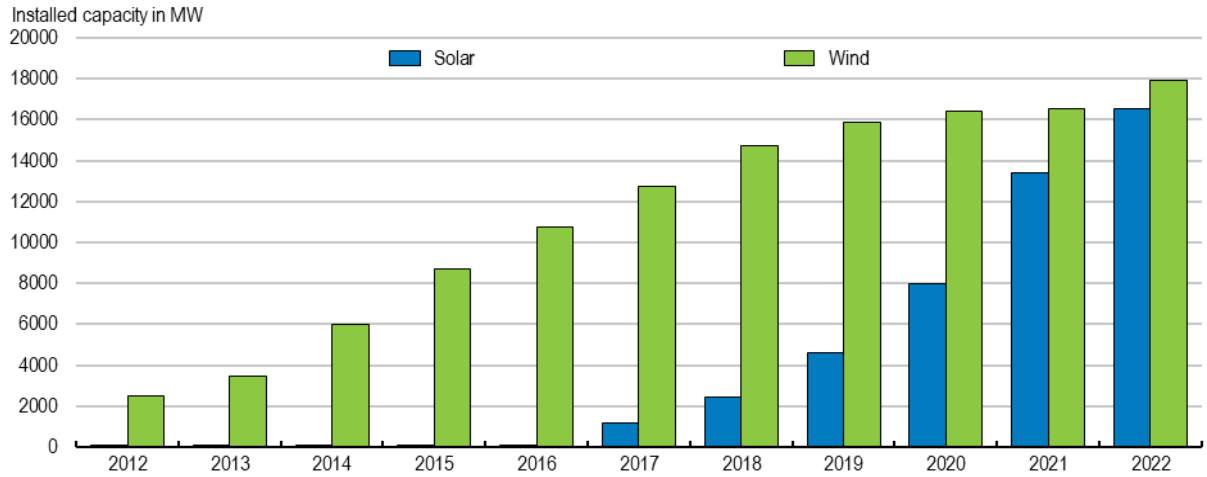
Massive expansions in electricity production capacity will imply looking for alternative low-carbon electricity sources beyond hydropower. Hydropower presents opportunities and risks in Brazil's energy mix. On the one hand, the dispatchable nature of hydropower provides flexibility to the system, while wind and solar photovoltaic sources are intermittent. On the other hand, the remaining unexplored potential of hydropower has been increasingly difficult to tap into due to challenges in obtaining environmental licenses for new hydropower projects. At the same time, hydropower is highly susceptible to severe weather events, such as droughts, prolonged dry seasons, reduced rainfalls, and rising temperatures, likely to occur more frequently as climate changes. Dependence on hydropower poses a critical risk to the country's long-term electricity supply and resilience (World Bank, 2022a). On several occasions, including most recently, low rainfall reduced reservoir fillings to low levels and led to price spikes through wider use of higher-cost thermal plants, and some observers even feared electricity shortages.

Brazil needs to develop drought management plans for new and existing assets setting out accountabilities and actions agreed in advance with stakeholders across all sectors using water. Agreeing upfront on restriction rules and compensation fund is paramount for the successful management of drought events. Brazil needs to have plans in place before a crisis so that actions, accountabilities and desired outcomes are clear at each pre-determined stage of a drought, mitigation measures are established, and the rules for restricting use have been agreed (OECD, 2022d). For example, this could include agreeing drought adaptation measures such as rules for restricting certain types of use as a drought progresses, potentially establishing a compensation fund using abstraction charges so that lower priority users are not financially disadvantaged if they are restricted during a drought. The process for doing so should be inclusive and have formalised governance to ensure that funds are ring-fenced and used for the intended purpose (OECD, 2022d).

Other renewables like wind and solar sources present significant untapped potential in Brazil recent policy announcements point to significant planned investments in renewables. Fairly steady trade winds and long sunshine hours make Brazil ideally placed to venture further into intermittent renewables like wind and

solar, particularly in the north and northeast regions (EPE, 2021b). This could increase energy security and allow for a constant electricity generation, as wind and solar sources are complementary to hydropower in terms of seasonality and between each other across hours of the day. Past deployment of solar water heating across the country shows the enormous potential for distributed solar generation, which has expanded rapidly over the last years (Figure 2.27). Already, wind and solar are the least expensive electric energy sources in the auctions of the national electricity system and their prices are significantly lower than those of thermoelectric power plants in Brazil, mirroring developments in many regions in the world (IEA, 2020).

Figure 2.27. Wind and solar photovoltaic energy production has increased significantly



Source: ANEEL, 2020

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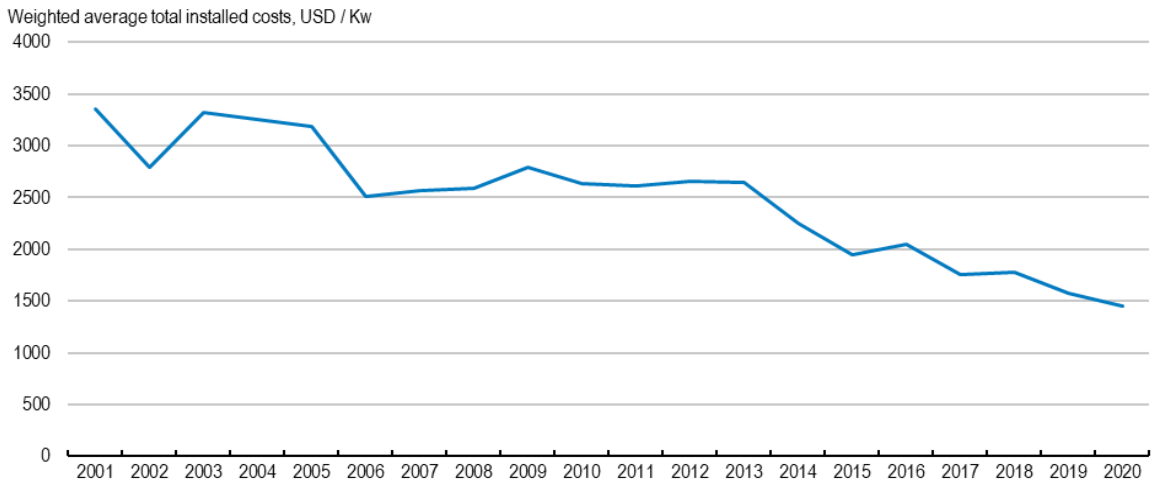
Wind power has achieved significant progress in the coastal regions and is expected to grow rapidly in the upcoming years. Current installed capacity is 16 GW, but according to the National Energy Plan, installed capacity can reach between 110 GW and 195 GW in 2050. A new law governing the installation of renewable energy plants in territorial waters, inland waters and on the continental shelf is aimed to encourage the deployment of offshore wind turbines and submarine power cables. Both the southern and northern coasts of Brazil offer favourable meteorological conditions for wind power, and technological advances have substantially reduced the necessary capital investments and operational costs (Figure 2.28).

Further developing the grid and the transmission infrastructure will be key for connecting more renewable energy sources, as their intermittent nature often puts strains on the stability of the network. A recent USD 70 million investment plan by the Climate Investment Funds to support grid flexibility for clean energy integration in Brazil aims to mobilise a total of USD 9 billion in private and multilateral investments, on the basis of a plan implemented by the Inter-American Development Bank and the World Bank Group (CIF, 2023). Moreover, green financing should be further directed to wind energy investment by leveraging financing from BNDES and attracting foreign investments.

Figure 2.28. Wind energy installation cost has been declining in Brazil



Source: IRENA, Renewable generation power cost 2020.

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Solar plant development is already playing a key role in bringing electricity to remote areas. A new solar photovoltaic (PV) installation in Belmonte (state of Pernambuco) became the biggest solar park in Latin America, providing electricity for nearly 800.000 families and generating 2.500 direct and indirect jobs. Additionally, household solar PV panels have allowed further progress, due to their ease of installation and their fairly rapid return to investment, with amortisation possible in as little as six months. Fine-tuning regulatory policies will be a key policy issue for future solar PV deployment. Solar PV grids can be found in more than 5.700 municipalities across the country, with a vast majority of installations within private homes. However, nearly 30% of installations were operating in the unregulated market in 2020 (IEA, 2020). Currently, registered solar PV micro-generators are subject to a net metering scheme in which they receive a one-to-one credit for each kWh fed into the grid while distribution costs are paid entirely by regular consumers. A 2022 law extends the principles of this legal framework until 2045 and establishes rules for the gradual introduction of an infrastructure charge to be discounted from the electricity credits as of 2023. This new law affords long-term legal certainty for those who produce their own energy and insulates them from potential future tariff changes implemented by the national energy regulator ANEEL. Additional tax incentives could be considered for the development of solar energy in rural and remote areas.

Adapting infrastructure to climate change risks

The damages caused by climate events on infrastructure are already detrimental to growth and well-being. Brazil frequently experiences extreme rains, flooding, severe droughts, and other weather-related disasters. Its location in the tropics implies high temperatures and high evaporation potential that facilitates large rainfall. Drought and excess rainfall, resulting in recurrent floods and landslides, are the most frequent and disruptive hazard events, with important impacts on urban areas. Floods comprise over 65% of the natural hazards, and damages related to flash floods and landslides were responsible for 74% of the deaths related to natural disasters over 1991–2010 (World Bank, 2022a).

On average, firms lose approximately 1.3% of GDP every year because of climate-related infrastructure disruptions (World Bank, 2021). The majority (55%) is caused by failures to transport infrastructure followed by power (44%) and water (2%). In 2021, the depletion in hydropower reservoirs due to a sequence of years with below-average rainfall starting in 2013 threatened the electricity supply for people who rely on hydropower for two-thirds of their electricity (OECD, 2022d).

Setting a legal basis for climate-resilient and sustainable infrastructure and cross-sector strategic engagement is key as climate change adaptation measures need to be agreed between relevant ministries.

Planning, funding and delivering infrastructure should systematically consider the climate resilience, with legislative and budgetary support, and clear accountability. An optimised portfolio of infrastructure assets would take into account cost-benefit-analysis, with some assets being climate-resilient but necessarily all. For example, nature-based solutions are among the most efficient to sustainably increase water yields.

Water stress has augmented due to droughts, mainly in the northeast and central regions. Changing precipitation patterns and prolonged dry periods have also significantly impacted rivers and water recharge in key aquifers. Together with rising temperatures, this is expected to affect both energy demand and supply, particularly from hydroelectric sources. As temperatures rise, increasing evaporation from existing water storage facilities will also increase production costs, resulting in higher prices for consumers. Adaptation policies in the water sector include expanding irrigation, dams, and sanitation infrastructure. Preservation policies, such as developing water and land conservation actions within micro-basins in rural areas, also have an important role to play. Industries that are major water polluters should be regulated and incentivised to reduce water pollution (World Bank, 2021).

All types of infrastructure are exposed to the different climate change events (see Table 2.3). For instance, the rapid, unplanned and uncontrolled urbanisation that has taken place in Brazil since the 1960s has meant building in unsafe areas such as flood plains and steep hillside slopes, which made urban residences and public infrastructure particularly vulnerable. Between 2009 and 2014, nearly every highly populated municipality in Brazil has been affected by floods and about 50,000 low-income homes were destroyed (World Bank, 2022a).

In addition, urban mobility in Brazilian cities is subject to disruptions arising from climate events. Better integrating adaptation policies in urban mobility systems requires focusing on planning of land-use and settlement patterns, and integrated infrastructure projects that consider climate risks assessments. Elaborating guidelines to support municipalities in assessing climate risks and integrate them in land use planning and providing hazard maps and access to climate information to municipalities to perform climate risk assessment would enhance urban planning. Moreover, investing in mass-transit infrastructure would limit individual vehicle use, and therefore reduce the vulnerability of the urban-mobility sector to climate change while at the same time reducing greenhouse-gas emissions. In addition, defining a clear allocation of responsibilities as regards climate risks impacts for new transports' concessions/PPP contracts is key for a proper accounting of climate risk upfront. Low-income municipalities should receive more technical and financial support to adapt their transport infrastructure to climate change risks. Leveraging the deep technical expertise of the national development bank BNDES may be one way to put this into practice.

Transport infrastructure may also be affected by rising temperatures, rainfall and wind intensity, all of which are capable of causing direct and indirect impacts on the road, railway and waterway transport networks. Among such impacts, the most common are floods and landslides, many of which are consequences of extreme weather events. Such disruptions may even compromise interconnection between different transport modes, adding to transport costs by requiring additional safety measures or use of alternative routes. A recent report found that 10% to 12% of the rail network, equivalent to 2000 km of railways, are subject to high and very high risk of landslide, erosion and high temperatures (Min. Infrastructure/PROADATA, 2022).

Road infrastructure is also exposed to climate change risks. Part of the road network in the states of Pará and Maranhão and on the Northeastern coast are exposed to a medium degree of flooding risk. Land slide risks are concentrated in the South and Southeast Regions (Serra do Mar and Serra Geral) and in the Northeastern coastal region (Min. Infrastructure/PROADATA, 2022). Erosion risks, closely related to land use, are concentrated on highways in the state of Pará, in Southern and Northeastern states. 60% of the road network is exposed to high or very high degrees of threat from high temperatures.

The long-term performance and reliability of transportation systems will need to consider and plan for climate change and extreme weather events. As Brazil is expanding its transport infrastructure with new concessions, these should systematically include an assessment of risk and vulnerability to climate change

events and clauses clarifying the allocation of responsibilities regarding climate related risks (Makovšek and Moszoro, 2018). The OECD has developed guidelines to build climate resilient infrastructure covering their design, the institutional framework and enhancing private-public partnering (Box 2.4).

Adaptation measures encompass different dimensions including governance, information and training, financing and climate risks identification. The governance of transport infrastructure should ensure that structured responses at local levels are in place and resources are provided to facilitate adaptation. Moreover, where needed, technical norms regarding drainage techniques, pavement requirements and equipment characteristics should be revised to make transport infrastructure resilient to climate events. It is also important to continuously improve communication about risk, implement early warning systems, emergency contingency, evacuation and recovery planning (Min. Infrastructure/PROADATA, 2022b).

Investment needs to make infrastructure resilient to climate shocks are estimated at 0.8% of GDP per year between 2022 and 2030 (World Bank, 2022b). These infrastructure resilience investments are worth making upfront as they pay back over time. For instance, in the road infrastructure sector, a 1.2% of GDP investment would significantly improve the climate resilience of the 23% of GDP of new investments needed over the next decade (World Bank, 2022b). Moreover, it would avoid losses estimated at 2.5% of GDP. Such investment would be more efficient than retrofitting roads within the normal replacement schedule.

Brazil has put in place an institutional framework to coordinate and implement mitigation and adaptation policies. An Inter-Ministerial Committee on Climate Change was created in June 2023 and charged with the definition of guidelines and strategies for designing, implementing, financing, monitoring and evaluating policies, plans and actions related to climate change. This includes sectoral mitigation and adaptation plans within the scope of the National Policy on Climate Change - PNMC, the Nationally Determined Contribution and the economic and financial mechanisms to be adopted.

Box 2.4. Climate-resilient infrastructure

Designing climate-resilient infrastructure

- Building climate resilience can involve a package of management measures (such as changing maintenance schedules and including adaptive management to account for uncertainty in the future) and structural measures (e.g. raising the height of bridges to account for sea-level rise or using natural infrastructure such as protecting or enhancing natural drainage systems).
- Flexible, adaptive approaches to infrastructure can be used to reduce the costs of building climate resilience given uncertainty about the future. Decisions about infrastructure should consider relevant uncertainties to ensure resilience across a range of potential future scenarios.

Strengthening the enabling environment for the development of climate-resilient infrastructure

- Decision makers need to have access to high quality information, consistent data and capacity to use this information to inform planning. Uncertainties should be clearly communicated and valued, and there should be access to the tools needed to support decision-making under uncertainty.
- Tools for mainstreaming adaptation in critical policy areas and encouraging investments in resilient infrastructure include:
    - spatial planning frameworks to redirect development away from high-risk areas.
    - infrastructure project and policy appraisals, including Strategic Environmental Assessment and Environmental Impact Assessment; and − regulatory and economic standards (such as building codes).
- Climate risk disclosure can help raise awareness of and encourage efforts to reduce climate-related risks to infrastructure but needs to be tailored to national circumstances.

Mobilising public and private investment for climate-resilient infrastructure

- Climate impacts are projected to lead to increases in investment required for infrastructure, particularly water storage, flood defences, and water supply and sanitation in some regions. The use of tools for decision-making under uncertainty can reduce the need for costly retrofitting while reducing upfront costs.
- Developing and communicating infrastructure plans can help investors to identify investment opportunities. Developing these plans provides an opportunity for decision makers to take a strategic view of how climate change will affect infrastructure needs in the coming decades.
- Public policies that promote resilience include public procurement processes that consider climate resilience when comparing competing bids, by accounting for costs over the asset lifetime under alternative scenarios. For Public Private Partnership (PPP) contracts, it is important to clarify the allocation of responsibilities regarding climate-related risks planning, management and response.
- Public finance can be used to mobilise private finance for climate-resilient infrastructure. Blended finance can be used to improve the risk-return profile of investments where appropriate.

Source: OECD (2018b), "Climate-resilient infrastructure", Policy Perspectives, OECD Environnent Policy Paper N°14.

Table 2.3. Illustrative impacts of climate changes in different sectors

	Temperature changes	Sea-level rise	Changing patterns of precipitation	Changing patterns of storms
Transport	Melting road surfaces and buckling railway lines	Inundation of coastal infrastructure, such as ports, roads or railways	Disruption of transport due to flooding	Damage to assets, such as bridges
	Damage to roads due to melting of seasonal ground frost or permafrost		Changing water levels disrupt transport on inland waterways	Disruption to ports and airports
	Changing demand for ports as sea routes open due to melting of arctic ice			
Energy	Reduced efficiency of solar panels	Inundation of coastal infrastructure, such as generation, transmission and distribution	Reduced output from hydropower generation	Damage to assets: - e.g. wind farms, distribution networks
	Reduced output from thermal plants due to limits on cooling water temperatures		Disruption of energy supply due to flooding	Economic losses due to power outages
	Increased demand for cooling		Insufficient cooling water	
Telecoms	Increased cooling required for datacentres	Inundation of coastal infrastructure, such as telephone exchanges	Flooding of infrastructure	Damage to above ground transmission infrastructure, such as radio masts
			Damage to infrastructure from subsidence	
Urban development	Increased cooling demand	Inundation and increased flood risk	Risk of drought	Damage to buildings
	Reduced heating demand	Changes in land use due to relocation of people living in exposed areas	Flooding	Deaths and injuries
Water	Increased need for treatment	Inundation of coastal infrastructure	Increased need for water storage capacity	Damage to assets
	Increased evaporation from reservoirs	Salinisation of water supplies	Increased risk of river embankments being overtopped	Decreased standard of protection offered by flood defences
		Decreased standard of protection offered by coastal defences		

Source: OECD (2018b), Climate-resilient infrastructure, OECD Environment Policy paper n° 14

The Ministry of Environment and Climate Change is responsible for leading the country's response to climate change and for developing policies and strategies for greenhouse gas mitigation and climate adaptation efforts. In cooperation with the Ministry of Finance, an Ecological Transformation Plan has been developed including economic and social instruments for sustainable management of water resources, ecosystems, biodiversity, and forests (see Chapter 1). The Ministry of Environment and Climate collaborates with the Ministry of Science, Technology and Innovation in order to implement strategies and improve climate modelling services, and to develop the National Adaptation Plan. The National Adaptation Plan should be expanded to cover transport infrastructure and more efforts are needed to integrate sub-government levels in the development and implementation of adaptation policies.

Table 2.4. Policy recommendations from this chapter (Key recommendations in bold)

MAIN FINDINGS	RECOMMENDATIONS
Infrastructure gaps are widespread	
Infrastructure investment has declined and is low in international comparison, while maintenance levels are low.	**Increase investment in infrastructure and maintenance, including in transport, energy, telecommunications, water, sanitation and urban mobility.**
Improving the efficiency of public investment in infrastructure	
Cross-sectoral coordination in the planning of strategic infrastructure has been limited, often leading to unrealistic demand and supply estimations, and missed opportunities for infrastructure sharing.	Continue to promote inter-ministerial collaboration to develop integrated infrastructure development plans.
Strategic planning documents are not binding and not systematically linked to annual budgets. As a result, infrastructure investment is not always coherent with national strategies and often lacks technical back-up.	Use integrated infrastructure plans as a pipeline of major, strategic, technically assessed, and publicly discussed projects. Allocate federal funds only to projects identified in this pipeline.
Multi-year projects lack a mechanism to carry-over budget appropriations. Infrastructure projects are often interrupted due to funding discontinuity or uncertainty.	Improve medium-term fiscal planning to allocate resources to multi-year investment projects and increase budget predictability.
Budget sequestration increases funding uncertainty.	Exclude strategic infrastructure investment projects from budget sequestration.
Most public investment in infrastructure is executed by subnational governments or non-financial SOEs, who often lack project management capacity.	**Expand technical assistance by BNDES to sub-national governments for infrastructure projects.**
The environmental licensing process is a source of risk that can discourage participation in the public procurement of infrastructure projects and inflate prices.	Assess projects' environmental impacts and procure environmental licenses before entering the bidding phase.
Inefficient procurement procedures can affect the successful completion of infrastructure projects within the agreed terms and timeline. Procurement data and information about prices, dispersed through several e-procurement platforms, is difficult to gather and analyse.	Continue to develop standard electronic templates for all stages of the procurement process and make their use mandatory for all types of procurement. Make the use of e-procurement mandatory using a centralised and unique web platform.
The co-existence of two public procurement regimes until December 2023 adds a layer of complexity and uncertainty, particularly affecting foreign bidders.	Accelerate the transition to the new public procurement regime approved in 2021.
Public procurement, including of infrastructure projects, is vulnerable to corruption, leading to public funds being wasted through higher expenses and infrastructure of lower quality.	Strengthen the autonomy of the Federal police and public prosecutors. Establish clear rules-based selection processes to minimise political interference. **Improve whistle-blowers protection and continue implementing the National Strategy to Combat Corruption and Money Laundering**.
Regulatory procedures have improved recently and became more aligned with international good practice. However, progress to adopt these new practices at the subnational level is uneven.	Consider the creation of a national regulatory body to oversee subnational regulatory practices. Promote the use of good regulatory practices across all levels of government by organizing workshops to share lessons learned, successful cases, and promote exchange of information.
Delays in transferring funds to regulatory agencies create a gap between financial needs and available resources, adding uncertainty and constraining their action.	Transfer monthly the budget to regulatory agencies to increase predictability and reduce misalignments. Exclude budget allocated to regulatory agencies from budget sequestration.
The 2016 "SOE Statute" has helped reducing political interference in the management of SOEs and advanced the professionalisation of its boards. However, full implementation is still ongoing. Many SOEs at the subnational level are non-compliant.	Continue to implement the 2016 "SOE Statute" at all government levels. Maintain a reasonable "cooling off" period between political office and a management position in an SOE.

Enhancing financing options for infrastructure projects	
Brazilian sub-national entities have been limited in their capacity to borrow by fiscal rules, capacity to pay and creditworthiness.	Allow those states and municipalities with strong fiscal accounts to issue infrastructure bonds, within the limits defined for their rating under the CAPAG.
Institutional investors cannot benefit from the current beneficial income tax treatment of infrastructure debentures as they are not subject to income taxes. Individuals and investment funds represent almost half of incentivised-bond investors, while institutional investors constitute less than 5% of investors.	Implement the planned reform of tax incentives for infrastructure bonds to afford the benefits to institutional investors as to individuals and investment funds. Better target the incentives of debentures to sectors where the infrastructure gaps are the highest (water, sanitation and urban mobility) and to projects that have longer time spans.
Different groups of investors have different desired risk profiles and restrictions. Tailoring financial assets for infrastructure financing to different investor groups may allow tapping into new funding pools.	**Expand the use of structured financial instruments, project financing and carefully designed guarantees to attract a wider range of institutional investors, with the help of BNDES.**
Foreign financing of infrastructure investment remains limited. The currency risk is limiting the international financing of infrastructure projects.	Consider indexing some infrastructure project revenues to the exchange rate. Consider providing partial foreign exchange rate hedges through clauses built into concession agreements.
The lack of formally agreed green taxonomy and definitions leads to multiple indicators, weak comparability, reliability, and accountability, as well as higher transaction costs	Streamline the green bond framework by harmonising the definition of green finance and further developing green and climate-risk reporting.
Better infrastructure to support climate change mitigation and adaptation	
The production of electricity is highly exposed to severe weather events, such as droughts, prolonged dry seasons, reduced rainfalls, and rising temperatures. The current strong dependence on hydropower poses risks to long-term electricity supply and resilience.	**Further diversify renewable energy sources by increasing investments in wind and solar energy, as well as biofuels.**
Water stress has augmented due to droughts, mainly in the northeast and central regions. Changing precipitation patterns and prolonged dry periods have also significantly impacted rivers and water recharge in key aquifers.	Develop emergency contingency plans for the case of severe droughts, including a compensation fund for those affected by rationing. Expand irrigation, dams, and improve sanitation infrastructure. Develop preservation policies, such as water and land conservation actions within micro-basins in rural areas.
The use of wind and solar power is limited by transmission bottlenecks and insufficient grid capacity.	Upgrade the transmission infrastructure to accommodate more intermittent renewable sources such as solar and wind plants.
Urban residences and public infrastructure are particularly vulnerable to climate shocks as a result of rapid, unplanned and uncontrolled urbanisation in the past.	Revise technical norms regarding drainage techniques, pavement requirements and equipment characteristics to make transport infrastructure more resilient to climate events. Better integrate adaptation policies into urban mobility systems. Make climate risk assessments mandatory for infrastructure projects. Elaborate guidelines to support municipalities in assessing climate risks and integrate them in land use planning. Provide hazard maps and access to climate information to municipalities to perform climate risk assessment. Invest in mass-transit infrastructure to limit individual vehicle use and reduce the vulnerability of the urban-mobility sector to climate change.

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The Brazilian economy rebounded strongly after the Covid-19 pandemic. Resilient domestic demand, supported by social transfers, continues to drive growth. Inflation is decreasing, providing room for further monetary policy easing. However, public debt remains high, calling for a credible fiscal framework and improved spending efficiency. The planned reform of the consumption tax system will reduce compliance costs significantly. Productivity has declined over the past decade, and rekindling it will require further structural reforms. Stringent regulations and administrative burdens in goods and services markets are hampering productivity growth, although recent reforms have addressed some issues. Supporting female labour force participation and reducing informality would improve labour markets. Expanding access to early childhood education, especially for single mothers and those with low incomes, can allow more women to enter the labour market and improve learning outcomes. Despite significant public spending on education, a more targeted resource allocation can help to address inequalities in opportunities. Enhancing infrastructure investment through better planning and coordination between federal and subnational governments would help to address longstanding infrastructure bottlenecks. A consistent enforcement of the Forest Code and the adoption of new technologies will be key for reducing greenhouse gas emissions.

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