OECD Sovereign Borrowing Outlook 2023

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Foreword

This edition of the *OECD Sovereign Borrowing Outlook* presents an analysis of the recent trends in sovereign borrowing needs and outstanding debt and provides projections for 2023 for the OECD area. It examines the recent developments in funding conditions including the rising interest rates and changing investor base for the government securities markets and sovereign issuers. It analyses the recent trends in sovereign sustainable bond issuance including benefits and challenges for issuers and presents country practices that can assist sovereign issuers in their efforts to meet those challenges. It also reviews sovereign debt issuance trends in Emerging Market and Developing Economies (EMDEs) and examines the issuance conditions in 2022. Finally, this edition also provides policy guidance on developing and implementing buyback and switch programmes as a debt management tool in view of the OECD country practices.

The publication draws mainly on responses received to an annual survey on the borrowing needs of OECD governments circulated by the OECD's Financial Markets Unit in 2022. This includes an update on trends and developments associated with sovereign borrowing requirements, funding strategies, market infrastructure and debt levels from the perspective of public debt managers. The Outlook makes a policy distinction between borrowing requirements and funding strategies. Central government marketable gross borrowing needs, or requirements, are calculated on the basis of budget deficits and redemptions. Funding strategies entail decisions on how borrowing needs are going to be financed using different instruments (e.g. long-term, short-term, nominal, indexed, etc.) and which distribution channels (auctions, tap, syndication, etc.) will be used.

The OECD conducted a special survey study on the 'Sovereign Debt Exchange and Buybacks' among OECD member and accession countries in 2022. Chapter 4 draws mainly on the responses to this survey.

Comments and questions should be addressed to the Financial Markets Unit within the Capital Markets and Financial Institutions Division of the OECD Directorate for Financial and Enterprise Affairs (e-mail: PublicDebt@oecd.org). Find out more about OECD work on bond markets and public debt management online at www.oecd.org/finance/public-debt/.

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Editorial

Market and funding conditions have shifted considerably since the last edition of the *Sovereign Borrowing Outlook* in 2022. In the year since the pace of monetary policy tightening has accelerated, global financial risk appetite has shifted, and investor confidence has declined. This marks the end of a long period of benign funding conditions for sovereign issuers as they adjust to new realities and a rapidly evolving market environment. The 2023 *Outlook* analyses recent trends in sovereign debt markets, presents new data and forecasts, and discusses considerations for sovereign issuers navigating the immediate challenges presented by this new landscape, and the longer-term issues facing public debt management.

OECD countries' borrowing needs continued to decline in 2022, down over 20% from the record peaks seen at the height of the COVID-19 pandemic in 2020, while outstanding debt has as also tapered off, from 90% of GDP in 2020 to 83% in 2022. However, this normalisation has been disrupted by the financial and economic spillovers of Russia's war of aggression against Ukraine, with borrowing forecasted to rise in 2023 as many OECD countries seek to cushion households and businesses from rising prices. Driven in part by geopolitical developments, the outlook for government funding needs is uncertain.

Despite the general downward trend in the last two years, borrowing and debt levels remain substantially elevated against pre-pandemic levels. In 2022 borrowing needs were 43% above the 2011-19 average, with total outstanding debt at 10 percentage points of GDP above the average over the same period. This substantial volume of government debt will need to be repaid or refinanced, and much of it soon. Almost half of the debt – some USD 23 trillion – will fall due over the next three years.

During the pandemic, many OECD countries could count on accommodative monetary policy to soften both the cost of financing higher debt levels and refinancing risks, but this is no longer the case. Borrowing costs have more than doubled for OECD sovereigns since 2021, and look set to rise further still in the near term. As a result, countries face elevated refinancing risk, and many governments will spend a higher proportion of their budgets servicing debt – and facing greater fiscal constraints as a result – in the years ahead.

Sovereign issuers face further challenges beyond higher rates. The end of quantitative easing has seen central bank demand for bonds largely evaporate, leaving the private sector to absorb high volumes of new issuance and refinancings. Liquidity in markets has also deteriorated in a confluence of macroeconomic uncertainty, geopolitical risks, declining investor sentiment and shifting trading dynamics, potentially increasing borrowing costs further and giving less flexibility to Debt Management Offices (DMOs) to adapt to shifting borrowing needs.

Emerging Market and Developing Economies (EMDEs) also face historically high levels of outstanding debt and a similarly challenging market environment, further exacerbated by systemic dynamics common in some EMDE sovereign debt markets. EMDEs generally face higher yields, less certain investor demand, and are more exposed to exchange rate risk. Reflecting these vulnerabilities, EMDE sovereign debt quality further declined between 2021 and 2022, with 40 rating downgrades centred most in Europe and Latin America.

Taken together, these developments mean that debt sustainability is a heightened concern going forward, with significant implications for governments broadly and debt managers specifically. The confidence that OECD sovereign issuers enjoy from markets is a major advantage in the face of such risks, challenges and uncertainties. This confidence is earned each day through good governance, responsible economic management and a credible framework for debt management, and markets showed us in 2022 that this cannot be taken for granted. Such principles apply equally to EMDEs, which could also benefit from building up domestic bond markets, and where debt transparency can be particularly important. These must be key priorities for the financial and technical support coming from the international community.

At a more technical level, public debt managers are already adapting their operations. Maintaining predictable and regular issuance is an important goal even through uncertain times, which DMOs have achieved by modifying the composition of issuances, building contingency funding tools for flexibility as well as strong co-ordination with monetary and fiscal authorities. They have supported liquidity in markets through enhanced communication, conducting buyback and switch operations, providing security lending facilities, and taking measures to support key market makers. Above all, DMOs must continue their vigilant monitoring of market conditions and stay abreast of the strategies and tools available to respond, which the *Outlook* helps equip them to do.

The *Outlook* also tracks the contribution of sovereign issuers in catalysing sustainable investment more broadly. The total stock of sustainable bonds now exceeds USD 325 billion, 75% of which are focused on climate and environmental projects. While the total value of sustainable bond issuance declined between 2021 and 2022, the number of countries issuing such instruments is expanding, with ten new countries in 2022 and a further five in the first four months of 2023. Investor demand appears strong, and this momentum is expected to continue in the coming years.

These are welcome developments, but more can be done to strengthen the efficiency and impact of sustainability instruments and the functioning of wider sustainable bond markets. Simplification and standardisation across the issuance process will be key, from criteria for projects to metrics for reporting. Sovereign issuers can help deliver on this by providing benchmark levels of compliance and disclosures within sustainable investing frameworks, as well as quality, comparable and relevant data so that investors are more fully equipped to direct capital toward key priorities, including the climate transition.

Carmine Di Noia,

Director for Financial and Enterprise Affairs, OECD

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Abbreviations and acronyms

AEs	Advanced Economies
AFT	Agence France Trésor
ATM	Average Term-to-Maturity
ATR	Average Term-to-Refixing
BCP	Business Continuity Plan
BFS	Benchmark Financing Strategy
BoE	Bank of England
BoJ	Bank of Japan
BTP	Buono del Tesoro Poliennale
CB	Central Bank
CDS	Credit Default Swap
CFA	Communauté financière d'Afrique
COVID	Coronavirus disease (COVID-19)
CPI	Consumer Price Index
CUSIP	Committee on Uniform Security Identification Procedures
DMO	Debt Management Office
DSSI	Debt Service Suspension Initiative
ECB	European Central Bank
EMDEs	Emerging Markets and Developing Economies
EME	Emerging Market Economy
ESG	Environmental, Social and Governance
EU	European Union
EUR	Euro
FRN	Floating Rate Note
FX	Foreign Exchange
GBP	Great Britain Pound
GBR	Gross Borrowing Requirement
GDP	Gross Domestic Product
GFC	Global Financial Crisis
HICs	High Income Countries
ICE	Intercontinental Exchange
ICMA	International Capital Market Association
ILBs	Inflation-Linked Bonds
IMF	International Monetary Fund
ISIN	International Securities Identification Number

KPIs	Key Performance Indicators
LAC	Latin America and the Caribbean
LICs	Low-Income Countries
MENA	Middle East and North Africa
MOF	Ministry of Finance
NBR	Net Borrowing Requirement
NDP	National Development Plan
OAT	Obligation Assimilable au Trésor
OECD	Organisation for Economic Co-operation and Development
PDM	Public Debt Management
PEPP	Pandemic Emergency Purchase Programme
PSPP	Public Sector Purchase Programme
QE	Quantitative Easing
QT	Quantitative Tightening
RCF	Rapid Credit Facility
RFI	Rapid Financing Instrument
RIC	Reuters Instrument Code
ROR	Rollover Ratio
SDG	Sustainable Development Goals
SDRs	Special Drawing Rights
SNA	System of National Accounts
SPTs	Sustainable Performance Targets
SSA	Sub-Saharan Africa
TTEC	Transition Energétique et Ecologique pour le Climat
UMICs	Upper-Middle Income Countries
UN	United Nations
UNEP	United Nations Environment Programme
USD	United States Dollar
WPDM	Working Party on Debt Management
YTM	Yield-to-Maturity

Executive summary

Sovereign borrowing needs and debt levels remain substantially elevated compared to pre-pandemic levels

Fiscal responses to the COVID-19 pandemic drove record levels of debt issuance in the OECD area in 2020, with gross sovereign borrowing requirements peaking at USD 15.4 trillion. Borrowing levels moderated slightly in 2021 and again in 2022, but are forecast to rise by 6% in 2023, to USD 12.9 trillion. This increase is largely confined to the countries most impacted by Russia's war of aggression against Ukraine.

Similarly, net borrowing needs for the OECD area, which represent additional exposures in the market, continued to decline in 2022 from pandemic-era peaks, from USD 7.4 trillion in 2020 to USD 2.0 trillion in 2022, but are estimated to slightly increase to USD 2.3 trillion in 2023. As a result, the outstanding amount of OECD area central government marketable debt is expected to continue its nominal rise in 2023 to nearly USD 52 trillion, which stands over 30% higher than 2019. This amount has fallen as a percentage of GDP, from a peak of 90% in 2020 to roughly 83% in 2022 and 2023, but total outstanding debt still sits at 10 percentage points of GDP above pre-pandemic levels.

Sovereign borrowers are refinancing significant portion of the debt at higher interest rates, despite the longer average-term-to-maturity of outstanding debt

Over the past year, central bank policy rates have climbed significantly at a steady pace, while asset purchase programmes are being reversed in some cases. Together with heightened geopolitical tensions and global economic uncertainty, investor's risk appetite has declined, while many markets face heightened volatility and shrinking liquidity. For governments as issuers of debt, these developments translate to higher financing costs and a less predictable funding environment. The cost of new borrowing for OECD sovereigns have more than doubled since 2021, rising from an average of 1.4% in 2021 to 3.3% in 2022. As a result, the median OECD country would see interest payments increase from 0.9% to 1.6% of GDP when refinancing 47% of its debt stock under conditions in 2022 compared to 2021, an increase of 80%.

Average maturities have lengthened considerably in the preceding decade among OECD countries, a trend unchanged in 2022, and many countries issued long maturities at low yields in recent years. Nonetheless, in the OECD as a whole debt portfolios may be exposed to short-term interest rate changes, with 29% of debt due to mature or be refixed under new interest rate conditions in 2023, and 47% by 2025.

Market conditions have deteriorated with tightening liquidity in sovereign bond markets

In addition to rising financing costs, OECD debt management offices have reported a deterioration in market conditions, and liquidity conditions in particular with more than 60% of countries noting a negative change between 2021 and 2022. The leading drivers cited for this decline were macroeconomic uncertainty, monetary policy developments, geopolitical risks, and deterioration of investor sentiment.

The reversal of central bank asset purchase programmes can also place pressure on markets in several ways that may increase costs for market participants and consequently yields, though exact effects depend on the pace and magnitude of the tightening.

In this context, the *Outlook* reiterates the importance for debt managers to use a variety of tools to support liquidity, including through enhanced market communication, tapping existing securities and buybacks. Chapter 4 is dedicated to reviewing existing liquidity support practices and provides both policy and technical recommendations to sovereign debt management offices when creating or reviewing their buyback and switch programmes, which may help to minimise borrowing costs over time for governments by reducing the liquidity premiums.

Emerging market and developing economies face heightened risks in a period of monetary tightening

The deterioration in global liquidity conditions is affecting Emerging Market and Developing Economy (EMDE) issuers, due to 'flight to safety' phenomenon. Debt issuances of EMDE governments in financial markets declined considerably in all regions except the People's Republic of China (China) in 2022, from USD 4.1 trillion in 2021 to USD 3.8 trillion in 2022. The sharpest decrease occurred in Sub-Saharan Africa, where gross issuances fell 32%, followed by 25% in the Middle East and North Africa, and Latin America and the Caribbean. At the same time, the average term-to-maturity at issuance shortened across all regions, and the share of foreign denominated debt continued to decline, as issuers relied more heavily on shorter-term local currency securities markets amid weakened investor sentiment and rising borrowing costs.

Among EMDEs, low-income countries face greater refinancing risk as 20% of their outstanding debt is due within one year and 42% within three years. Already several countries, including Zambia, Sri Lanka, and Ghana, are under enormous debt stress. Looking forward, it is important that these countries continue to receive financial and technical support from international financial institutions in order to manage their debt in a transparent and prudent way.

Total issuance of sovereign sustainable bonds has fallen from previous highs, but issuance is still strong and the number of sovereign issuers is expanding

The issuance of sovereign sustainable bonds, which are linked to specific or general environmental or social outcomes, has increased dramatically in recent years, reaching record highs in 2021. Issuance decreased by 18% in 2022, primarily due to reduced activity from large issuers. However, the number of sovereigns issuing sustainable bonds continued to expand in 2022, with ten new countries issuing such bonds for the first time, and a further nine more expected in 2023.

This *Outlook* also traces OECD practices across the sustainable bond issuance process, from establishing frameworks to identifying eligible projects, certifying, issuing, and reporting. Across the process, there are several priorities to lift the efficiency and impacts of sovereign sustainable issuance. At the issuer level, governments need to be able to expand, and more easily identify, eligible expenditures including by using green budgeting practices, and also build their own capacity in developing and issuing these instruments. At the market level, greater standardisation of sustainable products, related taxonomies and impact reporting will help drive further market development and bring down costs for investors and issuers alike.

1 Sovereign Borrowing Outlook for OECD Countries

Sovereign borrowing needs in the OECD area declined significantly in 2021 and 2022 from the record highs seen in the first year of the COVID-19 crisis as pandemic-related fiscal support policies were withdrawn. After declining for two consecutive years, sovereign borrowing needs are expected to increase in 2023 against the backdrop of weak growth prospects and rising interest rates.

This chapter examines public debt management challenges amid the current outlook of rising funding costs, high borrowing needs, heightened geopolitical uncertainties, and rapid monetary policy tightening. It mainly draws on OECD countries' survey data to explore trends in sovereign borrowing needs, funding strategies, yield movements, interest rate risk, and the liquidity of government securities.

1.1. Introduction

This chapter analyses sovereign borrowing needs, redemptions, costs, and funding strategies for the period between 2007-22 and provides projections for 2023. The chapter first looks at trends in gross and net (of redemptions) borrowing needs, and then delves into funding strategies and costs, including the exposure of countries' debt portfolios to interest rate hikes. Finally, it examines the implications of central banks' (CBs) quantitative tightening (QT) programmes for sovereign issuances and the trends in trading liquidity of government securities. The analysis in this chapter is based primarily on data collected from OECD countries' debt management offices (DMOs) covering realised figures for 2021, estimates for 2022 as of October 2022 and projections for 2023 (see Annex 1.A for details of the methodology used).

Key findings

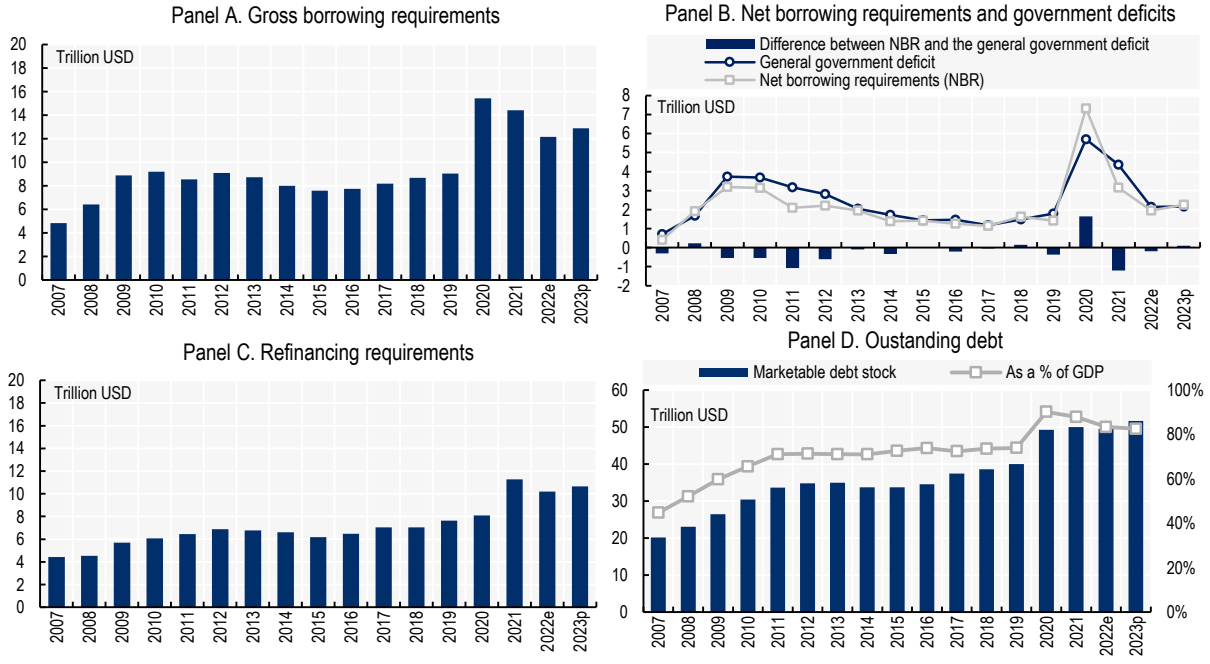
- **OECD governments' gross borrowing needs further declined to USD 12.2 trillion in 2022**, down an estimated 15% from 2021, and 21% from the peak in 2020. This downward trend results from decreasing net borrowing needs, which have fallen substantially since 2020, as well as diminishing refinancing needs, which peaked in 2021 and decreased in 2022.
- **Gross borrowing needs are projected to increase by around 6% in 2023,** to USD 12.9 trillion, due to the increase in both refinancing and net borrowing needs. While the COVID-19 crisis increased government net funding needs across the OECD area, this further increase is largely confined to those countries most impacted by Russia's war of aggression against Ukraine.
- **Outstanding central government marketable debt for OECD governments remains elevated relative to pre-pandemic levels, but is falling as a percentage of GDP.** The total debt stock in the OECD area increased by USD 10 trillion between 2019 and 2021 to USD 50 trillion and, is projected to reach almost USD 52 trillion in 2023. Outstanding central government debt declined as a share of GDP, from a peak of 90% in 2020 to 83% in 2022, and is projected to remain relatively stable in 2023 – though still about 10 percentage points above pre-pandemic levels.
- **The cost of new borrowing for OECD governments has more than doubled since 2021, driven predominantly by tighter monetary policy across most countries.** The OECD average yield of sovereign bonds at issuance rose from 1.4% in 2021 to 3.3% in 2022. Importantly, the volume share of sovereign bonds issued with negative yields in the OECD area declined from 17% in 2021 to 8% in 2022, primarily comprising issuances made in the year's first quarter.
- **Average term-to-maturity (ATM) of outstanding debt is at an all-time high**, at eight years and two months in 2022, almost two years longer than the ATM in 2012, owing to sovereign issuers' endeavours to minimise refinancing risks. Despite the extended maturities, debt redemption profiles are expected to be elevated and 47% of OECD marketable debt is anticipated to be redeemed or refixed under new interest rates until the end of 2025.
- **Quantitative tightening has implications for the investor base of sovereign debt,** given that approximately one-quarter of the outstanding sovereign debt is held in the form of government securities by central banks, with half of this amount expected to mature by 2030
- **Sovereign debt managers perceive a decline in liquidity conditions in various markets**, reflecting a confluence of factors, including macroeconomic uncertainty, monetary policy developments, geopolitical risks and deterioration of investors' sentiment. In response, debt managers have taken measures to support market liquidity through benchmark bond programmes, communication strategies, buyback and switch operations, primary dealership systems and security lending facilities.

1.2. Trends in total gross and net borrowing by OECD sovereigns

1.2.1. Gross borrowing needs declined by approximately 15% in 2022, yet they remain 35% higher than the figures recorded in 2019, prior to the pandemic

Total gross borrowing by OECD governments, which soared to a record amount of USD 15.4 trillion in the first year of the COVID-19 pandemic, diminished in 2021 and is estimated to have declined further in 2022, to USD 12.2 trillion (Figure 1.1 Panel A), a larger decline than previously anticipated.[1] Nonetheless, this downward trajectory is projected to reverse in 2023, with a 6% increase in borrowing requirements to USD 12.9 trillion, driven by slower economic growth prospects and amplified fiscal imbalances. Despite the decline in borrowing requirements from 2020 to 2022 (estimated at USD 3.3 trillion or 21%), governments continue to borrow roughly 45% more than in the previous decade, when borrowing amounts remained largely stable.

Figure 1.1. Borrowing, fiscal and debt outlook in OECD countries



Notes: Values in local currencies are converted to USD using the exchange rate on the last day of the year. Cash management-related issuances are excluded.

Source: 2022 Survey on Central Government Marketable Debt and Borrowing; OECD, (2022[1]) *OECD Economic Outlook, Volume 2022 Issue 2*, https://doi.org/10.1787/f6da2159-en; IMF (2022[2]), *World Economic Outlook*, https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022; Refinitiv, national authorities' websites and OECD calculations.

In 2022, total sovereign debt issuance remained 35% above the figures recorded in 2019 prior to the COVID-19 pandemic. This is primarily due to a considerable increase in refinancing needs (i.e. issuances intended for rolling over debt) and, to a lesser degree, a modest rise in new borrowing requirements (i.e. gross borrowing net of debt redemption) (Figure 1.1 Panel B and C). More specifically, new borrowing requirements, which peaked in 2020 at USD 7.3 trillion, are estimated to have decreased to USD 2.0 trillion in 2022 before a modest projected increase in 2023, remaining 43% above the 2011-19 average. While net borrowing needs declined sharply after 2020, refinancing needs peaked in 2021 at USD 11.3 trillion and are anticipated to have dropped to USD 10.2 trillion in 2022.[2] However, this is expected to reverse

slightly in 2023, with refinancing needs rising to USD 10.6 trillion due to increased short-term securities issuances in 2022.

Figure 1.1 Panel B also depicts a noteworthy shift in the borrowing behaviour by governments relative to their fiscal needs over the past three years. Before 2020, net borrowing needs were below or very close to the government deficit, meaning that governments borrowed equally to or less than their fiscal deficits. In 2020, net borrowing requirements exceeded the government deficit by an unprecedented amount of USD 1.6 trillion. This implies that governments within the OECD region capitalised on favourable funding conditions to issue debt exceeding their fiscal requirements, in large part due to the uncertainty surrounding actual fiscal needs. Consequently, DMOs augmented their liquidity buffer in case of further upward revisions to funding requirements. In 2021 and 2022, this surplus cash balance was employed to finance a portion of the borrowing needs, resulting in government deficits surpassing the net change in marketable debt by USD 1.2 trillion and USD 0.2 trillion, respectively. This signifies that gross borrowing needs in 2020 were higher than expected and lower in 2021 and 2022 if the entirety of government deficits were financed by debt issuance within the respective period. The extent to which the surplus cash balances from 2020 issuances have been exhausted, and thus whether the reduction of the liquidity buffer will continue to smooth gross borrowing needs in the upcoming years, remains uncertain. In this Outlook's forecasts for 2023, it is assumed that they will not.[3]

1.2.2. The OECD central government marketable debt stock decreased from 87% of GDP in 2021 to 83% in 2022 but remains 10 percentage points above pre-pandemic levels

Figure 1.1 Panel D shows that the outstanding amount of debt increased from approximately USD 40 trillion in 2019 to USD 49 trillion in 2020. Despite the phasing out of extensive pandemic-related fiscal support in 2021 and 2022, it rose to USD 50 trillion in 2021 and remained stable at that level in 2022. It is projected to reach approximately USD 52 trillion in 2023 on slower economic growth anticipated for the year, which could affect tax revenues, and the new expenditures arising from packages designed to mitigate the impact of Russia's war of aggression against Ukraine, including measures to alleviate inflationary pressures on households.[4] Additionally, as this analysis converts all values in local currencies to USD, foreign exchange rate movements and the conversion criteria can influence projections (Box 1.1).

While the outstanding debt level for the OECD area has increased in nominal terms, it has fallen as a share of GDP to an estimated 83% in 2022, down from its peak of 90% in 2020(Figure 1.1 Panel D). The ratio is projected to remain relatively stable in 2023, but is still about 10 percentage points above pre-pandemic levels.

An increasing outstanding amount of debt means that a higher amount of debt needs to be refinanced. In a period of rising interest rates, a larger volume of debt will need to be rolled over at higher rates, potentially adding strains to fiscal budgets. Furthermore, a combination of reduced market liquidity and a sizeable volume of debt to be refinanced could cause yields to be more volatile and sensitive to shocks.

Box 1.1. Definitions and conceptual approach: Revisions in the Survey template and methodology

The Sovereign Borrowing Outlook (SBO) publication draws mainly from the *Central Government Marketable Debt and Borrowing Survey (BO survey)*, which collects gross borrowing requirements, redemption and outstanding debt amounts with a breakdown by type of instrument and currency. Originally developed in 2009 by the OECD's Working Party on Debt Management (WPDM), the survey was revised in 2021.

The main revisions are the following:

i. Debt in foreign currency is now converted into national currency at the end of each year for years prior to the current year, and as of 30 June of the current year to estimate the current year and subsequent figures (previously, all figures collected through the survey were converted into USD using exchange rates from 1 December 2009);

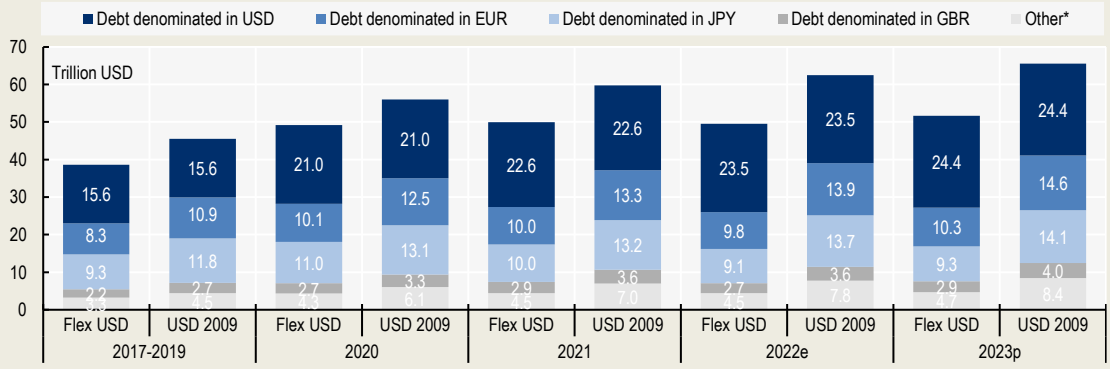
ii. Inflation-linked debt: Information on inflation-linked debt (i.e. linkers) is now collected separately and includes accrued inflation when appropriate. Previously, these instruments were categorised under index-linked debt, which did not allow for a distinction between other index-linked and inflation-linked debt;

iii. New data items are now collected Sustainable bonds, DMO holdings and NextGenerationEU loans; and

iv. The survey now gathers comments on country-specific methodological aspects of the figures, which can be found in Annex A of this publication along with the revised definitions of variable rate notes, inflation-linked debt, and ATM.

As this version of the SBO incorporates revisions, the figures displayed differ from those in previous editions of the publication. One notable revision concerns the date for foreign currency conversions. The BO Survey was designed in 2009 after the Global Financial Crisis (GFC), and the foreign exchange rate (FX rate) used to convert local currencies to USD was fixed as of December 2009. During the GFC, the US dollar hit its lowest value against many OECD currencies, including the euro (EUR) (since its introduction) and the Japanese Yen (since 1995). Conversely, in the second half of 2022, strong monetary tightening in the US and a "flight-to-quality" movement from investors in response to elevated geopolitical and macroeconomic uncertainties helped the US dollar reach its highest value since 2002, 1990, and 1985 against the euro, Japanese yen, and British pound, respectively. These fluctuations in USD foreign exchange rates significantly impact the USD values used in the SBO for aggregating debt figures (as illustrated in Figure 1.2). For example, under the previous methodology based on 2009 FX rates, the outstanding amount of debt would have increased from USD 59.8 in 2021 to 62.5 trillion in 2022.

Figure 1.2. Central government marketable debt stock in the OECD under different exchange rate assumptions



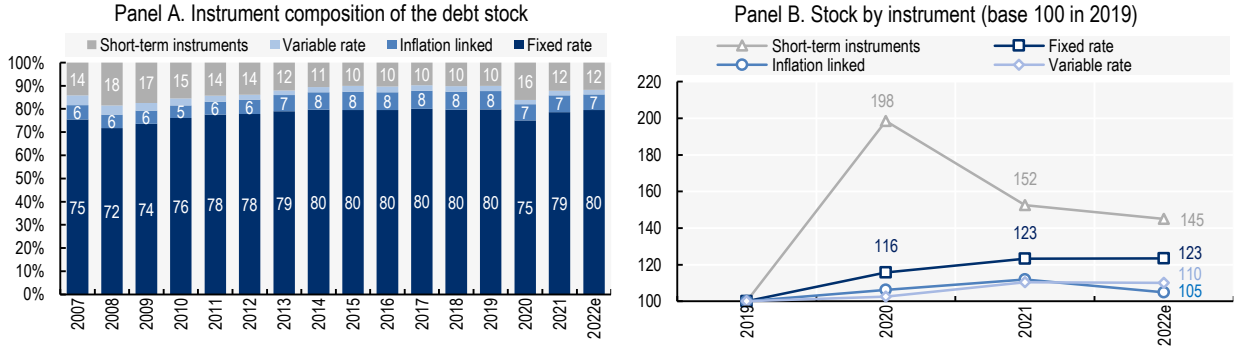
Notes: Other refers to the debt denominated in currencies other than USD, EUR, JPY and GBR. 2022 values are estimates and 2023 are projections. USD 2009 refers to the exchange rate from 1 December 2009, while USD Flex refers to the new methodology described in this box.
Source: 2022 Survey on Central Government Marketable Debt and Borrowing; OECD (2022[1]); IMF (2022[2]), World Economic Outlook, https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022; Refinitiv, national authorities' websites and OECD calculations.

1.3. The share of short-term instruments in the sovereign debt stock remained stable at 12% in 2022, slightly above the pre-pandemic levels

Figure 1.3 Panel A displays the composition of the debt stock in OECD countries, highlighting that the share of short-term instruments, after peaking at 16% in 2020, declined to 12% and remained stable at that level in 2022. The peak in 2020 was a consequence of DMOs' use of short-term borrowings as a shock absorber to accommodate the considerable uncertainties and fiscal pressures caused by the pandemic. At the onset of the COVID-19 crisis, sovereign issuers in many OECD countries (e.g. France, Germany and the US) expanded their short-term borrowing programmes, which doubled the outstanding amount of short-term debt in 2020 compared to 2019 (Figure 1.3 Panel B).[5] After rising rapidly in 2020, short-term instrument issuance has fallen notably over 2021 and 2022, as a result of the strategic choice of shifting from the money market to longer-term funding to both reduce interest rate sensitivity of the debt stock and rebuild contingency capacity if significant funding is needed again in short order. However, the share of short-term debt in total debt stock still remains slightly higher than pre-pandemic levels.

In nominal USD values, the outstanding amount of short-term instruments was estimated to be 45% larger by the end of 2022 compared to 2019 (USD 5.8 trillion compared to USD 4.0 trillion). The increase in the stock of fixed-rates, variable rates, and inflation-linked securities during the same period was much lower at 23%, 10%, and 5%, respectively. Although sovereign issuers reduced the share of short maturities in 2021, the pace of the reduction slowed in 2022, a year with high macroeconomic uncertainty and rising interest rates.

Figure 1.3. The composition of central government marketable debt by instrument type



Sources: 2022 Survey on Central Government Marketable Debt and Borrowing; OECD (2022[1]), *OECD Economic Outlook, Volume 2022 Issue 2*, https://doi.org/10.1787/f6da2159-en; IMF (2022[2]), World Economic Outlook, https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022; Refinitiv, national authorities' websites and OECD calculations.

1.4. Russia's war of aggression against Ukraine affected the net borrowing of OECD countries, particularly those in proximity to the conflict area

Figure 1.4 illustrates the estimated net borrowing to GDP ratio fluctuations from 2021 to 2022 and the projected changes from 2022 to 2023 across OECD countries at the national level. Net borrowing requirements diminished, on average, by 1.3 percentage points (pp) of GDP in the OECD between 2021 and 2022, mainly due to declining pandemic-related government expenditures and stronger-than-anticipated tax revenues. At the same time, there was a wide variation between countries: in ten countries net borrowing requirements *increased* by over 0.5 percentage points of GDP in 2022 compared to 2021, whereas in 21 countries, they *decreased* by more than 0.5 percentage points. Net borrowing requirements

are projected to increase between 2022 and 2023 by 0.3 percentage points of GDP on average, with a similar level of variation. A significant part of the rise in net borrowing requirements in 2023 is related to fiscal support measures. Notably, 10 countries among the 12 where net borrowing requirements are projected to grow by more than 0.5 percentage points of GDP from 2021 to 2023 are European. This reflects the impact of higher energy and food inflation in Europe and the fiscal support measures implemented to protect households and businesses from the consequences of elevated energy prices (OECD, 2022[1]). Five of the ten European countries share borders with Russia, Ukraine, or Belarus – namely Estonia, Finland, Latvia, Lithuania, and Poland. As a ratio to GDP, the 12 countries' net borrowing requirements are projected to be, on average, two times greater than their 2019 pre-pandemic levels by 2023.

Figure 1.4. Net borrowing requirements as a ratio to GDP (%) by country in the OECD area

Notes: 2022 values are estimations and 2023 are projections. OECD refers to the simple average of all ratios displayed. Countries are ordered by the difference in net borrowing to GDP ratio between 2023 and 2021.

Source: 2022 Survey on Central Government Marketable Debt and Borrowing; OECD (2022[1]) OECD Economic Outlook, Volume 2022 Issue 2, https://doi.org/10.1787/f6da2159-en; IMF (2022[2]), World Economic Outlook, https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022; Refinitiv, national authorities' websites and OECD calculations.

1.1. Funding strategies in times of high uncertainty

1.1.1. Sovereign issuers aim to minimise borrowing costs and risks by issuing in a regular, transparent, and predictable manner, regardless of the interest rate path

A funding strategy involves allocating financing needs across a variety of debt instruments over time. It requires two key elements: a forecast of gross borrowing and the composition of issuance by instrument. Its purpose is to meet governments' financial needs while minimising borrowing costs and the level of risk. However, there is a trade-off between these two objectives. Short-term instruments typically carry lower costs but increase refinancing and interest rate risks. In contrast, instruments with longer maturities and fixed-rates minimise refinancing and interest rate risks but come at a higher cost. This is why sovereign issuers maintain a diverse range of nominal and price-indexed instruments to minimise costs while controlling risks across the maturity spectrum. The precise choice of instruments depends on various factors, such as instrument liquidity, investor demand and base, the level of financial market development, the outstanding amount of debt maturity and macroeconomic conditions.

There are compelling theoretical arguments for sovereign issuers to adopt a regular and predictable funding strategy regardless of expected interest rate movements. These include improving market confidence, reducing the underwriting burden on Primary Dealers (financial firms that purchase sovereign bonds directly from governments to resell them to investors), facilitating investor planning, and minimising the risk of insufficient offering demand. DMOs achieve these objectives by publishing their borrowing programmes and goals in advance, issuing press releases, and regularly communicating with the market. Even during times of high volatility, sovereign issuers aim to maintain a predictable and regular issuance strategy. Attempting to predict market movements and adapting the strategy accordingly may yield short-term benefits for the sovereign issuer. However, over the medium- to long-term, investors would adjust, increasing market volatility and negatively affecting sovereign costs and risks.

1.1.2. Market volatility and unpredictability of funding needs impacted borrowing plans, which were revised in 2022 in varying ways across the OECD

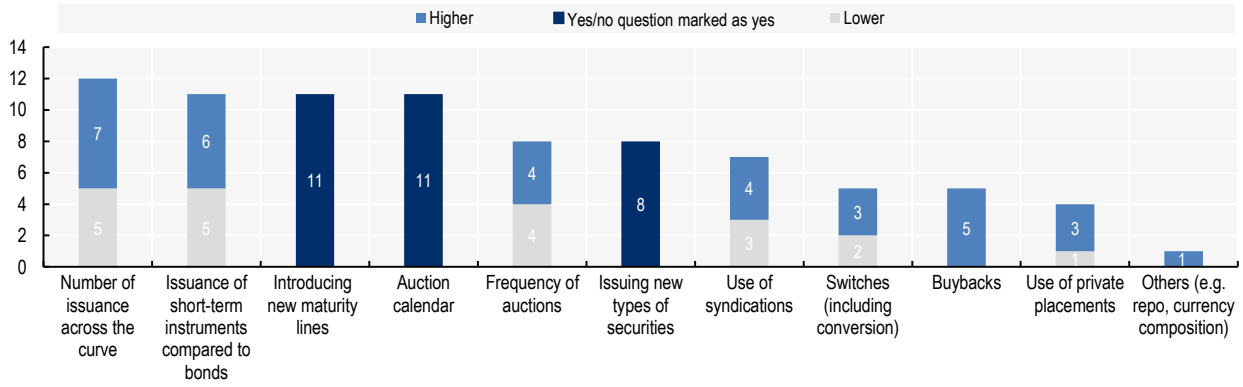
The recent survey on Primary Market Developments indicates that sovereign DMOs have been experiencing several challenges in their operations, such as high market volatility (reported by 88% of respondents), uncertain cash flow (70%), and unpredictable funding needs (68%). These challenges made it difficult to implement borrowing plans as initially intended.[6] The COVID-19 crisis led to increased uncertainty surrounding financing needs and investor demand for certain security instruments. Russia's war of aggression against Ukraine further exacerbated the situation by causing a sharp rise in food and energy prices, adding to global inflation at a time when prices were already rising rapidly. Global financial conditions tightened sharply as central banks increased interest rates in an effort to lower inflation (OECD, 2022[1]). This tightening in financial conditions raised the perception of a possible recession. Borrowing needs became less predictable as tax revenues tend to grow with inflation, as do expenditures where countries have pursued relief packages aimed at mitigating the effects of food and energy inflation on households and businesses.

Sovereign issuers have adjusted their borrowing strategies to the current economic outlook, adopting more flexible yet transparent approaches by modifying the volume, number, and instrument composition of planned issuances over the year (Figure 1.5). The most common changes in borrowing plans were related to the number of issuances across the yield curve, the composition of issuances and the introduction of new maturity lines. Other frequent changes were related to the frequency of auctions, the number of new types of securities, the use of syndication, and the use of buyback operations.

France, Italy and Japan offer examples of countries that revised funding plans or borrowing needs in different ways in 2022. Japan revised up its funding needs in May and November of 2022 by JPY 2.7 trillion

and 9.7 trillion respectively (approximately USD 92 billion combined), both reflecting increasing fiscal needs (Ministry of Finance, 2022[6]; Ministry of Finance, 2022[7]); with adjustments between fiscal years, market issuance by periodic auctions remained unchanged in May, and increased by JPY 4.5 trillion in November. France revised its borrowing requirement upwards by EUR 13.4 billion in July 2022 to accommodate the impact of a supplementary budget bill that reflected measures to mitigate the decrease in purchasing power due to inflation. Nevertheless, this did not affect its funding strategy given that this additional expenditure was funded by the Treasury's account, whose cash availability rose in 2020 and 2021 (Agence France Trésor, 2022[3]). Italy cancelled bond auctions scheduled on 11 and 25 August 2022, and on 28 and 29 December 2022, the first due to the large cash availability of the Treasury and the second because the funding target of the year was already reached (Ministero dell'Economia e delle Finanze, 2022[4]; Ministero dell'Economia e delle Finanze, 2022[5]).

Figure 1.5. Changes in borrowing plans in 2022 (number of countries)



Source: Calculations based on the OECD member and accession countries' responses to the 2022 OECD Survey on Primary Market Developments. Only countries that answered the question with any option other than "non-applicable" are covered.

1.1.3. Long-term securities constituted 56.3% of 2022 issuances, less than in 2021

The shares of short-term and inflation-linked securities in total issuance are estimated to have grown moderately in 2022 compared to 2021 (Table 1.1): from 37.3% to 43.7% for short-term securities, and from 2.4% to 2.8% for inflation-linked securities. The fixed-rate share is estimated to have decreased from 57.3% to 50.4% between 2021 and 2022. From the demand side, this might capture the fact that investors are protecting themselves from inflation and interest rate risk by preferring inflation-linked and short-term securities. On the supply side, sovereign issuers may also be utilising short-term instruments to maintain a more flexible borrowing plan, as they can help to smooth (historically high) financing needs, and to avoid the risks associated with the issuance of long maturities when rates and volatility are high. These two forces contribute to the widespread reduction in the term spread (refer to Figure 1.8).

Importantly, these trends varied across countries – the rise in the issuance of short-term securities as a proportion of total issuances was especially observed in the United Kingdom (from 17% in 2021 to 29% in 2022), the United States (from 42% to 49%), Canada (from 41% to 66%), and Switzerland (from 57% to 82%). Conversely, this share decreased in the European Union (EU) area (from 28% to 25%) during the same period and remained relatively stable in Japan. For 2023, it is projected that countries will experience a gradual convergence to the composition observed in the pre-pandemic era, with the relative share of short-term issuances decreasing by 0.2 percentage points. Box 1.2 delves into the persistence of short-term instruments on countries' debt portfolios since the pandemic.

Table 1.1. Funding strategy based on gross marketable borrowing needs in the OECD area

	OECD Countries				
	2017-19 Average	2020	2021	2022e	2023p
Short term	3.2 | 36.8%	6.7 | 43.7%	5.4 | 37.3%	5.3 | 43.7%	5.6 | 43.5%
Long term	5.5 | 63.2%	8.7 | 56.3%	9 | 62.7%	6.8 | 56.3%	7.3 | 56.5%
Fixed-rates	4.9 | 56.5%	8 | 51.9%	8.3 | 57.3%	6.1 | 50.4%	6.5 | 50.3%
Inflation-linked	0.3 | 3.6%	0.3 | 2.2%	0.3 | 2.4%	0.3 | 2.8%	0.4 | 2.8%
Variable rate	0.3 | 3%	0.3 | 2.2%	0.4 | 3%	0.4 | 3%	0.4 | 3.4%
Trillion USD | as a share of total borrowing					

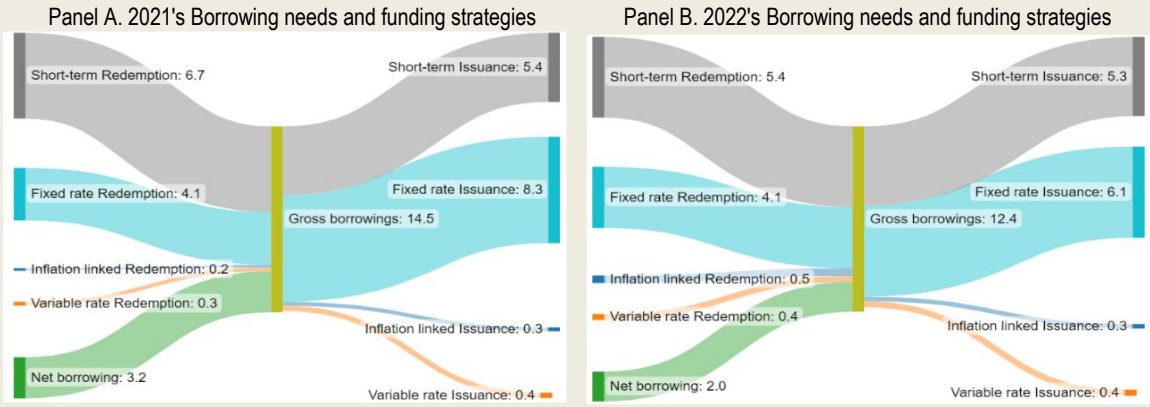
Note: Standardised gross borrowing requirements are shown. Values in local currencies are converted to USD using the exchange rate on the last day of the year. Cash management related issuances are excluded. For 2023 exchanges rates are fixed.
Source: 2022 Survey on Central Government Marketable Debt and Borrowing; OECD Economic Outlook 112 (November 2022); IMF (2022[2]), World Economic Outlook, https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022; Refinitiv, national authorities' websites and OECD calculations.

Box 1.2. Managing public debt: A stock-and-flow perspective

Sovereign issuers aim to minimise borrowing costs subject to a prudent level of risk and may do so by pursuing a particular debt structure. Debt portfolios vary over time depending on the dynamics between gross financing needs (i.e. refinancing needs plus net borrowing needs) and bond issuances. In this respect, the composition of gross financing needs influences borrowing strategies through two main channels. Firstly, on the bond investors' side, as they typically pursue a consistent structure for their investment portfolio over time, they will need to reinvest the proceeds of maturing issues into similar securities from the same issuer to maintain their portfolio composition, thereby supporting demand for refinancings. Net borrowing needs, which are associated with fiscal needs (but not identical as fiscal deficits can be funded through means other than debt), on the other hand, represent additional exposures in the market for investors. Secondly, on the sovereign issuers' side, the evolution of the debt stock composition is a function of both maturing securities and the issuances made to refinance them. Consequently, the rate at which DMOs can converge their debt portfolios to a benchmark debt portfolio is directly related to issuance and refinancing needs.

Figure 1.6. displays the borrowing needs and strategies in 2022 and 2021 in the OECD area. In 2021, refinancing needs from short-term instruments reached USD 6.7 trillion, while countries issued only USD 5.4 trillion in short-term instruments, reducing their share in debt portfolios (refer to Figure 1.3). Conversely, fixed-rate instruments' refinancing needs were USD 4.1 trillion in the same year, while their issuances reached USD 8.3 trillion. As the net issuance of fixed-rates bonds (USD 4.2 trillion) was greater than net borrowing needs (USD 3.2 trillion), the exceeding amount was used to fund short-term redemptions. This has resulted in an increase in the share of the fixed-rates in debt portfolios. In 2022, the proceeds raised through the issuance of fixed-rates were only sufficient to cover refunding needs from fixed-rates and new borrowing needs. Consequently, the relatively large outstanding amount of bills, inherited from 2021, was left virtually unchanged in 2022.

Figure 1.6. Borrowing needs and funding strategies in the OECD area (USD trillion)



Note: Values for 2022 are estimations. Standardised gross borrowing requirements are shown. Cash management-related issuances are excluded. Values in local currencies are converted to USD using the exchange rate on the last day of the year.
Source: 2022 Survey on Central Government Marketable Debt and Borrowing; OECD (2022[1]), *OECD Economic Outlook, Volume 2022 Issue 2,* https://doi.org/10.1787/f6da2159-en; IMF (2022[2]), World Economic Outlook, https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022; Refinitiv, national authorities' websites and OECD calculations.

Figure 1.6 also illustrates recent changes in inflation-linked debt stock in the OECD area. For example, the share of inflation-linked instruments in total issuances is estimated to have grown by approximately 27%, from 2.2% in 2020 to 2.8% in 2022 (Table 1.1). Despite the increased emphasis on inflation-linked instruments in borrowing strategies, their outstanding amount is estimated to have *decreased* in both nominal (from USD 3.40 to 3.35 trillion) and relative terms (from 6.9% to 6.8% of the debt stock) between 2020 and 2022. This was mainly the result of large redemptions of inflation-linked instruments in 2022 (increasing from USD 213 to 0.5 trillion from 2021 to 2022), that significantly exceeded the issuance amount, leading to a decrease in the direct exposure of countries to the changes in inflation.[1.]

Note:
1. Carrying short-term and variable-rate debt instruments also increases the exposure of sovereign issuers to inflation. That is because interest rates are correlated with inflation (and, thus, it affects the costs of variable rate instruments) and with the refinancing costs of short-term debt.

1.2. Rising borrowing costs in the OECD area in 2022

1.2.1. Inflationary pressures have prompted rapid monetary tightening, moving the OECD average policy rates from 0.8% to 5.3%

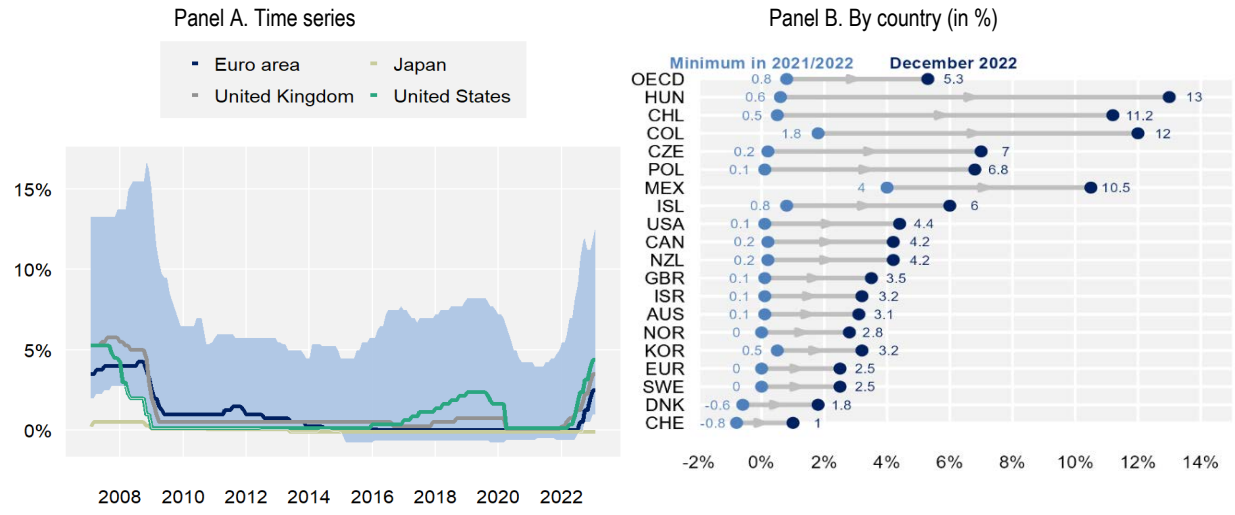
The secular declining trend of nominal and real interest rates was among the most consequential macroeconomic and financial developments in recent history and was particularly pronounced in the aftermath of the GFC. This decline has been linked to structural drivers including demographic trends (Lunsford and West, 2019[8]), changes in saving and investment propensities (Rachel and Summers, 2019[9]) and regulatory reforms (Ranaldo, Schaffner and Vasios, 2021[10]). Although none of these drivers reversed in 2022, inflationary pressures have prompted central banks to raise policy rates, halting a decades-long trend.

Inflation reached a nearly four-decade high across many OECD countries in 2022. Russia's war of aggression against Ukraine aggravated supply disruptions caused by measures to contain the COVID-19

outbreak, driving up energy and food prices as demand and employment in OECD economies rebounded from a severe recession (OECD, 2022[1]). Once inflation becomes entrenched, the self-reinforcing feedback between prices and wages makes the costs of transitioning back to a low-inflation regime high – requiring a stronger monetary response and raising the chances of a recession (BIS, 2022[11]). Central banks, by and large, have embraced rapid monetary tightening to avoid persistent inflation (Figure 1.7).

Figure 1.7 depicts the increase in policy rates across the OECD. The time series of policy rates in Panel A demonstrates that for the United States, the euro area, and the United Kingdom, policy rates reached their highest levels since 2008. A similar pattern can be observed for other OECD countries, as represented by the shaded area in the chart. Panel B indicates that, on average between 2021 and 2022, policy rates shifted from 0.8% to 5.3%. Emerging OECD countries and European countries outside the euro area make up the most significant increases in this period (average growth of roughly eight percentage points). In contrast, the smallest increases were in the euro area, Korea, Nordic countries and Switzerland. The Bank of Japan (BoJ) did not raise interest rates, and the Turkish Central Bank reduced policy rates during the period. Central banks' responses also varied in terms of the timing of the introduction of monetary tightening policies (Figure 1.7 Panel C), with four central banks rising policy rate hikes in the first half of 2021, seven in the second half of 2021, and eight until July 2022, including the Federal Reserve (Fed) and the European Central Bank (ECB).

Figure 1.7. Central banks' policy rates in the OECD area (selected OECD countries)



Panel C. Starting month of policy rates hikes

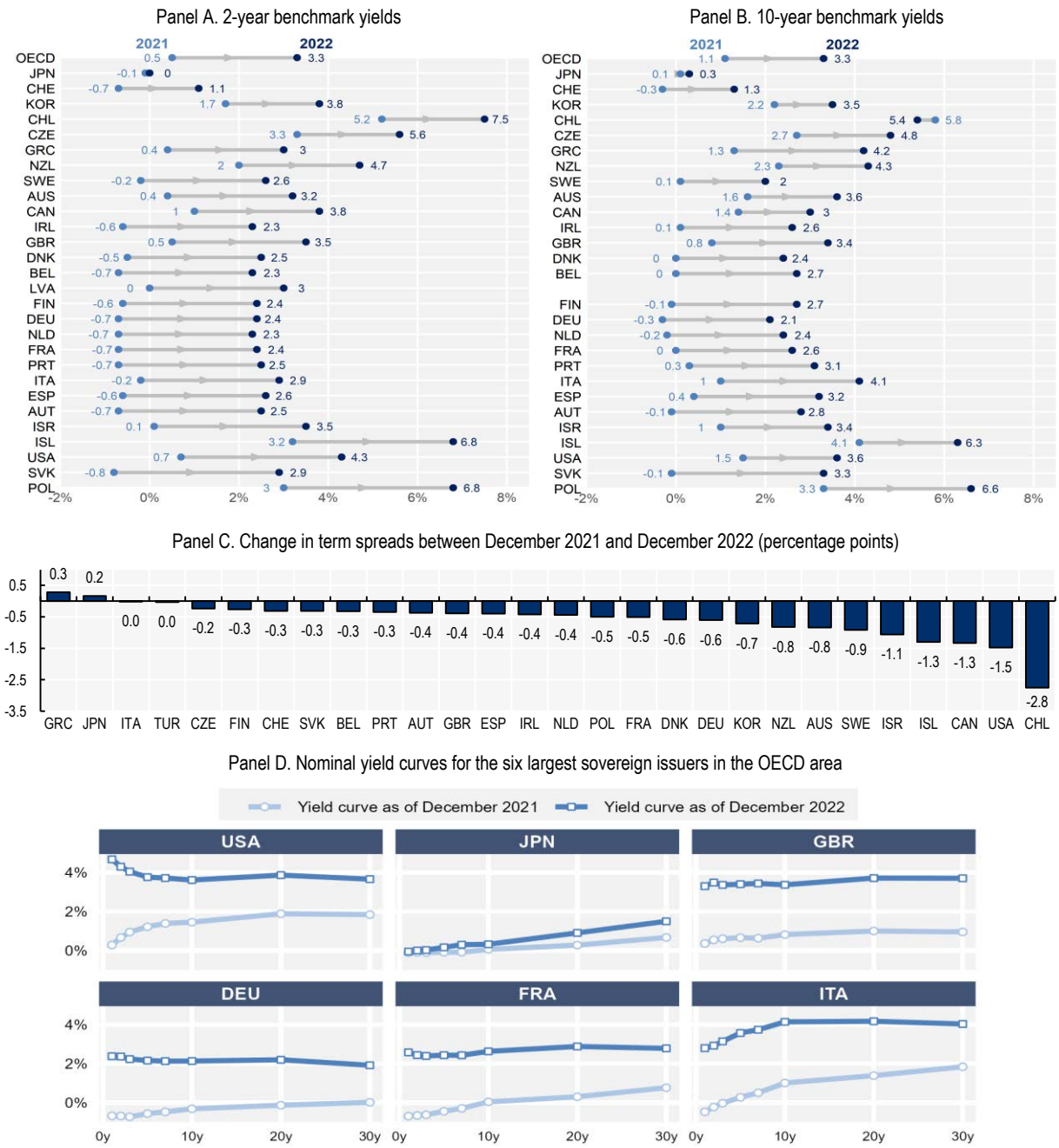
May-21	Jun-21	Jul-21	Aug-21	Sep-21	Oct-21	Dec-21	Mar-22	Apr-22	May-22	Jun-22	Jul-22
ISL	CZE	CHL	KOR	NOR	COL	GBR	CAN	ISR	AUS	CHE	DNK
	HUN				NZL		USA		SWE		EUR
	MEX				POL						

Note: The shaded area in Panel A shows the 5% and 95% percentiles for policy rates in the OECD area for each period and the policy rates for the central banks of the largest issuers. Panel B reveals central banks' policy rates when they reached their minimum in 2021/2022 and their value at the end of December 2022 (ordered by the movement size). Only central banks in countries with rising policy rates are shown (exceptions are Japan, with stable rates, and Türkiye, with rates decreasing from 19% to 9% between August 2021 and December 2022).
Source: OECD calculations based on data from the Bank of International Settlements (BIS).

1.2.2. Yield curves shifted up, with the term spread shrinking in most OECD countries, eventually flattening or inverting curves

With policy rates moving upward, bond yields tend to follow suit.[7] Figure 1.8 shows the changes in two- and ten-year benchmark yields for selected OECD countries between December 2021 and December 2022. More specifically, the OECD average for the 2-year benchmark yield increased from 0.5% to 3.3% while the ten-year one rose from 1.1% also to 3.3%, which implies that the shape of the OECD "average curve" changed from upward-sloping to flat. This pattern is also visible in Figure 1.8 Panel C, displaying a contraction in the term spread (difference between 10- and 2- year benchmark yields) across the OECD area, a common occurrence during periods of monetary tightening as short-term yields are more affected by the overnight policy rates while longer-term yields reflect to a large extent market expectations for the steady-state neutral rate.[8] The average reduction in the term spread was 0.6 percentage points, which precisely matches the average term spread in 2021, signifying that the average term spread reached zero in December 2022. Excluding Greece and Japan, where it increased by 0.3 percentage points and 0.2 percentage points, respectively, and Italy and Türkiye, where it remained constant, the term spread declined in all other 24 countries in the figure. The largest decreases took place in Chile (2.8 percentage points), the United States (1.5 percentage points, where the yield curve was inverted as of December 2022, as shown in Figure 1.8 Panel D), Canada (1.3 percentage points), and Israel (1.1 percentage point), demonstrating that this movement affected both large and smaller issuers.[9]

Figure 1.8. Change in benchmark yields between December 2021 and December 2022



Notes: Panel A and B displays the average of December's yields in each year. Covers selected OECD countries (based on data availability). Türkiye is not covered to avoid distorting the scale – where yields changed from 21.0 to 9.8 and 21.5 to 10.3 in the two-year and ten-year benchmarks, respectively. Japan's ten-year benchmark yield is capped at 0.5% (before December 2022, 0.25%) following a yield curve control policy implemented by the Bank of Japan. There was no data on Latvia's ten-year benchmark yield and, thus, the country was excluded from the second panel. Panel C illustrates the differences between the term spread (calculated as the difference between the ten-year and the two-year benchmark yield at a point in time) from December 2022 and December 2021 – so this means the difference between 1) the difference between the 2022s ten-year and two-year benchmark yields and 2) the difference between the 2021s ten-year and two-year benchmark yields, all of which can be found in the first two panels. Panel D displays the average of December's yields in each year for each benchmark; Each marker (square for 2022 and circle for 2021) represents a benchmark yield (1, 2, 5, 7, 10, 20 and 30 years) and the line results from linear interpolation between each benchmark yield.
Source: Refinitiv.

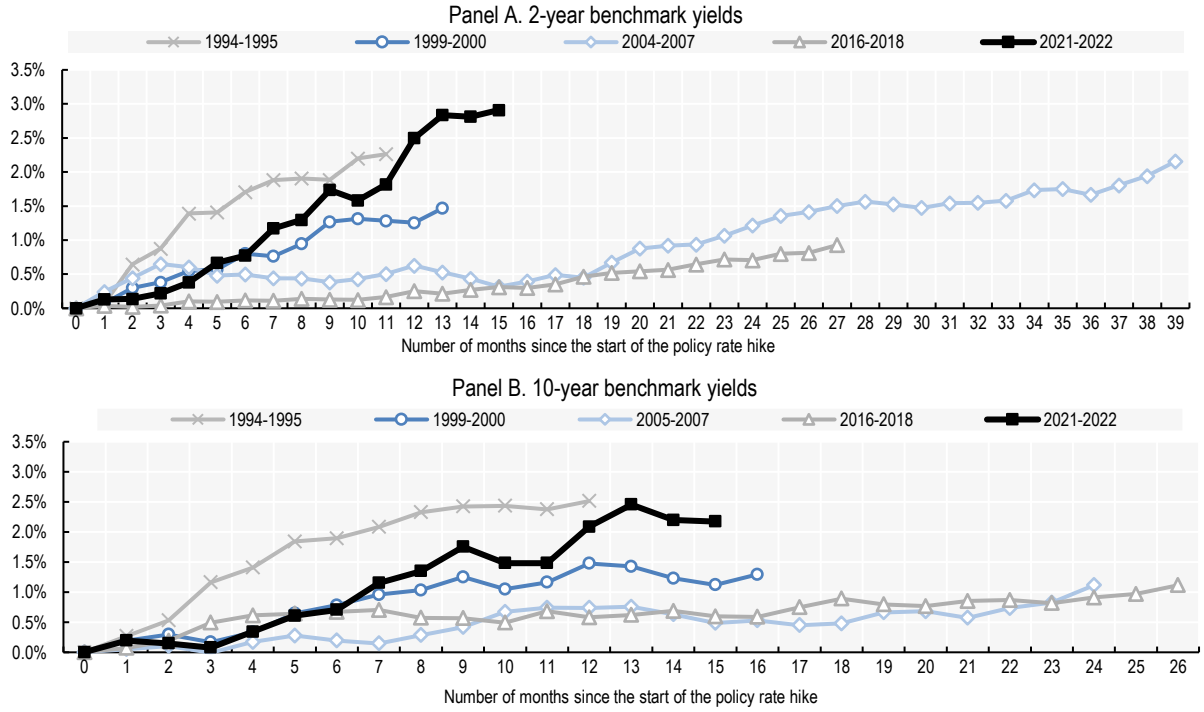
The shape of yield curves is, nevertheless, relevant for sovereign issuers' borrowing strategies given its implication in the classic trade-off between borrowing costs and risks (OECD, 2012[12]). In the more common scenario of upward-sloping curves, long maturities tend to have lower risks as they reduce refinancing risks and lock in a coupon for a longer period, protecting it from changes in short-term interest rates. For opposite reasons, issuances of short maturities tend to elevate refinancing and interest rate risks while minimising borrowing costs in the short run. When curves are inverted, however, although long maturities can be cost-minimising, there is also the potential for regret risk associated with the issuance of longer securities – issuers are locking their yields in for the long term during a period of higher yields. This can also partially explain why some sovereign issuers opted to increase short-term borrowing in 2022 (refer to Table 1.1). There are also liquidity considerations that affect borrowing strategies. When a government issues a relatively high volume of long maturities, the market buys the duration risks (i.e. exposure to future interest rate hikes). If there is insufficient demand for duration risk, the premium on long maturities will increase, affecting long-term yields. Against this background, a relatively balanced issuance split across the maturity spectrum is often targeted even when curves are inverted.

1.2.3. Sovereign bond yields increased at the fastest and strongest rate in the past three decades coupled with widening spreads between countries

Another important development has been the widening of spreads between countries, particularly at the longer end of the yield curve. For instance, in the euro area, where countries are subject to the same monetary policy, the spreads between Germany's and Southern European countries' yields have broadened from December 2021 to December 2022 for the 10-year benchmark, more precisely by 1.1, 0.7, 0.5 and 0.4 percentage points for Greece, Italy, Portugal, and Spain, respectively. The spreads of the 2-year benchmark for these countries remained largely stable in the same period – in fact, it decreased for Greece by 0.5 percentage points and did not vary by more than 0.1 percentage point in the other three countries.

Regarding the relative speed and intensity of the surge in bond yields, Figure 1.9 demonstrates that the increase in yields, which commenced in 2021, ranks among the most rapid relative to other recent periods of sustained and significant yield increases – 1994-95 (the 1994 Bond Market Crisis), 1999-2000 (the Dot-com Bubble), 2004-07 (the Housing Market Boom), and 2016-18 (the attempt to normalise monetary policy post-GFC). Figure 1.9 Panel A reveals that the increase in the 2-year bond yield benchmark between September 2021 and December 2022 was the sharpest among the last five periods of sustained rising yields on average for the G7 countries. The yield on the 2-year bond benchmark climbed quickly starting from September 2021 in anticipation of monetary policy tightening. Compared to other episodes shown in the figure, this was the strongest rise. Similarly, the 10-year bond yield, which began to rise slowly the second half of 2021 when inflation started to escalate in the OECD area, picked up during 2022. The recent episode of increase in the 10-year benchmark yield exceeded all those from other periods of sustained growth in yields except from the tightening cycle in 1994-95.

Figure 1.9. Changes in G7 benchmark bond yields following the start of the central banks tightening cycle



Note: Average yield for the G7. Both panels are on the same scale. For the 2-year benchmark, the first period refers to February 1994 to January 1995, the second to April 1999 to May 2000, the third to March 2004 to June 2007, the fourth to July 2016 to October 2018 and the fifth to September 2021 to December 2022. For the 10-year benchmark, the first period refers to January 1994 to January 1995, the second to January 1999 to May 2000, the third to June 2005 to June 2007, the fourth to August 2016 to October 2018 and the fifth to September 2021 to December 2022. Periods were selected to range from a local minimum to a local maximum and they represent The Great Market Crisis of 1994-95, the Dot-com bubble of 1999-2000, the Housing Market Boom of 2004-07 and the attempt to normalise monetary policy in 2016-18.
Source: Refinitiv.

1.2.4. The increases in nominal yields were largely driven by real yields in the US and UK, and inflation expectations in the euro area

Breakeven inflation captures inflation expectations and inflation risk premiums, with the latter referring to the risk that investors take to lock in their returns to the current inflation expectation (and, thus, correlated with uncertainty about future inflation). Real yields are associated with growth and growth volatility expectations, as they serve as a proxy for the rate of return on investments. An increase in real yields can signal improved growth prospects or heightened economic uncertainty. Given that growth prospects for the OECD area have been revised downward since 2021, this uptick in real yields can be interpreted, as a consequence, of increased macroeconomic and geopolitical uncertainty.

Figure 1.10 illustrates the variation in real yields across selected countries between the last quarter of 2021 and 2022. The US real yield curve shifted from negative and upward-sloping to downward-sloping and entirely positive. Germany, France and the UK also experienced upward shifts in their yield curves, however, with France and the UK surpassing zero thresholds only for longer maturities and Germany's curve remaining negative but nearing zero. Real yields rose equally or more than nominal yields in the UK and the US, and less than nominal yields in France and Germany. Thus, the growth in yields was primarily driven by real rates in the United States and the United Kingdom, while in France and Germany, it was influenced by a combination of both an increase in breakeven inflation and real yields (Figure 1.7).

Figure 1.10. Real yield curves for selected sovereign issuers in the OECD area

Note: Real yields were computed by subtracting the average benchmark yield for a specific term and quarter from the average breakeven inflation for the same period and term. Each marker (square for 2022 and circle for 2021) represents the difference between the benchmark yield and the breakeven inflation for a specific term (1, 2, 5, 7, 10, 20 and 30 years, depending on data availability) and the line is the result of linear interpolation between each marker.
Source: Refinitiv.

1.2.5. Positive real yields can put more constraints on governments' fiscal policy

Prior to 2022, negative real yields were prevalent across developed economies, allowing governments, in principle, to sustain higher fiscal deficits without jeopardising their debt sustainability (Blanchard, 2023[13]). However, given that interest rates are endogenous to fiscal instances (i.e. they depend on how market participants perceive fiscal policy to be sustainable), revising down fiscal targets can lead to increasing rates. When real rates rise, the fiscal balance further deteriorates due to escalating borrowing costs, creating a feedback loop that, in extreme scenarios, can result in a debt default. Although the impact of fiscal policy on borrowing costs is more pronounced in emerging markets due to their heightened vulnerability to debt repayment, developed countries may also face fiscal constraints, even when real yields are negative. A notable example of this was the severe market stress in the UK bond market during September 2022, where a fiscal announcement in the United Kingdom immediately affected bond yields, imposing high costs on the government, which was subsequently compelled to revise the recently announced fiscal plan within a month (Box 1.3).

Box 1.3. The September 2022 UK bond market: from a public debt management perspective

On 23 September 2022, the UK Government published a Growth Plan presented in a fiscal statement, which included unfunded tax cuts. This extension of the unfunded tax cuts and the absence of independent scrutiny by the Office for Budget Responsibility came as a surprise to the UK Government bond (gilt) market and immediately resulted in a sharp increase in long-term bond (gilt) yields. This sudden and sharp rise in yields also led to urgent margin calls (i.e. demands for additional capital to cover leveraged positions due to the depreciation of the value of collateral) for investment vehicles (particularly pension funds) engaged in liability-driven investments (LDI) (BIS, 2022[14]). To raise cash in order to meet demands for collateral, or to reduce exposure to collateral calls, some LDI funds sold gilts, which further reduced particularly long-dated gilt prices, increasing yields and forcing those funds to post more collateral, thereby creating a negative spiral of rising yields and falling prices in the gilt market.

To stabilise markets, and assist pension funds in managing their liquidity and in closing out their positions, the Bank of England (BoE) announced on 28 September 2022 temporary and targeted purchases of long maturity gilts (Bank of England, 2022[15]). Although the BoE successfully helped stabilise the market, yields remained notably higher than before the announcement of the Government's Growth Plan (

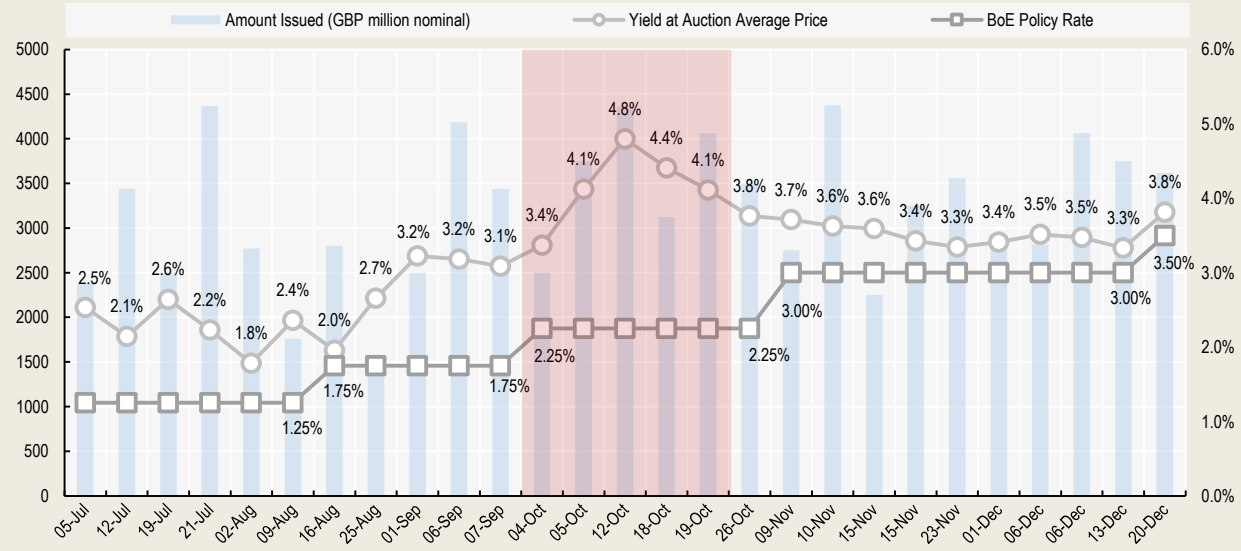
Figure 1.11).

Yields only returned to pre-announcement levels in late October 2022 when a reversal of most of the proposed tax cuts and a reduction in the scope of the relief package set out in the Growth Plan were announced (HM Treasury, 2022[16]). During the period between 23 September and 20 October 2022, the average yield to maturity of conventional gilts rose to 4.2%, higher than both the period prior to the announcement of the Growth Plan and the subsequent months. During this period, yields on government bonds in other major markets were also increasing. However, compared to other large issuers in the OECD area, the increase in the UK's 10-year benchmark yield in this period was more than 50% higher than the average increase for Canada, France, Germany, Italy and the US in the same period.

From a debt management perspective, the new fiscal plan necessitated a significant increase in the UK Government's borrowing requirement (HM Treasury, 2022[17]). As usual on the day of a fiscal event, the UK's Debt Management Office (UK DMO) published on 23 September 2022 a revised financing remit for the financial year 2022-23. The remit for each financial year is first published shortly before the start of the relevant financial year, with subsequent revisions typically occurring twice a year (a technical revision in April, and a further revision during the autumn alongside a fiscal event) (UK DMO, 2023[18]). The UK DMO's net financing requirement was revised up by GBP 72.4 billion to GBP 234.1 billion for the financial year 2022-23, representing an increase of approximately 45% since the previous remit revision that was published on 26 April 2022. The planned composition of gilt issuance also changed, with the proportion of short maturities rising from 32% to 38%, alongside a decrease in the share of long maturities and index-linked securities. Throughout this challenging period between 23 September and 17 November, the DMO remained committed to its already-announced issuance programme and successfully raised more than GBP 31 billion via 11 different gilt operations, notwithstanding the volatility of the market; and another GBP 31 billion in Treasury Bill sales.

On 17 November 2022, following the announcement by a new government of a reversal of most of the policies set out in the Growth Plan (UK DMO, 2022[19]) and alongside the publication of the Economic and Fiscal Outlook by the independent Office for Budget Responsibility (OBR), the UK DMO published a further revision to its borrowing remit. This time, the net financing requirement was revised down by GBP 31.4 billion to GBP 202.7 billion for the fiscal year.

Figure 1.11. The amount issued and auction yields during the period of market stress



Note: Only conventional gilts are considered (fixed-rates). Ribbon in red highlights the stress period. Dates refer to issuance days.
Source: OECD calculations based on information available from the Bank of England and the United Kingdom Debt Management Office (Bank of England, 2022[20]; UK DMO, 2022[21]).

Overall, the stress episode in the gilt market offers insights into the impact of a large unanticipated fiscal loosening on the cost of debt issuance. It is important to note that the increase in borrowing costs during this period, part of which may have been attributable to the market's reaction to the announcement, will persist until the gilts issued during this period mature. Considering that the nominal yield curve for UK Government bonds was approximately flat in late 2022 (refer to Figure 1.8), this difference in yields cannot be explained solely by the maturities of the debt issued. It is also likely that it is attributable to the reaction that long-end investors had to the 23 September 2022 announcement. If the spread between auction yields and the BoE's policy rate had remained constant between 23 September and 20 October 2022 (at 1.0pp from July to mid- September 2022, instead of 1.46 percentage points from 23 September to 20 October 2022), the issuance of GBP 17.8 billion of gilts at fixed rates would have cost approximately GBP 2.0 billion less for the UK Government until 2061 (the maturity year of the longest gilt issued over the period).

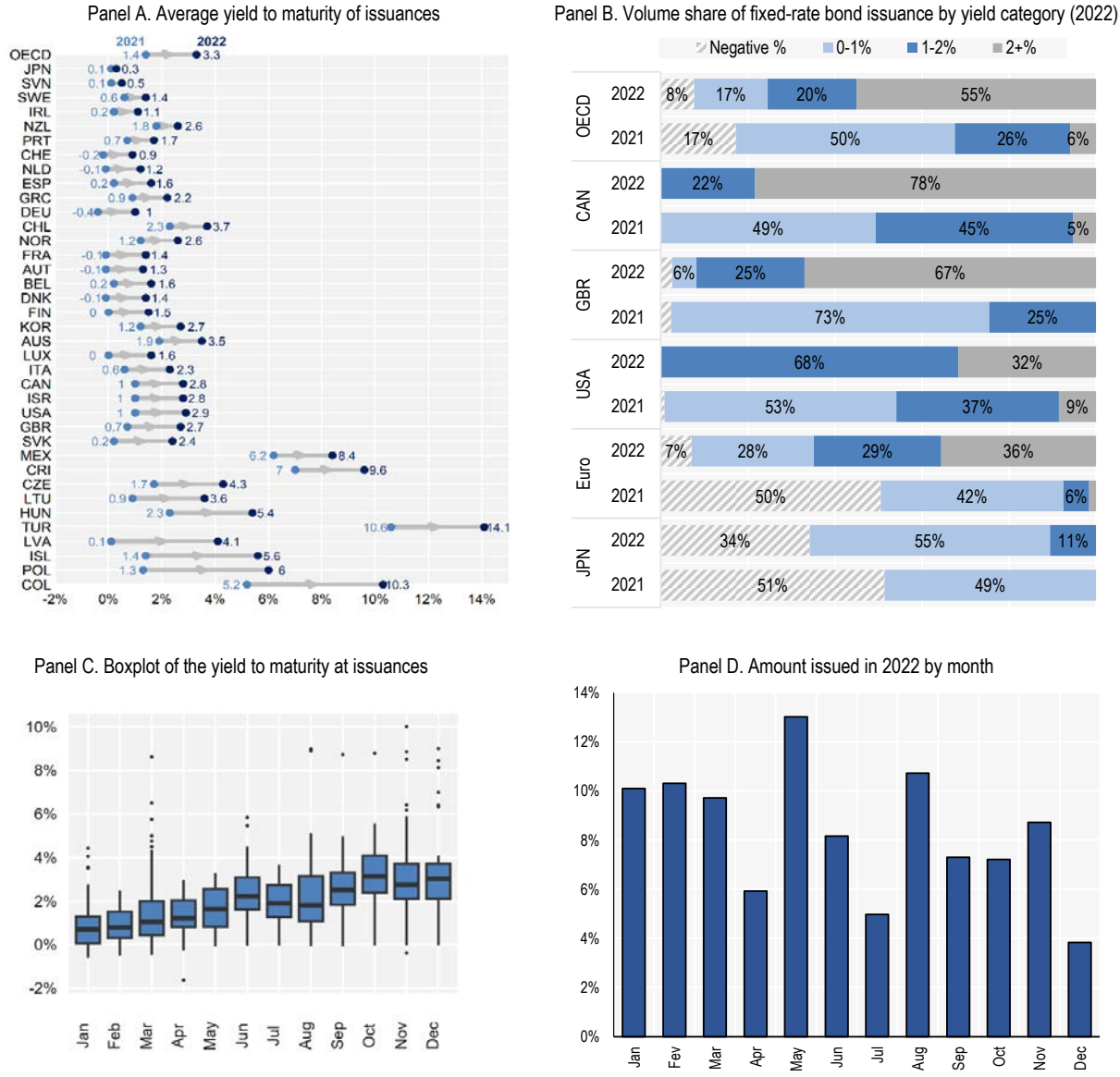
These events highlight that, even in the relatively liquid gilt market, specific sectors of the investor base can be detrimentally impacted by unexpected events. From a debt management perspective, it also demonstrates that interventions by the authorities aimed at stabilising markets can be successful and underlines the importance of maintaining a credible institutional framework for debt management and fiscal policy.

1.2.6. Average yield to maturity at issuance rose less than secondary market yields, with the volume share of securities with sub-zero yields gradually falling to zero

Yield to maturity (YTM) at issuance reflects the actual borrowing costs borne by sovereign issuers, as opposed to benchmark yields, which represent yields from secondary market transactions for specific representative securities. The OECD average YTM increased from 1.4% in 2021 to 3.3% in 2022 (Figure 1.12, Panel A), a slightly smaller rise compared to the movements observed in benchmark yields (see Figure 1.8). In general, emerging economies and countries near the conflict in Ukraine experienced

the highest increases in the average YTM, such as Colombia, the Czech Republic, Hungary, Latvia, Lithuania, Mexico, Poland, the Slovak Republic, and Türkiye. Other EU countries and Japan experienced the lowest increases in the average YTM. The UK and the US both experienced a relatively high YTM increase compared to the countries in the EU area, likely explained by the proportionally higher increase in their policy rates (refer to Figure 1.7). It is also noteworthy that negative average YTMs in 2021 (found in Austria, Denmark, France, Germany, the Netherlands, and Switzerland) vanished in 2022.

Figure 1.12. Yield to maturity at issuance and volume issued in 2022



Note: YTM values cover fixed-rates with maturity above one year. Panel A shows the average YTM weighted by the amount issued denominated in all currencies. Panel B displays the volume share of issuances denominated in EUR, USD, JPY, CAD and GBP while Panel C displays boxplots covering this same data (i.e. box plots are a concise graphical representation of a dataset's distribution, highlighting its median with a horizontal line, the interquartile distance – i.e. the distance between the 25% and 75% percentiles – with the box, and potential outliers represented by dots outside the whiskers, which are more than 1.5 times the interquartile away from the 1st or 3rd quartiles). Panel D displays the share of the amount issued of fixed-rates denominated in all currencies across the months of 2022.
Source: OECD calculations based on Refinitiv.

Figure 1.12 Panel B displays the volume share of fixed-rate bond issuances by yield category in 2022. The volume share of negative yield issuances has diminished significantly between 2021 and 2022, notably from 51% to 34% in Japan and 50% to 7% in the euro area. Conversely, the share of issuances with YTM above 2% rose in the same period, more specifically from roughly 2% in the euro area to 36%, from 9% to 32% in the United States, from 0% to 67% in the United Kingdom and from 5% to 78% in Canada.

Breaking down yield to maturity at issuance by month in 2022 shows that the share of primary issuance at negative yields was largest in the first quarter and decreased gradually through the year (Figure 1.12 Panel C). More precisely, until April, a portion of the boxplots' bottom whiskers, which approximately represents 25% of the volume of the issuances, had a yield below zero.[10] This share declined gradually, reflecting that the volume share of the issuances with a yield below zero decreased from 18.5% in January to 5.4% in April and finally to zero in December.

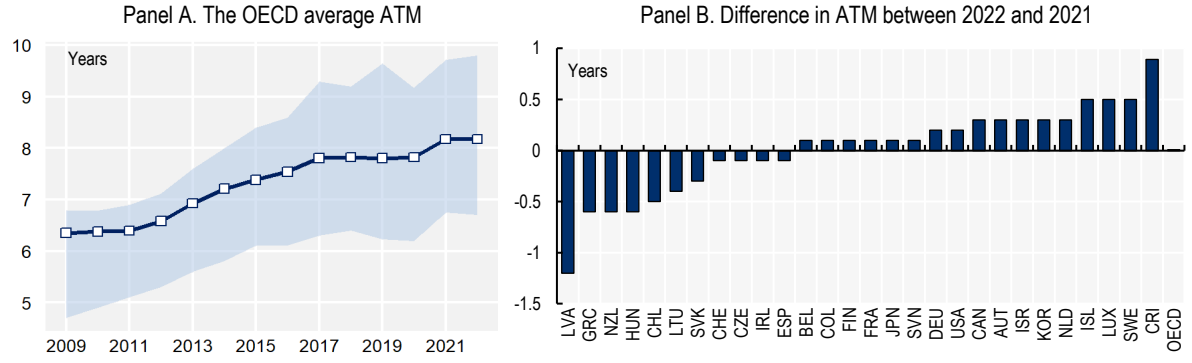
Figure 1.12 Panel D presents the percentage of the amount issued across 2022 in the OECD area, showing that funding activities were more concentrated until August when borrowing conditions were relatively more favourable. By the end of June, DMOs had already borrowed 57% of the year's borrowing needs and 73% by the end of August. This concentration, to some extent, clarifies why the average yield at issuance was generally below benchmark yields: many issuances occurred when policy rates had not yet increased and, thus, benefited from relatively favourable funding conditions.

1.3. Interest rate sensitivity in times of rising interest rates

1.3.1. The average term-to-maturity for OECD countries remained at a record high

The effect of rising government bond yields on borrowing costs is highly dependent on issuers' debt portfolio features, such as maturity and instrument composition.[11] Figure 1.13 Panel A demonstrates that the average remaining time-to-maturity for all securities composing a debt portfolio (ATM) reached a record high level in 2021 at approximately eight years and two months and remained unchanged in 2022. This can be explained by the fact that, on aggregate, in 2022 countries issued securities with roughly the same ATM as their maturing debt (see Box 1.2 for more details). In addition, the ATM of long maturities issued in 2022 moved from nine years and two months in 2021 (a record high) to nine years in 2022, both above the ATM of long maturities maturing in 2021 and 2022, respectively of six years and four months, and five years and eight months. Regarding new lines, eight OECD countries issued their longest instrument in 2022.[12]

Figure 1.13. The average term-to-maturity for OECD central governments' marketable debt



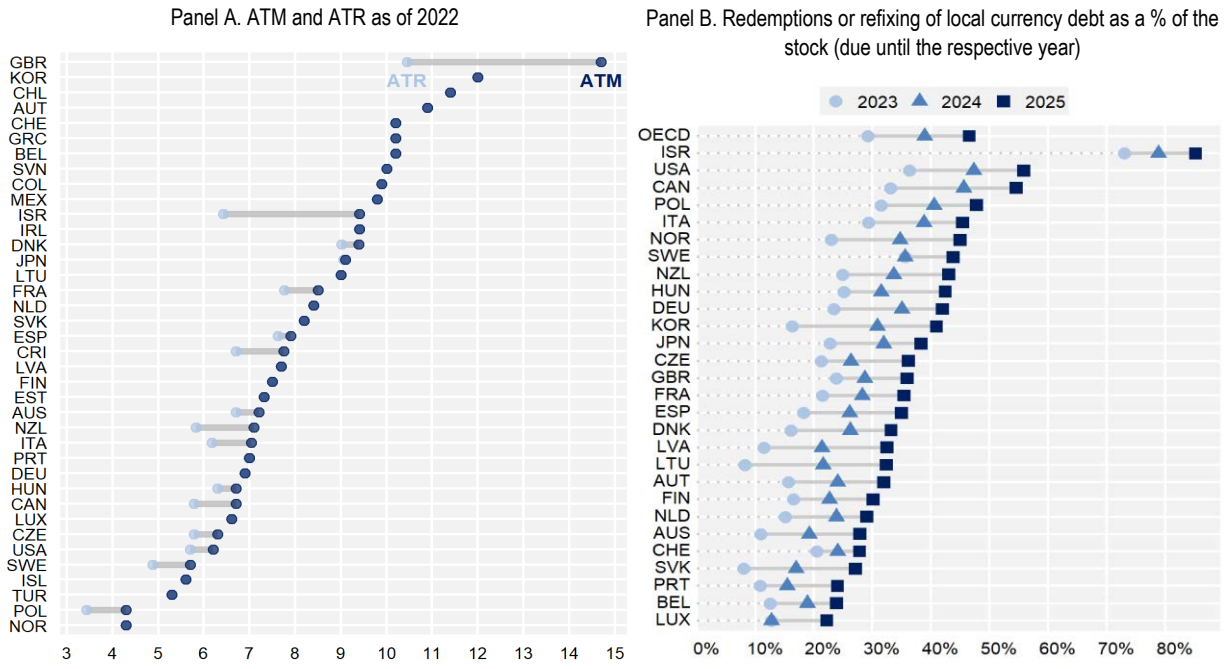
Note: Panel A displays two statistics for the ATM of OECD countries: the simple mean (represented by the dark blue line) and the interquartile range (the shaded area indicating the span between the 25th and 75th percentiles). Panel B illustrates the variation in years of the countries' ATMs between 2021 and 2022 – countries in which no or minor variation was reported are excluded from the chart.
Source: 2022 Survey on Central Government Marketable Debt and Borrowing.

OECD averages hide considerable variation across countries. Country-specific data indicates that the average ATM decreased in 11 countries in 2022. (Figure 1.13 Panel B). Among these, nine are in Europe, which could result from the uncertainties stemming from Russia's war of aggression against Ukraine. In seven countries, the ATM remained roughly unchanged, while in 17 countries, it increased by an average of three months. Large issuers predominantly featured in countries with a rising ATM (e.g. Canada, France, Germany, Japan, and the United States), except the United Kingdom (approximately unchanged ATM) and Italy, where a modest decrease of less than one month was observed.

1.3.2. The average time-to-refixing figures indicate larger exposure to interest rate changes than the average term-to-maturity implies

Figure 1.14 Panel A contrasts the 2022 ATM with the average time-to-refixing (ATR, i.e. the weighted average of time to maturity for fixed-rates and time to refixing (adjusting) for variable rates and inflation-linked instruments within a debt portfolio). ATR is a superior indicator of borrowing cost sensitivity to interest rates, as it also accounts for the refixing effects of floating rates and index-linked instruments. On average, ATR is approximately one year shorter than ATM.

Figure 1.14. Marketable debt's average maturity and refixing



Note: For details on the ATM and ATR methodology see Annex A. Countries for which ATR and maturing and refixing outstanding amount within 2025 have not been estimated are the following: Chile, Colombia, Costa Rica, Greece, Iceland, Mexico, Slovenia and Türkiye.
Source: OECD calculations based on information from the 2022 Survey on Central Government Marketable Debt and Borrowing, Bank of Canada, Bank of England, Bank of Japan, European Central Bank, Federal Reserve and Refinitiv.

The United Kingdom has the most significant difference between ATM and ATR, primarily because 23% of its debt stock comprises inflation-linked securities, some with very long maturities of up to 50 years. In the ATR, these securities are weighted by their refixing term, rather than their maturity in the ATM. Despite this, the UK's ATR remains relatively long, exceeding 10 years, as it has the highest ATM in the OECD. Other countries with a moderate share of inflation-linked or variable rate instruments (more than 20%) and, consequently, a large difference between their ATM and ATR are Costa Rica, Iceland, Israel, and Poland. It is worth noting that there is a premium paid by investors to protect them from future hikes in inflation and

interest rates and, therefore, although floating rates and index-linked securities do increase sovereign issuers' exposure to interest rates, they can also be cost-minimising (see Box 1.4).

ATM and ATR are widely utilised indicators of market-risk exposure by debt management offices. However, since they do not capture the short-term and medium-term exposure to interest rate increases, countries also monitor the proportion of debt maturing or refixing in the upcoming years.[13] Figure 1.14 Panel B shows that 29%, 39%, and 47% of the outstanding debt from OECD countries is due to mature or be refixed by 2023, 2024, and 2025, respectively. Thus, by the end of 2025, 47% of the total OECD debt stock will be refunded or refixed under new interest rate conditions.

A country with an 83% central government marketable debt-to-GDP ratio (the 2022 OECD average), and an average yield at issuance of 1.1% (the December 2021 OECD average for the 10-year benchmark), will see an increase in interest payments from 0.9% to 1.6% of GDP when refunding 47% of its debt stock at a 3.3% yield (the December 2022 OECD average for the same benchmark). This represents an 80% increase compared to the average OECD country in 2021. The 0.7 percentage point GDP increase, for example, is more than what OECD governments spent on environmental protection or housing and community amenities.[14] It is important to note that this exposure varies considerably among countries. Figure 1.14 Panel B shows that the percentage of debt stock maturing or refixing within the next three years ranges from 22% in Luxembourg to 85% in Israel, with relatively high levels in the United States (56%) and Canada (54%), and lower levels in the EU area (37%).

Box 1.4. The costs and benefits of inflation-linked instruments (linkers)

Inflation-linked sovereign bonds have been part of the funding strategies of sovereign borrowers in the OECD for decades, originating in 1981 in the UK and later in many other OECD countries, for instance, in 1985 in Australia, 1991 in Canada, 1994 in Sweden, 1997 in the US, 1998 in France, 2003 in Italy and 2004 in Japan, 2006 in Germany, 2015 Belgium, and 2017 Ireland (OECD, 2017[22]). As of 2022, half of OECD member countries, or 19 nations, incorporated these instruments into their borrowing strategies. They are also accounting for a large share of borrowing strategies and debt stock – linkers' share of the debt stock rose from 6.4% in 2007 to 8.1% in 2019, before the COVID-19 outbreak, especially pushed by strong and sustainable demand from pension funds and insurance companies. Then it fell to 7.0% in 2022, as the share of short-term instruments grew in response to the pandemic (see Figure 1.3).

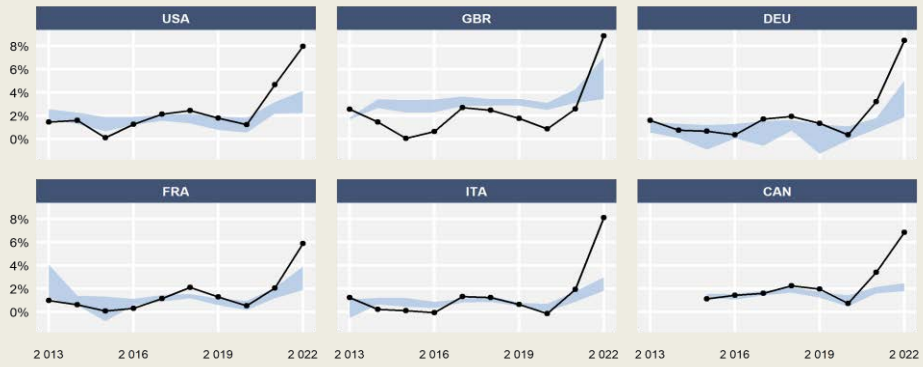
Linkers present several advantages to sovereign borrowers, including i) Facilitating portfolio lengthening and smoothing of payments, as they protect against inflation, encouraging investors to accept more duration risk (in the OECD area, the average maturity of inflation-linked securities is 4.7 years longer than the rest of the debt portfolio); ii) Expanding and diversifying the investor base, which plays a crucial role in building funding strategy resilience, improving market liquidity, and managing funding risk, particularly with insurance companies and pension funds, whose liabilities are also inflation-linked; and iii) Enabling better debt portfolio positioning regarding cost and risk trade-offs, particularly when borrowing costs can be reduced due to a premium that investors are willing to pay for inflation protection.

The exact cost of a linker can only be determined after it matures and is compared to its counterfactual. If the realised inflation rate over the life of the bond is, on average, below the breakeven rate at issuance, linkers would be cost-efficient, and *vice versa*. Figure 1.15 compares breakeven inflation and realised inflation for selected OECD countries with more liquid linkers' markets in the same period. It demonstrates that the costs of linkers, relative to their fixed-rate counterparts, have varied significantly across countries. In the United Kingdom, aside from 2022, breakeven inflation remained above the realised inflation for the same year, implying that investors paid a premium for inflation protection. The

country benefited from reduced borrowing costs compared to issuing fixed-rate instruments with a similar term. This was also the case in France, Italy and the United States, but only before 2016. In Canada and Germany, realised inflation tended to align with breakeven inflation before 2016 but was slightly higher afterwards. Notably, in all of these countries, inflation exceeded its breakeven in 2022, highlighting that the magnitude of inflationary pressures took the markets by surprise.

Despite the recent increase in the relative costs of linkers compared to fixed-rates, it may be premature to conclude that they will be more expensive than their fixed-rate counterparts. Linkers typically have long maturities, and their costs depend heavily on future inflation. Surpassing the breakeven inflation for several years, even substantially, does not imply that linkers will be costlier than their fixed-rate counterparts. Decisions regarding the use of linkers are multifaceted and contingent upon the demand and liquidity of each sovereign bond market, which debt management offices carefully scrutinise. For example, Canada discontinued its Real Return Bonds programme due to insufficient demand in the last quarter of 2022 (Government of Canada, 2022[23]). New linkers' lines were also issued in 2022 in Denmark, France, Iceland, Italy, Japan, Korea, Türkiye and the United States.

Figure 1.15. Realised headline inflation (line) versus breakeven inflation (shaded area)



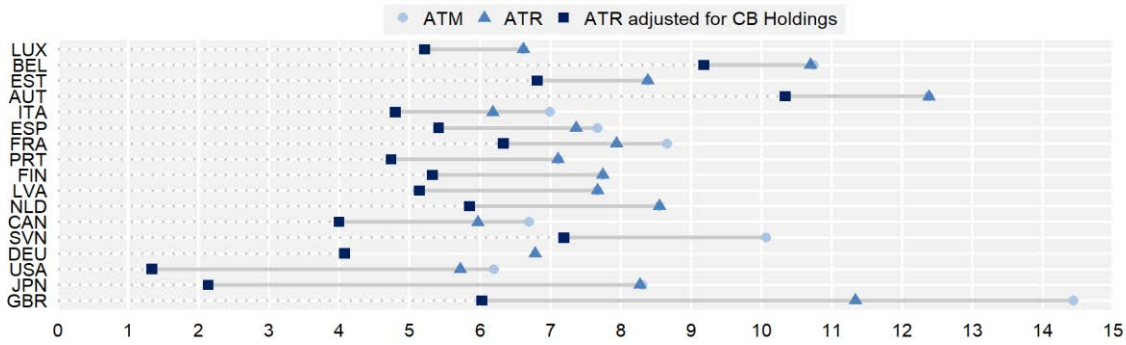
Note: Realised inflation refers to the headline inflation (or harmonised headline if the former was unavailable) for the specific year while the shaded area covers the range between the 10% and 90% percentile of breakeven inflation for issuances in that year across all available terms.
Source: OECD (2022[1]), *OECD Economic Outlook, Volume 2022 Issue 2*, https://doi.org/10.1787/f6da2159-en; and Refinitiv.

1.3.3. Sovereign debt becomes more sensitive to interest rates when considering the effect of central banks' holdings

A significant consequence of large-scale central bank purchases of government debt, known as quantitative easing (QE), is the heightened exposure of the public sector to interest rate fluctuations. Central banks acquire sovereign bonds, funding these purchases by issuing bank reserves. The remuneration of these reserves, accessible on demand for the banking sector, is closely linked to the policy rate. Consequently, sovereign instruments on central banks' balance sheets function like floating rate notes. Figure 1.16 illustrates the adjusted ATR for the Euro area and G7 countries when central bank holdings are considered to have zero maturity, as they are funded at an overnight rate. Given that central banks hold a substantial proportion of their respective countries' debt (see Figure 1.17) and that the ATM of their holdings is lengthy, treating them as floating rate notes results in a significant reduction in ATR. The average ATM for selected countries in Figure 1.16 of 8.6 years and ATR of 8.0 years decrease to 5.6 years when adjusted for CB holdings.

Thus, in addition to the two already explored drivers of short-term and medium-term sensitivity to interest rates (i.e. maturing bonds that are expected to be refunded under new interest rates, and floating rates and index-linked securities that are refixed under new rates or indexes), there is a third one that refers to central banks' government security holdings, which are refixed overnight. Under this enlarged public sector perspective that also covers central banks' balance sheet, 80%, 71%, 71%, and 67% of Japan, the United States, Canada, and the United Kingdom's debt matures or re-fixes (because they are floating rates or index-linked instruments, or fixed-rates held by central banks) by 2025, compared to 38%, 56%, 55%, and 36% when the analysis is limited to the central government, respectively.

Figure 1.16. Adjusted ATR to consider the effect of central banks' holdings



Note: The figure considers the central bank government security holdings as of December 2022 to have zero maturity in the computation of the adjusted ATR.
Source: OECD calculations based on Bank of Canada, Bank of England, Bank of Japan, European Central Bank, Federal Reserve and Refinitiv.

1.4. Implications of monetary policy normalisation and quantitative tightening for sovereign debt markets

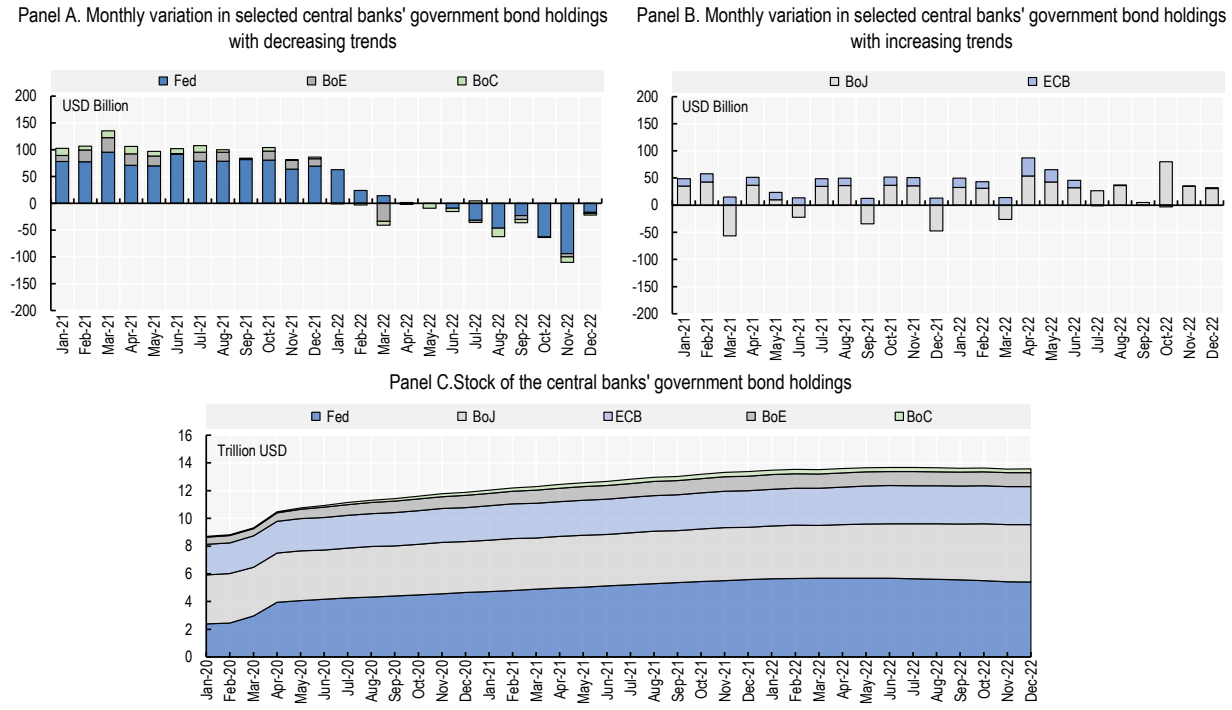
1.4.1. Some central banks shifted from net buyers to net sellers of sovereign bonds

As shown in the previous section, sovereign issuers have significantly lengthened the maturity of their debt portfolios over the past decade in a favourable funding environment facilitated by the asset purchase programmes implemented by many central banks in the OECD area (i.e. quantitative easing – QE). These programmes aimed to lower long-term funding costs and were generally successful in achieving this objective, with bond acquisitions of 1% of GDP having been estimated to decrease long-term yields by approximately 5 to 10bps on average (OECD, 2022[1]). In response to increasing inflationary pressures, central banks have begun to downsize their substantial bond holdings (i.e. quantitative tightening – QT), which is likely to contribute to tighter funding conditions. The downsizing strategy differs considerably across OECD countries, with some central banks actively selling bonds, while others are not (fully or partially) reinvesting the proceeds from maturing bonds.[15]

In 2022, the government security holdings of the Bank of Canada (BoC), the BoE, and the Fed declined, while the ECB maintained a broadly stable holding, and the BoJ saw continued growth (Figure 1.17. G7 Central banks' government security holdings Panels A and B).[16] The monthly changes in the holdings of the first three central banks transitioned from an average increase of USD 100 billion in 2021 to a decrease of USD 25 billion in 2022. This shift resulted in a reduction of USD 181 billion, USD 60 billion, and USD 53 billion in the holdings of the Fed, BoC, and BoE, respectively. These figures equate to approximately half, one-third, and 5% of the 2022's issuances of long-term instruments by their respective governments. In contrast, the ECB increased its government security holdings by USD 113 billion in the first half of 2022

but kept it broadly stable in the second half, indicating a shift in the ECB's policy. Meanwhile, the BoJ expanded its government security holdings in both semesters of 2022, with a growth of USD 166 billion in the first half and USD 213 billion in the second half.

Figure 1.17. G7 Central banks' government security holdings



Note: In Panel A, variations are computed as the difference between the outstanding amount of government securities on central banks' holdings from one month to another. All values were converted to USD using the rate of 31 December 2022.
Source: OECD calculations based on the Bank of Canada, Bank of England, Bank of Japan, European Central Bank, Federal Reserve and Refinitiv.

G7 central banks' balance sheets reached a record high in July 2022 at USD 13.7 trillion, as the pace at which the government security holdings of the BoJ and the ECB rose was faster than the decline in the holdings from the BoC, BoE and the Fed (Figure 1.17. G7 Central banks' government security holdings Panel C). The government security holdings of the three G7 central banks that started to downsize their balance sheets in 2022 (BoC, BoE and the Fed) peaked in February 2022, reaching USD 7.0 trillion, and declined by 5% to USD 6.7 trillion. Since the start of the downsizing, the BoC, BoE and Fed decreased their balance sheets by 19%, 2%, and 5%, respectively.

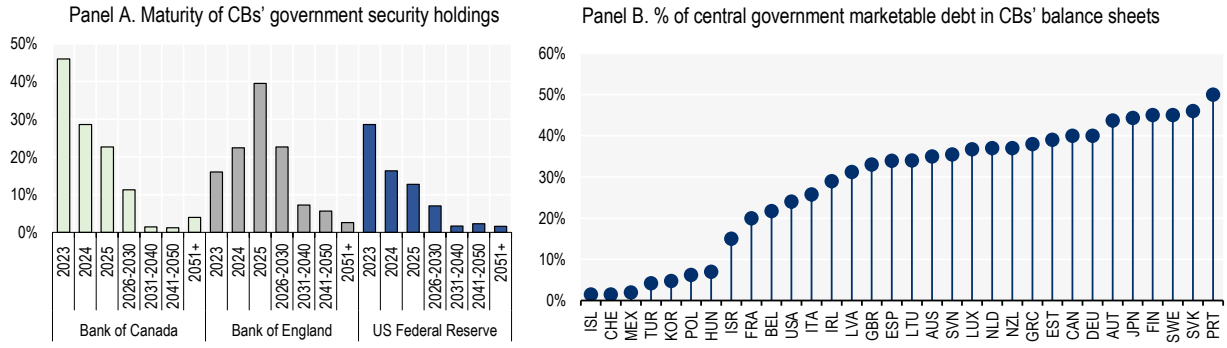
1.4.2. Over 50% of central banks' government bonds holdings mature by 2030

Quantitative tightening impacts DMOs' operations in three ways: through the portfolio balance channel, which may lead to higher yields as investors absorb increased net issuance; through a signalling effect, where market participants may interpret balance sheet reduction as a sign of future policy rate changes; and by increasing primary dealers' search costs and risk premia due to reduced activity of central banks (OECD, 2022[24]). In all of these cases, the pressure put by QT programmes will vary with their pace and magnitude, both of which depend on the maturity profile and size of their holdings.

Figure 1.18 Panel A displays the maturity profile of three selected G7 central banks,[17] revealing that over 50% of the government security holdings on the Fed's, BoE's, and BoC's balance sheets will mature

by 2030. Among these, only the BoE has more than 10% of its government security holdings expected to mature after 2030, which also reflects the fact that the United Kingdom has longer lines than these two sovereign issuers (i.e. the longest line is 2073 for the UK, 2052 for the US, and 2064 for Canada). Panel B shows the relative size of CBs' government security holdings in the OECD area, revealing that on average 25% of the outstanding amount of government debt is held by central banks. This figure ranges from zero in Chile, the Czech Republic, Denmark, and Norway to 50% in Portugal.

Figure 1.18. The impact of QT overtime: the maturity profile and size of holdings



Note: In Panel B the following countries are not displayed as their central banks hold no government security: CHL, CZE, DEN and NOR.
Source: OECD calculations based on information from the Bank of Canada, Bank of England, Bank of Japan, European Central Bank, Federal Reserve, 2022 Survey on Central Government Marketable Debt and Borrowing, OECD (2022[1]), *OECD Economic Outlook, Volume 2022 Issue 2*, https://doi.org/10.1787/f6da2159-en; IMF (2022[2]), World Economic Outlook, https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022; Refinitiv, and national authorities' websites.

1.5. Deteriorating liquidity conditions in sovereign bonds markets

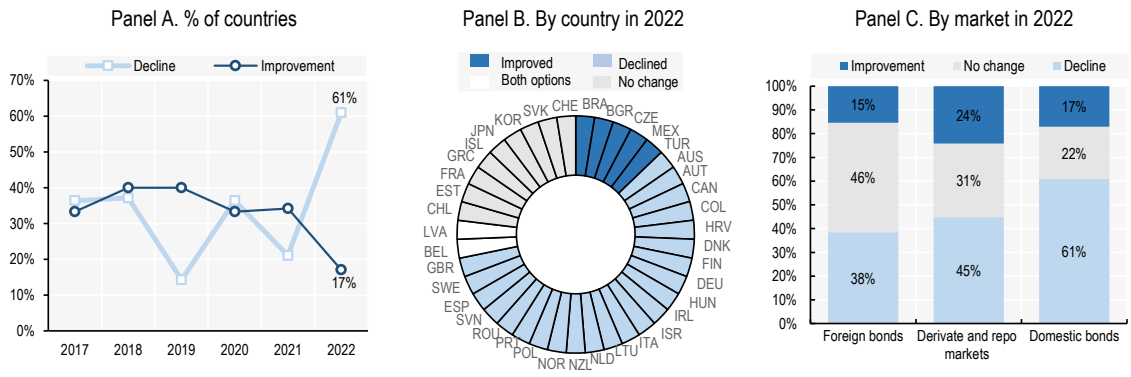
1.5.1. Liquidity deteriorated in 2022, with the domestic sovereign bond markets being more affected than the repo, derivatives and foreign bond markets

Market liquidity (i.e. the degree to which an asset can be traded without impacting its value) is paramount for markets to function efficiently and, therefore, is among the most important factors monitored by DMOs. With low liquidity, investors must bear greater costs to enter or exit a position due to price movements. The extent to which prices move during transactions depends heavily on the volume being traded, the asset being exchanged, and the specific market dynamics in which the trade occurs. Sovereign bond markets are among the most liquid ones due to several reasons, including the availability of high-quality and voluminous securities with various maturities and the high demand of sovereign bonds by a variety of investors. A highly liquid sovereign bond market enables DMOs to adapt more easily to changes in borrowing needs, as the market will absorb the increase in volume without affecting prices (much), thus facilitating the pursuit of their funding strategies, which minimise costs while keeping risks controlled.

A recent survey on Liquidity in Secondary Government Bond Markets conducted among OECD member and accession countries, indicates that sovereign issuers observed a deterioration in liquidity metrics across asset classes, including in the highly liquid sovereign bond market of OECD countries. DMOs monitor a myriad of indicators on sovereign bonds' market liquidity, including bid-ask spreads, turnover, volatility metrics, free float, and the average bid-to-cover ratio among others.[18] Figure 1.19 Panel A illustrates that 2022 was the first time since 2017 that more than half of the DMOs from OECD and accession countries reported a decline in liquidity conditions of domestic sovereign securities.[19] Exceptions are Brazil, Bulgaria, the Czech Republic, Mexico and Türkiye, where liquidity conditions were reported to

improve (Figure 1.19 Panel B), particularly in their foreign bonds market due to rising demand for investments in hard currency (i.e. flight-to-quality phenomenon).

Figure 1.19. Trends in liquidity conditions of domestic sovereign securities



Note: For Panel C countries that ticked two options (improvement and declined) were included in the "no change" category.
Source: Calculations based on the OECD member and accession countries' responses to the 2022 OECD Survey on Liquidity in Secondary Government Bond Markets.

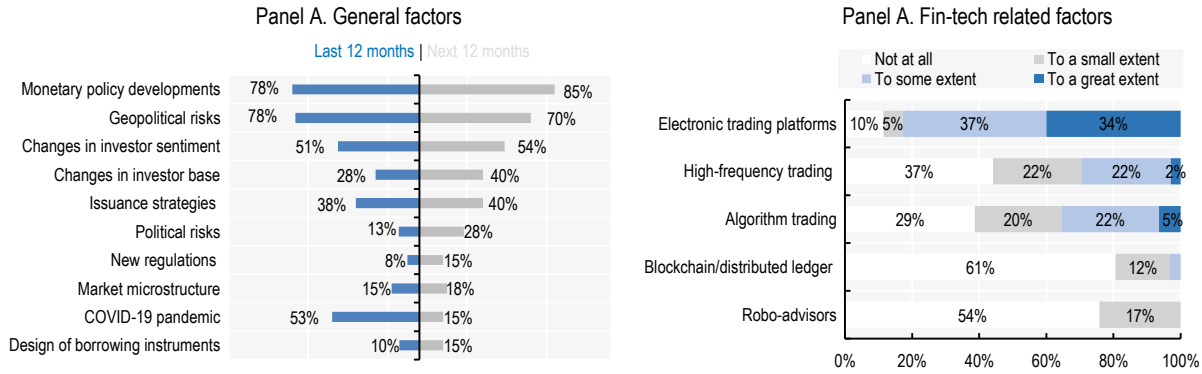
Compared to the derivative, repo and foreign bond markets, the domestic bond market was the one whose liquidity conditions deteriorated more frequently across OECD and accession countries (Figure 1.18 Panel C). One reason is that the repo and derivative markets benefited more directly from the support of security lending facilities, operated either by the monetary authority or the DMOs themselves.

1.5.2. Macroeconomic uncertainty, geopolitical risks, declining investor sentiment, and a reduction in free float contributed to a deterioration in liquidity

The primary factors affecting market liquidity include macroeconomic uncertainty, monetary policy developments, geopolitical risks, and deterioration of investor sentiment (Figure 1.20 Panel A). A monetary policy direction reversal following a decade of historically low yields and abundant liquidity has generated considerable macroeconomic uncertainty. The rapid withdrawal of supportive monetary policy implemented since the GFC resulted in significant asset depreciation and rising volatility. Typically, a one-percentage-point change in interest rates implies a change in a bond's price equal to its duration (i.e. the weighted average time to receive all the bond's cash flows) (OECD, 2017[22]), indicating that the average 4.5 percentage points rise in policy rates across the OECD could lead to a nearly 45% loss for a bond with a 10-year duration. In addition to these conjunctural factors affecting market liquidity, DMOs have reported that digitalisation and algorithmic trading may heighten the risks of a market squeeze (Figure 1.20, Panel B). Specifically, as the share of liquidity provided by algorithmic providers has increased over the past decade, liquidity has become less resilient, often declining during periods of extreme stress.

Another crucial development impacting market liquidity pertains to changes in the sovereign debt investor base, leading to a decline in free float (i.e. the share of debt that can be exchanged in markets). Two characteristics of the investor base are particularly relevant for market liquidity: diversity; and willingness to trade. Firstly, a more diverse investor base increases the likelihood of having investors on both sides of a transaction (buy and sell) – if the investor base were homogeneous, all investors would want to buy or sell simultaneously, hindering transactions and increasing market volatility. Secondly, if investors hold their assets until maturity, they will not exchange them, thus not providing liquidity to the markets. Consequently, markets are more likely to be liquid when their investor base is diverse and actively trading their holdings.

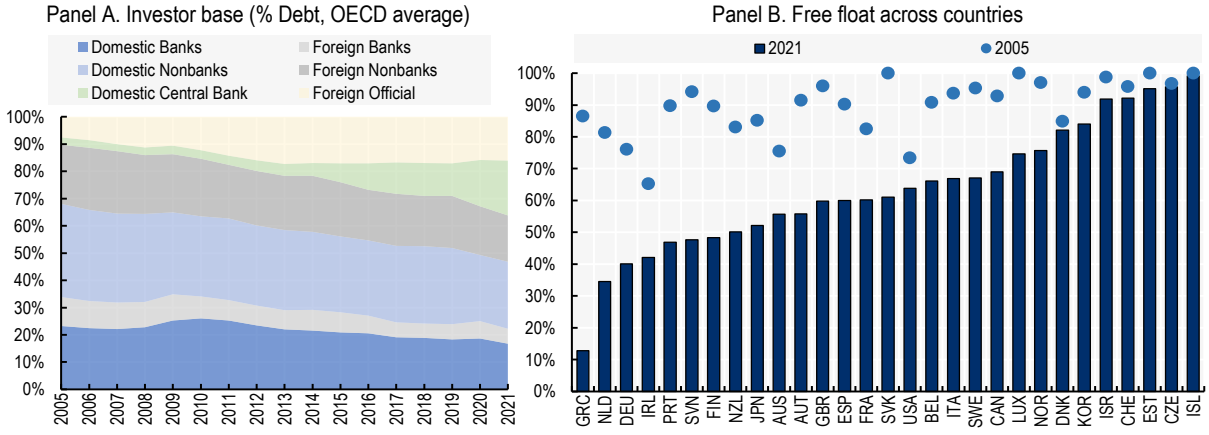
Figure 1.20. Factors affecting market liquidity



Note: Although Panel A gathered information on the "changes in investor sentiment", in another question of the same survey DMOs reported that in most cases (57%) investor confidence got worse in 2022, with only three countries (Canada, Chile and Costa Rica) reporting an improvement.
Source: Calculations based on the OECD member and accession countries' responses to the 2022 OECD Survey on Liquidity in Secondary Government Bond Markets.

Since the GFC, investor bases have significantly changed in many OECD countries, with central banks becoming one of the primary investors. Figure 1.21 Panel A indicates that since 2010, the proportion of sovereign debt held by domestic central banks has increased from 3% to 20%, reducing the portion held by domestic investors (banks and non-banks – by 9 percentage points and 5 percentage points, respectively) and foreign investors (banks and non-banks – by 3 percentage points and 4 percentage points, respectively). Another increasingly relevant investor type is foreign official institutions, which held, on average, 16% of OECD countries' sovereign debt in 2021, up from 8% in 2005. These two investor types tend to hold these securities long term – they do not actively engage in sell-side operations. As a result, they tend to reduce the free float of the debt and, consequently, market liquidity. Specifically, the free float decreased for all countries displayed in Figure 1.21 Panel B, with the average decrease reaching 26 percentage points. Additionally, some countries reported that due to deteriorating market conditions, some Primary Dealers became less active (note the significant decrease in the domestic banking sector in Figure 1.20 Panel A), while other market participants, such as hedge funds, filled the gap left by them, with some of these participants ultimately acting as "shadow dealers".

Figure 1.21. Sovereign debt investor base for selected OECD countries



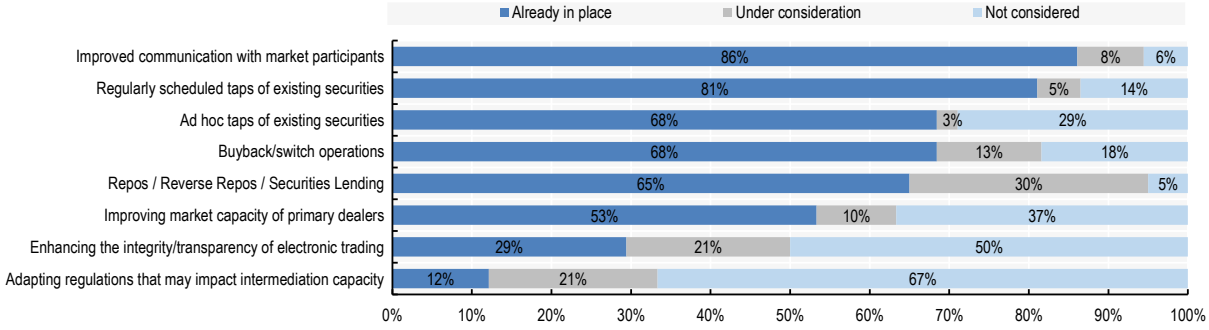
Note: Free float was estimated by removing the portion of sovereign debt held by foreign official institutions and domestic central banks.
Source: IMF Sovereign Debt Investor Base for Advanced Economies.

1.5.3. Sovereign issuers have been supporting liquidity through various means, including improved communication, tapping existing securities and buybacks

Considering the influence of liquidity on borrowing costs and market resilience, DMOs strive to actively enhance the liquidity conditions of sovereign bond markets. DMOs have improved communication with market participants (e.g. through more frequent communication), tapped existing securities (particularly off-the-run bonds), conducted buyback and switch operations, provided security lending facilities,[20] and implemented measures to enhance the market capacity of Primary Dealers[21] (e.g. reducing the minimum quotation time and coverage, broadening requirements for bid/ask spreads) (Figure 1.22). These measures supplement the general strategies followed by DMOs to support liquidity, through which they aim to establish large benchmarks with transparent and predictable issuances. For smaller issuers, auctions serve as the primary liquidity points; thus, they may increase the frequency of auctions to improve liquidity.

Primary Dealers (PDs), who are among the most crucial providers of liquidity in the sovereign bond market, face elevated risks during periods of high volatility, as their holdings may depreciate while they fulfil their role as intermediating parties. QT can also impact operations by reducing central banks' role as investors during periods of elevated borrowing needs, leading to increased search costs for PDs and potentially extending the time securities are held in their portfolios. Additionally, they have been affected by new capital and liquidity regulations put in place during a time of abundant liquidity and low volatility in the early 2010s as a response to the GFC (OECD, 2013[25]; 2014[26]). For these reasons, despite the observed deterioration in market liquidity in numerous OECD countries, DMOs tended not to increase the burden on PDs in their liquidity provision role – specifically, more than 80% of DMOs reported that they did not impose new requirements on market-makers. However, existing requirements were largely maintained, such as those related to bid/ask spreads, the size of offers, and secondary market performance, among others.[22]

Figure 1.22. Measures implemented by sovereign issuers to improve liquidity conditions



Source: 2022 OECD Survey on Liquidity in Secondary Government Bond Markets.

Sovereign bond markets have been shifting away from an environment characterised by low interest rates and abundant liquidity. While this is likely negatively impacting liquidity, it is not clear whether current conditions are abnormally illiquid or whether liquidity was abnormally high during the period of quantitative easing implemented since the GFC. Markets may be experiencing a temporary liquidity squeeze – in this scenario, when the global macroeconomic and geopolitical outlook stabilises, liquidity could improve and potentially return to levels seen in the previous decade (the reduction would be merely cyclical). Alternatively, the diminished role of central banks in sovereign bond markets, coupled with a decline in the role of traditional banks and the broader adoption of algorithmic trading, may structurally impact liquidity; consequently, even when the outlook becomes less uncertain, liquidity might not recover to pre-2022 levels. Since poor liquidity in bond markets could sharply amplify asset price moves and shocks, policy makers should remain vigilant and address potential vulnerabilities to prevent any systemic event that may adversely affect market confidence.

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Annex 1.A. Methods and sources

Definitions and concepts used in the Sovereign Borrowing Outlook Survey

The Borrowing Outlook survey collects gross borrowing requirements, redemption and outstanding debt amounts with breakdown of these items by maturity, currency, interest rate types and ESG-labelling. It also collects data on DMOs' holdings, NextGenerationEU loans and country-specific methodological aspects. It uses core definition of sovereign debt, so-called central government marketable debt, mainly due to its comparability and collectability. This measure, directly linked to the central government budget financing, enabled the OECD to collect not only for realisations but also for estimates of government borrowing requirements, funding strategies as well as outstanding debt with instruments, maturity and currency types.

Coverage of institutions: Central Government

The coverage of institutions by debt statistics varies from public sector to central government. Public sector stands as broadest institutional coverage, as it includes local governments, state funds financial and non-financial public corporations as well as central government debt. General government definition, which is used for example by the OECD System of National Accounts (SNA), consists of central government, state and local governments and social security funds controlled by these units. Central government covers all departments, offices, establishments and other bodies classified under general government, which are agencies or instrument of the central authority of a country, except separately organised social security funds or extra-budgetary funds. In terms of layers of coverage of institutions, central government stands out as the core definition. Debt of the central government is raised, managed and retired by the national DMOs on behalf of the central government. Hence, the advantage of this relatively narrow definition of debt is that it enables countries to provide comparable figures, in particular for the estimations.

Coverage of types of debt: Marketable debt

In terms of instruments, liabilities can be in the form of debt securities, loans, insurance, pensions and standardised guarantee schemes, currency and deposits, and other accounts payable. Debt items can be classified as marketable and non-marketable debt. While marketable debt is defined as financial securities and instruments that can be bought and sold in the secondary market, non-marketable debt is not transferable. For example, bonds and bills issued in capital markets are marketable debt; multilateral and bilateral loans from the official sector are non-marketable debt.

The Borrowing Outlook survey focuses on marketable debt instruments, while most government debt statistics (e.g. OECD SNA, EU Maastricht debt, and IMF Public Sector Debt Statistics) cover both marketable and non-marketable debt items. OECD governments are financed predominantly by marketable debt instruments. This is a central definition for every analysis concerning various issues around debt management including borrowing conditions, portfolio composition, investor preferences and market liquidity. An advantage of using this definition is to indicate to investors which instruments are available for trade in the secondary markets, and which are not. Another reason is for the issuer to calculate different characteristics of the debt, such as duration or time to maturity, which in the case of non-marketable debt would present a difficult issue.

Terminology

- Standardised gross borrowing requirement (GBR) for a year is equal to the net borrowing requirement during that year plus the redemptions of long-term instruments of the same year and the redemptions of short-term instruments issued in the previous year. Therefore, this indicator captures the issuances of all securities excluding those that were issued and redeemed in the same calendar year. In other words, the size of GBR in calendar year amounts to how much the DMO needs to issue in nominal terms so as to fully pay back maturing debt issued in previous years plus the net cash borrowing requirement through any issuance mechanism.
- Net borrowing requirement (NBR) is the amount to be raised for the current budget deficit. While refinancing of redemptions is a matter of rolling over the same exposure as before, NBR refers to new exposure in the market.
- The funding strategy involves the choice of i) money market instruments for financing short-term GBR and ii) capital market instruments for funding long-term GBR. The strategy entails information on how borrowing needs are going to be financed using different instruments such as long-term, short-term, nominal, variable-rate, indexed bonds and FX-denominated debt.
- Gross debt, or debt stock, corresponds to the outstanding debt issuance at the end of calendar years. This measure does not take the valuation effects from inflation and exchange rate movements; thus it is equal to the total nominal amount that needs to be paid back to the holders of the debt.
- Redemptions refer to the total amount of the principal repayments of the corresponding debt including the principal payments paid through buy-back operations in a calendar year.

Regional aggregates

- Total OECD area denotes the following 38 countries: Australia, Austria, Belgium, Canada, Chile, Colombia, Costa Rica, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Türkiye, the United Kingdom and the United States.
- OECD accession countries include Bulgaria, Brazil, Croatia, Peru and Romania.
- The G7 includes seven countries: Canada, France, Germany, Italy, Japan, the United Kingdom and the United States.
- The OECD Euro area includes 17 Member countries: Austria, Belgium, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Portugal, the Slovak Republic, Slovenia and Spain.
- In this publication, from a public debt management perspective, the Emerging OECD group (i.e. OECD emerging-market economies) is defined as including seven countries: Chile, Colombia, Costa Rica, Hungary, Mexico, Poland and Türkiye.
- The euro (EUR) is the official currency of 20 out of 28 EU Member countries. These countries are collectively known as the Euro area. The Euro area countries are Austria, Belgium, Cyprus, Estonia, Finland, France, Germany, Greece, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, the Slovak Republic, Slovenia and Spain. In this report, the Euro area covers only the countries that are simultaneously in the Euro area and in the OECD.

Calculations and data sources

- Estimates that are presented as a percentage of GDP, for consistency reasons, use GDP estimates from the last *OECD Economic Outlook* in the previous year (so November 2022 for this publication) and are calculated using nominal GDP data.
- Debt is measured as the face value of current outstanding central government debt. Face value, the undiscounted amount of principal to be repaid, does not change except when there is a new issue of an existing instrument. This coincides with the original promise (and therefore contractual obligation) of the issuer. DMOs often use face value when they report how much nominal debt will mature in future periods. One important reason for using face value is that it is the standard market practice for quoting and trading specific volumes of a particular instrument.
- Currencies are converted into USD using flexible exchange rates using data sourced from Refinitiv. The effects of using alternative exchange rate assumptions (in particular, fixing the exchange rate versus using flexible exchange rates) are illustrated in Box 1.1.
- All figures refer to calendar years unless specified otherwise.
- Aggregate figures for gross borrowing requirements (GBR), net borrowing requirements (NBR), central government marketable debt, redemptions, and debt maturing are compiled from answers to the Borrowing Survey. The OECD Secretariat inserted its own estimates/projections in cases of missing information for 2022 and 2023, using publicly available official information on redemptions and central government budget balances. Where government plans have been announced, but not incorporated into financing plans as of the end of December 2022, they are not included in the projections presented in this publication. Also, the latest estimates of government net lending in the OECD Economic Outlook database are used in estimating some missing data.
- Both the 2022 OECD Survey on Primary Market Developments and the 2022 OECD Survey on Liquidity in Secondary Government Bond Markets were carried out in October 2022.
- Yield group debt calculations in Figure 1.12 Panel B are based on all issuances and re-openings of fixed-rate bonds (i.e. data excludes: short-term instruments, indexed linked, floating rate instruments and strips) and for comparability reasons only bonds issued in USD, EUR), JPY, GPB and Canadian dollars (CAD) were chosen. Data is sourced from Refinitiv.

Revised definitions

- Inflation-linked securities are instruments with coupon and/or principal payments which are linked to an inflation index. Includes accrued inflation for all years up to and including the current year of the survey as of the reporting date.
- Variable rate notes have a floating or variable interest rate or coupon rate. It is a long-dated debt security whose coupon is refixed periodically on a “refix date” by reference to an independent interest rate index such as LIBOR or Euribor. For example, medium and long-term floating rate notes (FRNs, or colloquially as floaters) are debt obligations with variable interest rates that are adjusted periodically (typically every one, three, or six months). The interest rate is usually fixed at a specified spread over one of the interest rate indices. For projections of variable rate debt, the rate at the level of the last settled coupon is used.
- Average term-to-maturity figures follow the same coverage described at the beginning of this Annex.

Country-specific methodological aspects

Annex Table 1.A.1. Average term-to-maturity: country comments

Country	Note
Canada	The debt stock includes both domestic and foreign marketable securities. The ATM is reported as at the end of each calendar year from 2007 to 2022.
Colombia	All marketable debt in Colombia corresponds to domestic bonds (TES) and foreign bonds.
Costa Rica	Maturity of domestic debt and Eurobonds of external debt.
Estonia	The figures of Estonia take into account the average life of total debt including IFI loans, T-bills and Eurobonds.
France	Excludes swap effects.
Germany	Calculation excluding holdings in own stock. Inflation-linked securities weighted with 0.75.
Hungary	Data excludes retail securities, locally issued FX bonds, loans and since 2020 also excludes the non-marketable bonds issued to municipalities. Data includes cross-currency swaps.
Italy	No security has been excluded; swap effects, buybacks and repos are excluded.
Japan	MOF announces ATM, based on Fiscal Year, not Calendar Year. Figures from 2007 to 2021 exclude saving bonds. Figures of 2022 are estimated and include saving bonds.
Netherlands	The information is based on the data of T-bill and Bonds.
New Zealand	The calculation is marketable securities only and, therefore, excludes the non-market securities held by the Reserve Bank of New Zealand and the Earthquake Commission. However, it includes securities held by the Reserve Bank of New Zealand that were purchased under their Large-Scale Asset Purchase programme and Government Bond repurchases.
Sweden	End of year. Government bonds; Inflation-linked bonds; Public bonds, foreign currencies; Green bonds; T-bills.
The United Kingdom	ATM is weighted by the nominal amounts outstanding of gilts and T-bills issued for debt management purposes, as of the reporting date. Nominal amounts of gilts include government holdings; nominal values of index-linked gilts also include accrued inflation as of the reporting date.

Annex Table 1.A.2. Borrowing Outlook survey: country comments

Country	Variable	Comment
Austria	ESG-labelled of which: green bonds only	Includes also Green Treasury Bills with a Maturity less than 1 year (debt stock: 1 billion in 2022 and 2 billions in 2023)
Belgium	General comments on Methodology and concepts	Central Government Gross Borrowing Requirement reporting on final debt positions (i.e. after swap).
	T-bills	Treasury Certificates (TC)
	Other (cash etc..)	ECP
	Long-term instruments	OLOs, State bonds and EMTN
	Fixed Rate of which: zero (or negative) coupon bonds	OLOs and EMTN (after swap) with nominal coupon <= 0%
	Long-term marketable debt (from row 15)	Long-term final debt positions (after swap)
	Long-term marketable debt of which: issued in national currency	Long-term final debt positions (after swap) in euro
	Long-term marketable debt of which: issued in foreign currency	No long-term final debt positions (after swap) in foreign currency
	ESG-labelled of which: green bonds only	Green OLOs
	Total of DMO / central government holdings	Securities held in portfolio
	Short-term DMO / central government holdings	OLOs held in portfolio
	Long-term DMO / central government holdings	TCs held in portfolio
	Loans from other financial facilities (e.g. ESM, EFSF, SURE, NextGenerationEU etc.)	SURE (central government only)
Canada	T-bills	For current calendar year 2022, we have provided all numbers as of August 2022, as year-end estimates are not public and, in some cases, not projected.
	Other (cash etc..)	

Country	Variable	Comment
	Fixed rate	
	Inflation linked	
	Marketable debt held by non-residents	Non-resident holdings for 2022 are reported as of the latest published numbers for July 2022, and there are no forward-looking estimates.
	Average maturity of marketable debt	Because of data constraints, ATM for years 2006-10 are net of assets and as at fiscal year-end (March). ATM for 2022 is as of August 2022, as we do not project it for remaining months.
Denmark	Short term instruments	Please note that the numbers for borrowing in short-term instruments are net borrowing numbers.
	Inflation linked	Issuance in the inflation-linked bond includes the index revaluation. Outstanding amount in the inflation-linked bond is measured at indexed nominal value year-end.
France	Long-term instruments	For 2023 the amount of gross issuance does not include potential buybacks.
	Fixed rate	Redemptions integrate buybacks. The 2023 redemptions do not include potential buybacks.
	Inflation linked	For 2023, AFT will maintain its inflation-linked bonds issuance commitment around 10%
	Debt Service – Principal	Principal integrates the accumulated inflation for linkers
Germany	Marketable debt held by non-residents	Estimate. Short- and long-term. Rounded.
	Average maturity of marketable debt	Calculation excluding holdings in own stock. Inflation-linked securities weighted with 0.75.
	Debt Service – Principal	Money market instruments included at cash value.
Hungary	General comments on Methodology and concepts	We converted all foreign currency debt into national currency rate as 31 December of each year (realisations, officials FX rates of NBH), and we used 404 EUR/HUF rate for current year (2022, planning rate).
Ireland	General comments on Methodology and concepts	Ireland currently has two 0% coupon Government bonds outstanding, one of which matures on 18 October 2022. Ireland also has one green bond with an o/s balance of EUR 6.85bn. The 0% coupon bonds and green bond are included in the long-term instruments categories 1.2 and 1.M.2. Ireland also has three inflation linked bonds with a total balance o/s of c. EUR 1.1bn. As these bonds were all issued as private placements they are included within the non-marketable debt category in this survey.
	Marketable debt held by non-residents	We do not have data on non-resident holdings – the Central Bank of Ireland publishes some information on Holdings of Irish Long-Term Government Bonds
	Total of DMO / central government holdings	Slightly unclear what is being requested here – is it Irish sovereign marketable debt held by Government/public sector bodies?
Israel	General comments on Methodology and concepts	No applicable data earlier than 2011
Italy	Average maturity of marketable debt	With regard to marketable debt issued by central government and held by the same sector, please see data published in the "Financial accounts" (table 21) on the Bank of Italy website: "https://www.bancaditalia.it/pubblicazioni/conti-finanziari/index.html?com.dotmarketing.htmlpage.language=1" The Italian Treasury could only provide data about its bond portfolio used for Repo activity, which is not accounted for in the "Total Marketable Debt" above
Japan	T-bills	T-bills for cash management purposes are excluded. They are included in "Short-term Other (1.1.2)".
	Average maturity of marketable debt	MOF announces ATM, based on Fiscal Year, not Calendar Year. Figures from 2006 to 2021 exclude JGBs for retail investors.
Spain	General comments on Methodology and concepts	In the interest of not delaying even further the delivery of the data, we haven't been able to provide information on Accrued Inflation. Although we do have this information, we don't have it readily available and prepared for this format. We hope to provide it shortly or include it in next year's outlook.
Sweden	Central Government Gross Borrowing requirement	The total marketable debt and the non-marketable debt adds up to the official measure of government debt and is defined based on principles laid down at EU level. It accounts for the Central Government gross debt, without regard to the assets. For the years in the forecast, it is nominal (face value) amount, incl. assets under management and is the sum of the amounts that the Debt Office is committed to paying when a debt instrument matures and receives at maturity if it is an asset.

Country	Variable	Comment
		The amount is reported in SEK at the exchange rate at the time of borrowing.
	T-bills	Borrowing in the money market corresponds to outstanding stock at year-end. Redemptions: Initial stock maturing within 12 months.
	Fixed rate	Government bonds; Inflation-linked bonds; Public bonds, foreign currencies; Green bonds;
	Average maturity of marketable debt	End of year. Government bonds; Inflation-linked bonds; Public bonds, foreign currencies; Green bonds; T-bills
	Other non-marketable (e.g. government bonds for retail investors or retails bonds, saving bonds, etc.)	Other capital market debt: Assigned bonds, Private placements foreign currencies Liquidity management: Deposits; accounts; Securities holdings; Commercial paper, foreign currencies; Repos, other securities; Liquidity bills; Repos, Swedish Government papers; Collateral. Borrowing liquidity management corresponds to outstanding stock at year-end. Redemptions liquidity management: Initial stock maturing within 12 months Lottery bonds, National debt savings Derivatives market
	Debt Service	Government bonds; Inflation-linked bonds; Public bonds, foreign currencies; Green bonds; T-bills; On-lending
Türkiye	Inflation Linked of which: accrued inflation	With respect to the Central Government Accounting Regulation in Turkey, accrued inflation is reported as interest. Therefore, it is not included in central government debt stock statistics. In this regard, we will continue not to include accrued inflation as memo item.
	Total of DMO / central government holdings	Total of central government holdings is shared since the data could not been broken down in terms of term.
United Kingdom	General comments on Methodology and concepts	* Government holdings: 1. are included in Debt stock data (rows 15 to 19 and in ATM). Government holdings of index-linked gilts include inflation uplift as of the reporting date. 2. are excluded from S2 debt service data as well as historical redemptions and gross borrowing data. *ATM is weighted by the nominal amounts outstanding of gilts and T-bills issued for debt management purposes, as of the reporting date. Nominal amounts of gilts include government holdings; nominal values of index-linked gilts also include accrued inflation as of the reporting date. *Gross borrowing data are cash amounts rather than nominal. *Debt stock and redemptions data are nominal amounts; however holdings from overseas investors are market value data (they are sourced from the Office for National Statistics). *T-bill data include only T-bills issued for debt management purposes i.e. they exclude T-bill issued for cash management purposes.
	Debt Service – Principal	Data exclude DMO holdings of gilts as well as future inflation uplift.
	Debt Service – Interest	
United States	Fixed Rate of which: zero (or negative) coupon bonds	For this section, the U.S. Treasury has listed the volume of principal-STRIPS outstanding. (https://www.treasurydirect.gov/marketable-securities/strips/)

Notes

[1] This analysis considers the standardised method to compute the gross borrowing needs. For details, see Annex 1.A.

[2] Refinancing requirements were assessed utilising the standardised method. In other words, for a specific calendar year, the method takes into account all the long-term maturities that were due for redemption within that year, as well as the stock of short-term debt from the previous year which, by definition, will be redeemed in the following year. Consequently, the method excludes the redemption of all securities issued and redeemed within the same year.

[3] It is important to recognise that three primary sources contribute to the discrepancies between the government deficit and net borrowing requirements, complicating the determination of the precise proportion attributable to cash balance management. Firstly, there is a distinction in scope: while the latter pertains to the central government, the former encompasses the general government, which includes state and local governments as well as social security funds. Secondly, the stock of marketable debt may not increase in parallel with the government deficit if the government employs its financial assets to meet fiscal needs beyond cash balances, such as through the sale of real estate and state-owned enterprises. Lastly, governments may augment their net liabilities via alternative means distinct from marketable debt, such as loans or arrears encompassing other accounts payable.

[4] Global GDP growth is estimated to reach 3.2% in 2022, approximately half the rate observed in 2021, and is projected to decelerate further to 2.6% in 2023, significantly below the rate anticipated prior to the war in Ukraine (OECD, 2023[42]). It is worth noting that there are moderate downside risks to this projection, particularly the potential for even slower economic growth due to the tense geopolitical situation (including the escalation of the War in Ukraine), the uncertain magnitude and duration of monetary tightening, duration risks in the business models of financial institutions (as exemplified by the failure of the US Silicon Valley Bank in March 2023), scarcity of energy supplies, and global trade-related tensions.

[5] In normal times, short-term debt such as T-Bills act as a cash management instrument, whose issuance volume is determined by the timing and size of government receipts and outlays. During crisis periods, such as the 2008 financial crisis and the recent COVID-19 crisis, T-Bills play an important role as 'shock absorbers' in sovereign financing. When there are unexpected changes in financial requirements, sovereign debt managers can delay adjusting debt issuance rates during the year, typically through changes in the issuance of T-bills (OECD, 2022[24]).

[6] A borrowing plan, based on funding strategies, often sets out an issuance calendar with information on issuance methods and the use of debt management operations and tools.

[7] Monetary policy influences the yield curve (i.e. yields for different maturities) through at least two channels: 1) forward guidance (i.e. changes in the expectations of future levels of interest rates) and 2) term spread (i.e. the excess return required by investors to hold a bond to maturity net of the expected return from continually reinvesting at the short-term rate over that same time horizon) (Lane, 2019[27]). More specifically, an increase in policy rates under a scenario of unchanged expectations of future levels of interest rates would affect the yield of short-term investments, while its effect on long maturities tends to be less pronounced as it is "weighted" by the (held constant) expectations of future levels of interest rates. In other words, the increase affects short-term maturities more than their long-term counterparts. However, if central banks communicate about future hikes, they will influence the intermediate and long

maturities accordingly. Regarding the term spread, as there is virtually no credit risk in sovereign securities of OECD countries, it captures mostly the duration risk – the impact on the securities' price that comes from changes in the yield curve. As future interest rates are affected by future decisions of central banks, which are navigating a trade-off between controlling inflation while avoiding causing unnecessary damage to the economy (BIS, 2022[11]), the shape of the yield curve is affected by expectations on inflation, growth and employment outlooks.

[8] It is important to note that the phenomenon of short-term yields rising more significantly than their long-term counterparts is commonly observed during periods of monetary tightening. This occurrence, known as bearish flattening, leads to a flatter yield curve in a bearish bond market, characterised by falling prices due to rising interest rates. This dynamic arises from market expectations concerning future interest rates, growth, and inflation. A flattening yield curve indicates slowing economic growth, which results from higher funding costs and, consequently, reduced long-term real returns. Investors may opt to purchase long-dated maturities as a protective measure against this downturn. In this scenario, investors anticipate that central banks will accommodate their current monetary policy stance, and the potential impact of future policy rates will be factored into long-term yields (i.e. due to the arbitrage principle, long-term yields are just the weighted average of the future policy rates).

[9] Although curve inversions have been associated with recessions in the past, they are merely indicators reflecting market expectations about the path of inflation and monetary policy and should not necessarily be regarded as a harbinger of economic downturns (Engstrom and Sharpe, 2022[28])..

[10] The bottom whisker extends from the lower edge of the box (which represents the 1st quartile, or 25th percentile) to the smallest data point that is not considered an outlier. Outliers are considered as data points that are below the 1st quartile minus 1.5 times the interquartile range (i.e., the difference between the 3rd and 1st quartiles).

[11] Firstly, the maturity of the current debt portfolio determines the outstanding amount of debt to be refinanced during the period of high interest rates. Suppose a fixed-rate bond matures only after this period. In that case, the yield at issuance of a debt portfolio (i.e. the one that proxies the borrowing cost to the issuer) will be unaffected by the current interest rate hike, and debt holders will only experience losses. Secondly, the outstanding amount of floating-rate and index-linked instruments, as the principal and (or) the coupons of these instruments are refixed, usually within a period of fewer than six months, based on the new index or rate of reference. Thirdly, the share of debt denominated in foreign currency, as borrowing costs in local currency depend on foreign exchange rate movements, which are linked to differences in the expectations on interest rates and inflation of the issuing country and the country whose currency the debt is denominated in. Particularly during times of uncertainty, investors tend to prefer holding the debt of developed economies, whose macroeconomic fundamentals are typically more robust, increasing the cost in the domestic currency of the debt denominated in hard currencies.

[12] These include Estonia (2032, previously 2030), Germany (2053, previously 2052), Iceland (2042, previously 2033), Japan (2062, previously 2061), the Netherlands (2054, previously 2052), Norway (2042, previously 2023), and the United States (2052, previously 2051).

[13] The answers from the 2022 Survey on Central Government Marketable Debt and Borrowing revealed that virtually all OECD countries compute the ATM and more than 60% the ATR, while roughly 90% computes the share of debt maturing in the next few years. Theoretically, two countries may have identical ATM and ATR values but experience significantly different exposures. For example, consider a country with a 10-year ATR and a debt portfolio consisting solely of zero-coupon fixed rates maturing in 10 years.

Its exposure to interest rate fluctuations differs greatly from a country with the same ATR, with half of its debt portfolio maturing in the next year and the other half in 20 years. In the latter scenario, half of the country's debt portfolio would be refinanced under new interest rates, while in the former case, the issuer remains unaffected. It is worth noting that this is a (very) stylised example with the sole purpose of showing how the ATM/ATR can be misleading. No OECD country has such a small diversity of bond types across the maturity spectrum.

[14] According to the OECD Government at Glance 2021 for 2019. The amount spent on these government functions was 0.5% and 0.6% of GDP, respectively.

[15] Selected examples are: 1) *Australia*: Since February 2022, the Reserve Bank of Australia ceased bond purchases while ruling out bond sales to minimise market impact, gradually decreasing bond holdings (Reserve Bank of Australia, 2022[39]); 2) *New Zealand*: On 23 February 2022, the Reserve Bank of New Zealand agreed to initiate a gradual reduction of bond holdings by selling a limited number of securities in order of maturity date, starting with the longest maturity, while allowing shorter-maturity bonds to mature without reinvesting the proceeds (Reserve Bank of New Zealand, 2022[30]); 3) *Canada*: Since April 2022, the Bank of Canada (BoC) discontinued its bond purchase programme (Bank of Canada, 2022[29]); 4) *The United States*: On 4 May 2022, the Federal Reserve Board communicated that reductions of the System Open Market Account's (SOMA) balance sheet would be gradual, predictable, and achieved by capping the number of reinvestments from the proceeds of matured bonds (Board of Governors of the Federal Reserve System, 2022[36]);[15] 5) *The United Kingdom*: In September 2022, the Bank of England's (BoE) Monetary Policy Committee decided (and implemented the decision) to commence selling UK Government bonds (gilts) from November onwards, with a quarterly schedule targeting short- to medium-term maturity sectors (3 to 20 years) (Bank of England, 2022[34]); 6) *Sweden*: On 20 September 2022, Sweden's central bank (Sveriges Riksbank) announced that the asset purchase programme was expected to cease at year-end, leading to a gradual decline in its balance sheet across all maturities (Sveriges Riksbank, 2022[32]); and 7) *The European Union*: On 15 December 2022, the ECB president, Christine Lagarde, announced in a press conference that from March 2023, the ECB's holdings would decline at a measured and predictable pace, as it would not reinvest all proceeds from matured securities (European Central Bank, 2022[31]) The ECB may still purchase securities through the Transmission Protection Instrument (TPI) to smooth monetary policy stance across Euro area countries via targeted bond purchases for countries with sound fiscal and macroeconomic policies (European Central Bank, 2022[33]).

[16] It is worth noting that the movements in central banks' government holdings differ from the movements of their total holdings. The BoJ, for instance, decreased its total holdings by 2.6% between the first quarter of 2022 and the first quarter of 2023.

[17] These central banks were selected given the data available on the maturity of their government security holdings.

[18] Based on the discussions and background documents from the 2022 meeting of the Working Party of Debt Management. Bid-ask spreads refer to the difference between the bid and ask prices; turnover to the traded volume as a share of the outstanding amount, free float to the share of the outstanding amount that can be freely traded on the market, and the average bid-to-cover ratio to the dollar amount of bids received in a treasury security auction versus the amount sold.

[19] The OECD Council adopted Accession Roadmaps for Brazil, Bulgaria, Croatia, Peru, and Romania in June 2022.

[20] Several DMOs and CBs across the OECD have bolstered market liquidity through security lending facilities. These facilities function in the repurchase agreement market (Repo market) – a market in which a counterparty sells a security with a simultaneous agreement by the seller to repurchase the same security from the same buyer at a pre-agreed price. Through this operation, the buyer acquires a security that can be utilised for transactions in the market, thereby enhancing liquidity. CBs have become active in this market, given their extensive range of securities purchased during quantitative easing. For instance, the New York Fed's Open Market Trading Desk is authorised to conduct repo and reverse repo transactions to support effective monetary policy implementation and facilitate smooth market functioning (Federal Reserve, 2022[38]). The ECB has permitted repo transactions using securities acquired under the public sector purchase programme (PSPP) since 2015 (European Central Bank, 2022[37]). Given the importance of market liquidity to sovereign issuers, some DMOs have also started operating repo facilities. Repo facilities managed at the DMO level can provide liquidity even for off-the-run securities and those not purchased by the central bank during liquidity squeeze, thereby rendering markets more resilient to shocks. DMOs can also utilise the Repo facility to conduct reverse Repos, which can offer them a more favourable yield compared to central bank deposits, thus improving their cash management. As of 2022, 26 OECD and accession countries operate a lending facility, 11 are considering implementing one, and only two countries (Korea and Estonia) neither possess nor contemplate having such a facility (calculations based on the OECD member and accession countries' responses to the 2022 OECD Survey on Liquidity in Secondary Government Bond Markets).

[21] Primary dealers (PDs) are financial institutions (i.e. banks or securities firms) that are entitled to buy government securities in primary markets to resell them to others, thus acting as market makers of government securities.

[22] These requirements are, in many cases, associated with benefits such as enhanced communication with the DMO, direct access to auctions, and access to security lending facilities, among others.

2 Sovereign sustainable bonds: Issuance trends and practices

The sovereign sustainable bond market is evolving, with new issuers and new approaches such as sustainability-linked and transition bonds.
The years running up to 2022 saw a marked increase in the pace of sovereign sustainable bond issuance. After declining in 2022, issuance activities in the first four months of 2023 indicate a strong rebound. The long-term future of this market depends on a variety of demand- and supply-side factors, including continuity of strong investor demand and simplification and standardisation across the bond lifecycle, from issuance procedures to impact reporting.
Drawing on a wealth of data sources including a recent survey of issuers, this chapter delves into trends, benefits, and challenges associated with sovereign issuance of sustainable bonds, and presents country practices that can assist sovereign issuers in their efforts to meet those challenges.

2.1. Introduction

This chapter builds upon the discussion on sovereign sustainable bonds from the 2022 Sovereign Borrowing Outlook (SBO) by providing a comprehensive overview of the sovereign sustainable-bond market, emphasising the latest trends in issuances and the operational aspects of these issuances. The analysis utilises survey data, market data, and debt management offices' (DMOs) framework, allocation, and impact reports. The structure of this chapter is organised as follows: it begins by analysing the trends in sovereign sustainable bond issuance. It then delves into OECD practices, supplementing the survey-based analysis by examining the framework, allocation, and impact reports of OECD countries. Finally, the last two sections investigate the primary challenges in and the prospects for sovereign sustainable bond issuances.

Key findings

- **After more than doubling between 2020 and 2021, sovereign sustainable bond issuance decreased by 18% in 2022.** This first-ever decline was primarily due to reduced activity from large issuers, and the appreciation of the US dollar, which diminished the value of issuances denominated in other currencies.
- **The stock of sovereign sustainable bonds now exceeds USD 325 billion globally, with two-thirds issued by advanced economies (AEs)**. However, despite recent rapid growth, sovereign sustainable bonds represent a small share of total sovereign bond issuances, averaging 2.2% for AEs and 8.1% for emerging market and developing economies (EMDEs) in 2022.
- **Majority of sovereign sustainable bonds are euro-denominated and sustainable bonds have longer maturities.** The large volume of Eurozone issuances means more than half of the outstanding sustainable bonds are denominated in euros, followed by US dollars, largely from the issuance of EMDEs in international bond markets. Maturities are on average five and two and a half years longer than conventional bonds for AEs and EMDEs, respectively.
- **Green bonds have maintained their dominance in the sovereign sustainable bond market,** accounting for over 75% of sovereign sustainable instruments mainly issued by AEs. New approaches such as sustainable and sustainability-linked bonds, developed to overcome some of the challenges of green bonds, are more popular among EMDEs.
- **Most sovereign sustainable bond proceeds are directed towards clean transportation, energy efficiency, renewable energy, and sustainable water and wastewater management.** However, countries have a wide and varied range of eligible expenditures based on their investment strategies and characteristics.
- **Sovereign debt managers face major challenges in issuing sustainable bonds**, notably administrative burdens in identifying eligible projects and reporting on funds' use and impact, a lack of internal expertise, and a general lack of eligible projects in budgets, which existing green budgeting practices can help address.
- **Further progress is required to lift the integration of environmental and social factors in public debt management practices and to promote robust and liquid sustainable bond markets,** including through greater standardisation of sustainable products and related taxonomies and impact reporting, expanding eligible expenditures, and sustained growing investor demand for sustainable investing and sustainable products.
- **A wider adaptation of green budgeting,** which is a form of outcome-based budgeting that evaluates the impact of expenditures and budgetary measures, can further support the issuance of sustainable bonds.

2.2. Recent trends in sovereign sustainable bond issuance

2.2.1. Sovereign sustainable bond issuances declined in 2022 after peaking in 2021

Sustainable bonds refer to an emerging category of financial instruments that have captured the attention of investors. These bonds can be categorised into three primary types. Firstly, based on the use of proceeds, which includes green, social, sustainability, SDG (Sustainable Development Goal), and transition bonds. These instruments are explicitly designated for projects that deliver positive environmental and/or social outcomes. Secondly, based on Key Performance Indicators (KPI), known as sustainability-linked bonds, which tie financial performance to pre-determined sustainability targets, often through non-binding documentation. Lastly, there are unlabelled bonds, which are deemed ESG-compliant based on a second-party opinion. While these are more common amongst corporate issuers, some sovereign cases may also exist. This chapter will delve into the nuances of sovereign sustainable bonds by exploring these distinct types and their implications for both investors and issuers.

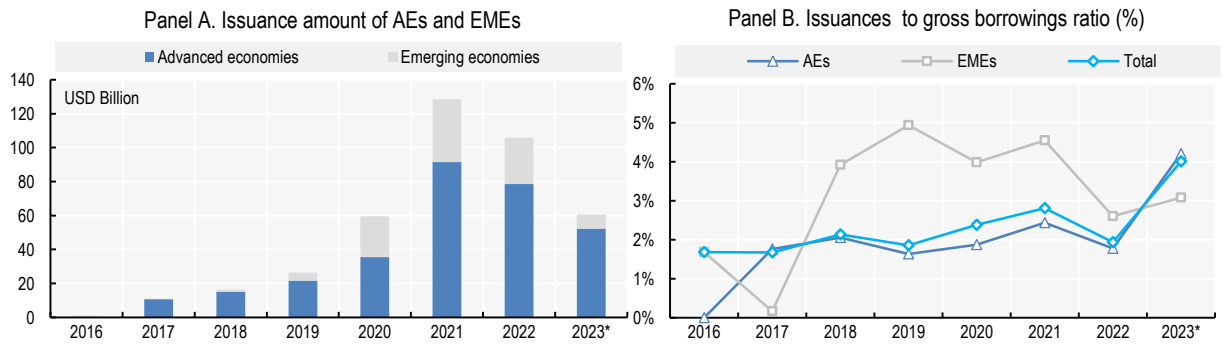
Sustainable bonds have gained ground in the government bond market in recent years on the back of robust market demand and supply. On the demand side, the number of investors who are committed to responsible investment and integrating environmental and social factors into their investment decisions and processes is rapidly increasing (e.g. Norwegian Global Fund, Denmark's ATP Pension Fund, Swedish National Pension Fund and the California State Teachers' Retirement System) which, in turn, supports portfolio investments in sustainable securities. On the supply side, the growing issuance momentum was sustained between 2016 and 2021, with a more than tenfold increase in gross amounts in this period. The trend accelerated in the wake of the COVID-19 pandemic, due to both the sudden increase in borrowing needs prompted by the pandemic, and by governments' expanding social and climate agenda and efforts to promote sustainable finance markets (OECD, 2022[1]). Hence, the issuance amount reached record levels in 2021, at around USD 129 billion (Figure 2.1 Panel A).

After rising with a growth rate of 115% from 2020 to 2021, the issuance amount declined by 18% to USD 106 billion in 2022 (Figure 2.1 Panel A). While this was the first decline in issuance since the debut of these instruments in 2016, levels are still relatively high, with the amount issued in 2022 almost double that of 2020. The decrease in 2022 in sovereign sustainable bond issuance is also reflected in the relative share of the issuers' gross borrowings in marketable debt, meaning that the decline in overall government borrowing needs in the same year (see Chapters 1 and 3 for details) does not explain the reduction in labelled issuances. More precisely, after peaking at 2.8% in 2021, the ratio of sovereign sustainable issuance to total issuances declined to 1.9% in 2022 (Figure 2.1 Panel B).

It should be noted that the decrease in sovereign sustainable issuance was more acute for emerging market and developing economies (EMDEs), which issued 26% less in 2022 than in 2021, compared to 14% for advanced economies (AEs). Nevertheless, despite a reduction in the share of EMDEs in global sovereign sustainable bond issuances, as a share of their respective total gross borrowings, EMDEs issued significantly more sovereign sustainable bonds than AEs since 2018 (e.g. 1.5 times more in 2022).

This relative and absolute decrease in sovereign sustainable bond issuances in 2022 can be attributed to three main factors. Firstly, 2021 was an exceptional year as large issuers of sovereign government bonds debuted in this market, such as Italy, Spain and the United Kingdom, which contributed to doubling the amount issued in that year compared to 2020. Secondly, 89% of the issuances were made in currencies other than the US dollar. Given the substantial appreciation of the USD in 2022, issuances in dollars also diminished due to a pure foreign exchange effect. This effect accounts for roughly one-third of the reduction (i.e. 6 percentage points of the 18% reduction). Lastly, four of the top five issuers (i.e. Chile, France, Italy, and the United Kingdom) reduced their issuances in 2022.[1]

Figure 2.1. Sovereign sustainable bond issuance trends in advanced and emerging market economies



Note: *Values of 2023 are as of April 2023.
Source: OECD calculation based on data from Refinitiv.

One factor behind the reduction in the issuances from large issuers of sustainable bonds, comprising both AEs and EMDEs, is the limited size of eligible expenditures; France and Chile, two large issuers, attributed their lower issuance amount in 2022 to this. In France, the envelope of green expenditure for Green Bonds, including public subsidies for renewable energies, was revised downward against the backdrop of a lack of need for subsidies for renewable energy tariffs in 2022[2] (Agence France Trésor (AFT), 2022[2]).[3] In the case of Chile, the country's borrowing needs are declining, as is the size of its eligible expenditures and room for sustainable bonds, despite a favourable environment with stable investor demand and improved pricing and liquidity conditions for these instruments (Annex A).[4]

It is worth highlighting that corporate sustainable bond markets have been following a similar trend to sovereign bond markets. In 2016, companies issued USD 74 billion in Sustainable bonds and issuances peaked in 2021 at USD 622 billion, a more than eight-fold increase over five years. Total issuance fell in 2022 but remained high, at USD 516 billion. However, there is a noteworthy difference between sustainable sovereign and corporate bond markets: sustainable bonds are relatively more commonplace for companies. For instance, the ratio of sustainable bonds to total bond issuances by non-financial corporates was 13% in 2021 and 15% in 2022.

2.2.2. *The first four months of 2023 marked a historic high in the amount issued*

In the first four months of 2023, the sovereign sustainable bond market witnessed the entry of several new participants. Israel issued USD 2 billion in 10-year green bonds through an international offering on 25 January. India introduced its debut 10-year Sovereign Green Bond in January, amounting to INR 80 billion (USD 1 billion), and followed up with a second issuance of the same value in February due to the positive response. In March 2023, Slovenia made its first issuance worth USD 1.25 billion. In addition, Türkiye and Cyprus issued 7-year and 10-year sovereign sustainable bonds valued at USD 2.5 billion and USD 1.1 billion, respectively.

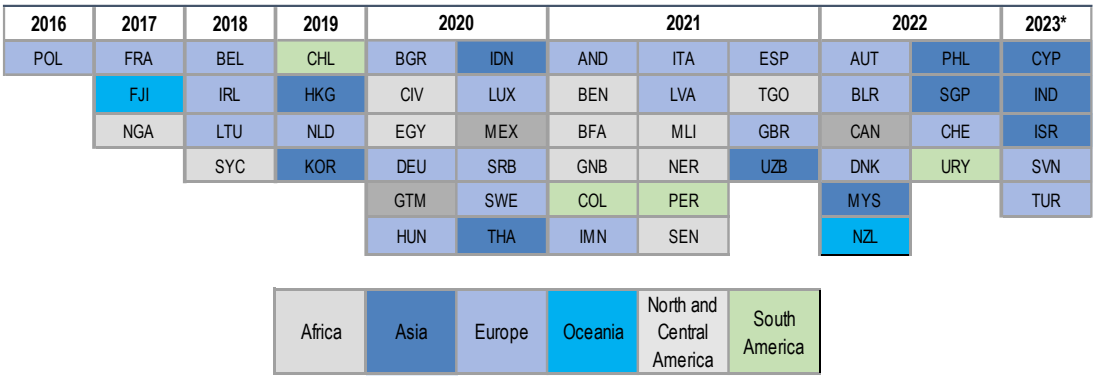
From January to 26 April 2023, governments issued sustainable bonds worth approximately USD 60 billion – higher than the issuance in the same period over the past six years. This figure is nearly triple that of 2022 and 60% higher than the previous record set in 2021. The momentum of sustainable bond issuance is anticipated to carry on in the coming years, encompassing both OECD member countries and various emerging market economies. Potential debut issuers within the next 12 months include Greece and Iceland among the OECD members, and Brazil and the United Arab Emirates among EMDEs.

2.2.3. *The number of sovereigns issuing sustainable bonds continues to increase*

The number of sovereign issuers of sustainable bonds has increased rapidly since the issuances from Poland in 2016 and France in 2017 (followed by Fiji and Nigeria in the same year) (Figure 2.2). Twelve countries debuted issuance in 2020 and a further 16 in 2021, amid increased government borrowing needs due to the COVID-19 pandemic, which widened the scope for new instruments, as well as governments' increased willingness to meet their Paris Agreement commitments and UN Sustainable Development Goals. In 2022, ten new countries issued their debut sovereign sustainable bonds, below the number of new issuers in 2021 and 2020.

As of April 2023, 55 countries have already issued such instruments since the first in 2016. Of these, 24 are European, 11 are African, 11 are Asian, four are South American, three are from Central or North America and the remaining two are from Oceania. As a share of the number of countries in each continent, 55% of all European nations already issued a sovereign sustainable bond, followed by 33% in South America, 20% in Africa, 23% in Asia, 14% in Oceania and 13% in Central and North America. It is worth noting that the three largest issuers of sovereign bonds, Japan, the People's Republic of China (hereafter 'China') and the United States, have never issued a sovereign sustainable bond.

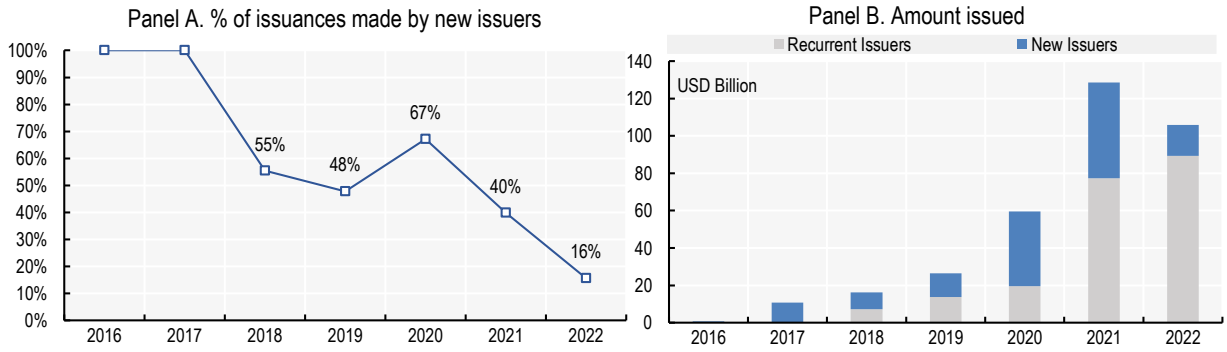
Figure 2.2. New sovereign issuers by year of debut issuance



Note: New issuers are defined by countries that issued for the first time that year. Data from 2023 refers to the issuances made until 26 April.
Source: OECD calculation based on data from Refinitiv.

As expected in a growing market, the volume share of issuances made by new issuers (i.e. countries that issued for the first time in a given year) has been decreasing on an annual basis (Figure 2.3). At the same time, sovereign issuers, especially large issuers, are committed to mainstreaming sustainable bond issuance in their annual strategy and sustaining the liquidity of debt securities on both primary and secondary markets. For example, 15 out of the 24 countries that issued sovereign sustainable bonds for the first time in 2020 or before issued in all years following their first issuance, while only nine went for sporadic issuances. As many sovereigns have already issued their first sustainable bond market, future issuances will rely on recurrent issuances instead of on debut issuance. Recurrent issuance of these bonds is important to support the deepening of the market and ensure the entrance of new issuers, influenced by leading examples. In addition, this would create positive spillovers to the private sector, especially by setting up a benchmark for private issuers, and could generate crowding effects (OECD, 2022[1]).

Figure 2.3. Issuer trends: new entrants vs recurrent issuers



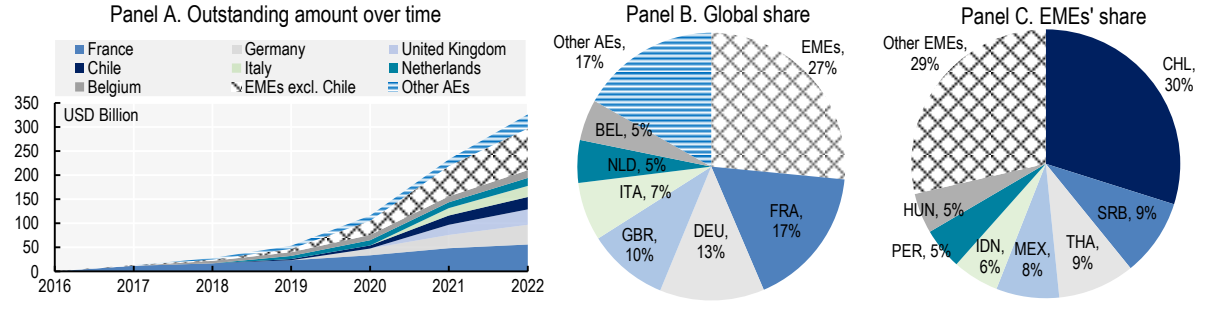
Note: New issuers are defined by countries that issued for the first time that year. Data from 2023 refers to the issuances made until 26 April.
Source: OECD calculation based on data from Refinitiv.

2.3. Composition of the outstanding sovereign sustainable bonds

2.3.1. AEs account for the majority of all sovereign sustainable bonds' stock, with France and Germany accounting for roughly one-third of it alone

In terms of the USD 326 billion outstanding in sovereign sustainable debt as of 2022, Figure 2.4 shows, in descending order, that France, Germany, the United Kingdom, Italy, the Netherlands, and Belgium are the largest AEs sovereign issuers, accounting for 65% of all the debt stock combined. Chile is the only EMDE that makes up more than 5% of all the sovereign sustainable bond stock, with 8% of the total stock and 30% of all EMDEs stock. In descending order, other EMDEs comprising more than 5% of the EMDE stock are Serbia, Thailand, Mexico, Indonesia, Peru and Hungary. It is worth noting that although OECD EMDEs (a group comprising Chile, Colombia, Costa Rica, Hungary, Mexico, Poland, and Türkiye) account for only 11% of EMDEs' total outstanding sovereign debt, they make up 47% of all EMDE sovereign sustainable bonds' outstanding amount. In addition, the European Commission might shortly become the largest player in the sustainable bond market – the European Commission plans to continue funding NextGenerationEU (an instrument designed to help repair the immediate economic and social damage caused by the COVID-19 pandemic) through the issuance of green bonds, which could amount to EUR 250 billion, or 30% of the programme's total needs (European Commission, 2023[3]).

Figure 2.4. Country composition of outstanding sovereign sustainable bonds



Source: OECD calculation based on data from Refinitiv.

Naturally, the more debut issuers that join the sovereign sustainable market the more the outstanding amount is distributed across countries. The share made up by EMDEs rose from 8% in 2017 to 35% in

2021 and remained roughly stable in 2022. As a share of their total sovereign marketable debt stock, sustainable bonds account for 1.7% of the outstanding amount issued by AE sovereigns and 3.0% by EMDE sovereigns. In no advanced economy did this share exceed 10%, while for ten EMDEs this value exceeds 30%, including Chile.

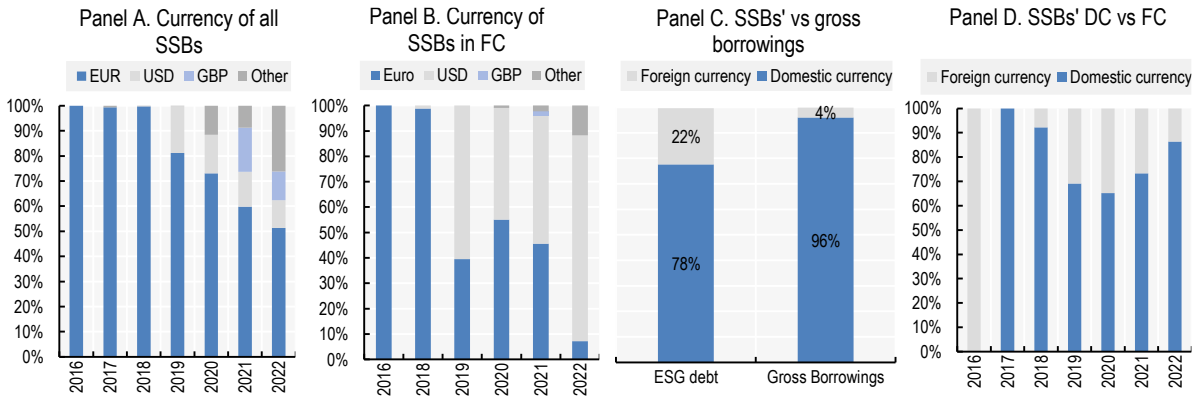
2.3.2. The euro remains the preferred currency in sovereign sustainable bond issuances, accounting for half of the issuances in 2022, down from 60% in 2021

In 2022, the euro maintained its position as the primary currency of choice for sovereign sustainable bond issuances, representing over 51% of the total issuance, a decrease from 60% in 2021 (Figure 2.5 Panel A). The proportion of sovereign sustainable bonds denominated in US dollars diminished from 14% to 11% in 2022, while the British pound constituted approximately 11% of the annual issuance in 2022, a decline from 18% in 2021. Other currencies, such as the Canadian dollar, Chilean peso, Colombian peso, Mexican peso, New Zealand dollar, and West African CFA franc, comprised the remaining 26% of the 2022 issuance. The predominance of the euro can be attributed to the considerable number of EU countries issuing such bonds. In fact, 85% of all sustainable bonds issued since 2016 in euros originate from the euro area.

Countries tend to issue a higher proportion of sustainable bonds in foreign currencies than conventional bonds, with 22% of all issuances since 2016 (Figure 2.5 Panel B) being denominated in foreign currencies, compared to a mere 4% for conventional bonds for the same countries within the same period (Figure 2.5 Panel C). When examining country averages (rather than the aggregate), 35% of the total amount issued was denominated in foreign currency, as opposed to 23% for conventional bonds. However, there are significant asymmetries across countries. On the one hand, countries such as Chile, Egypt, Korea, the Philippines, Poland, and Uruguay issued in foreign currency, and tended to benefit from labelled bonds in accessing international capital markets. On the other hand, countries such as Cote d'Ivoire, Senegal, and Uzbekistan issued all their sovereign sustainable bonds in domestic currencies, while an average of 70% of their funding needs were financed through bonds denominated in foreign currency since 2016. Box 2.1 explores the impact of sovereign sustainable bond issuance in the debt portfolio with more detail.

While the euro has been the predominant currency in the sovereign sustainable debt market since 2016, the US dollar is the preferred currency for foreign currency issuances (Figure 2.5 Panel D). Since 2016, the amount of sovereign sustainable bonds issued in USD (USD 42 billion) has been higher than the amount of sovereign sustainable bonds issued in euro as a foreign currency (USD 33 billion). This is mainly explained by the issuance by Chile of 65% of its outstanding sustainable bonds in USD and 32% in euro. Additionally, Asian and South American countries, which have mainly entered this market since 2019, have issued more in US dollars than in euros. Indonesia, Peru, South Korea, and Hong Kong respectively issued 87%, 75%, 65%, and 60% of their sustainable bonds in US dollars. Aside from Benin, all other countries that issued more sustainable bonds denominated in euro as a foreign currency are the countries in Eastern Europe (i.e. Bulgaria, Poland and Serbia).

Figure 2.5. Currency composition of sovereign sustainable issuances



Note: SSBs, FC and DC refer to sovereign sustainable bonds, denominated in foreign currency and denominated in domestic currency, respectively. The "Other currencies" category includes Canadian Dollar, Chilean Peso, Chinese Yuan, Colombian Peso, Danish Krone, Fijian Dollar, Hungarian Forint, Indonesian Rupiah, Japanese Yen, Nigerian Naira, Swedish Krona, Thai Baht, and Uzbekistani Sum. Panel C: No foreign currency issuance in 2017.
Source: OECD calculation based on data from Refinitiv.

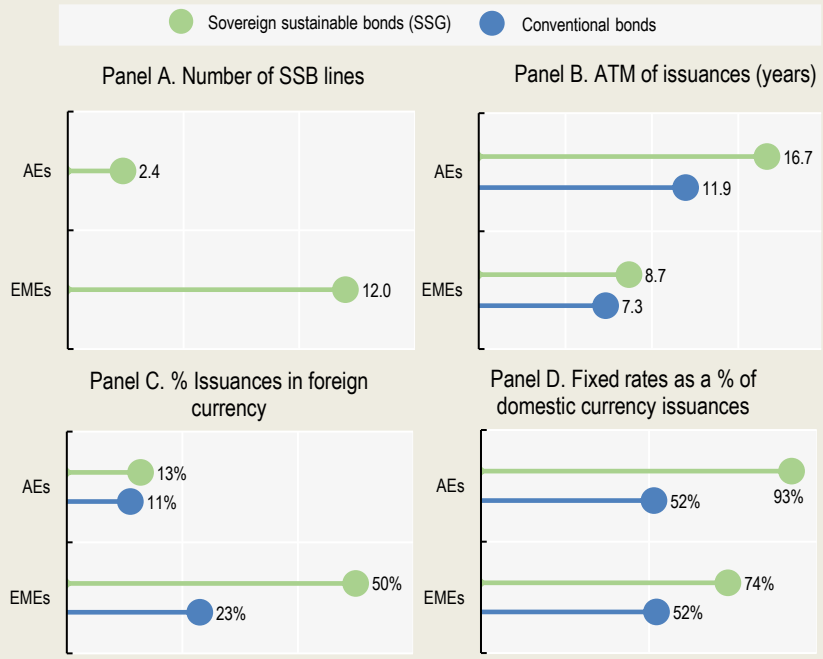
Box 2.1. The impact of sovereign sustainable bonds on countries' debt portfolios

Sovereign sustainable bonds can change the risks and costs of debt portfolios

Sovereign issuers diversify their debt instruments to fulfil government financial needs while minimising borrowing costs and risks. To accomplish this, DMOs issue various instruments, such as long-term maturities, short-term instruments, floating rate securities, and index-linked securities. These instruments impact the issuer's strategy differently, with some offering lower costs and higher risks, and others presenting higher costs and lower risks. Furthermore, DMOs aim for a diverse investor base to benefit from a liquid market that enables efficient security trading at lower costs and higher volumes.

In this context, sovereign sustainable bonds can help achieve debt managers' objectives concerning the diversification of the investor base. As reported by a few DMOs, these bonds attract different investors compared to conventional bonds, diversifying the investor base and potentially altering the cost and risk trade-off. However, depending on the sustainable bonds' features, such as maturity, indexation, currency denomination and (floating) coupon, they may also increase debt portfolio risks or costs. Figure 2.6 compares the characteristics of sovereign sustainable bonds with conventional bonds, demonstrating that some countries benefit from issuing these bonds to reduce debt portfolio risks, while others incur additional risks through their issuance.

Figure 2.6. Characteristics of sovereign sustainable bonds VS conventional bonds



Note: This chart covers only countries that issued sovereign sustainable bonds. For each specific country, only the years in which at least one labelled issuance occurred are included. So, for instance, for a country that issued sovereign sustainable bonds in 2020 and 2022, with no issuance in 2021, the data will cover 2020 and 2022. Unweighted averages were used so the impact of small issuers is not averaged out of the computation. ATM refers to average term-to-maturity, which is the weighted average of the term-to-maturity of bond issuances.
Source: OECD calculation based on data from Refinitiv.

Compared to conventional bonds, sovereign sustainable bonds generally have longer maturities, are more frequently denominated in foreign currency, and, when in domestic currency, often have fixed rates

In terms of the number of sovereign sustainable bond lines, EMDEs, on average, have roughly five times the number of bond lines than AEs, resulting in a more diverse range of maturities and instrument types (Figure 2.6 Panel A).

Sovereign sustainable bonds contribute to lengthening the debt portfolio in terms of weighted average term-to-maturity (ATM) (Figure 2.6 Panel B). For AEs, the ATM of labelled bonds is nearly five years longer than conventional bonds, while for EMDEs, the difference is around one and a half years. Of the 50 countries that issued sovereign sustainable bonds until 2022, only in seven AEs and three EMDEs was the ATM of conventional bonds longer than that of labelled bonds.

Sustainable issuances denominated in foreign currency can create debt payment fluctuations in local currencies, if not hedged. Despite the high share of sovereign sustainable issuances denominated in foreign currency in EMDEs, this average conceals the fact that only a few countries issued sovereign sustainable bonds denominated in foreign currency, while the countries that issued in local currency also tend to issue a portion of their labelled bonds in foreign currency. Of the 50 sovereign issuers of sustainable bonds, the share of issuances denominated in foreign currency was higher for labelled bonds compared to conventional bonds in 16 countries.

Regarding domestic currency bonds, sovereign sustainable bonds are predominantly fixed rates for both AEs and EMDEs (Figure 2.6 Panel D). The average share of fixed rates accounts for a significantly higher proportion of gross borrowing in domestic currency. Only four sovereign issuers –Benin, Mexico, Senegal,

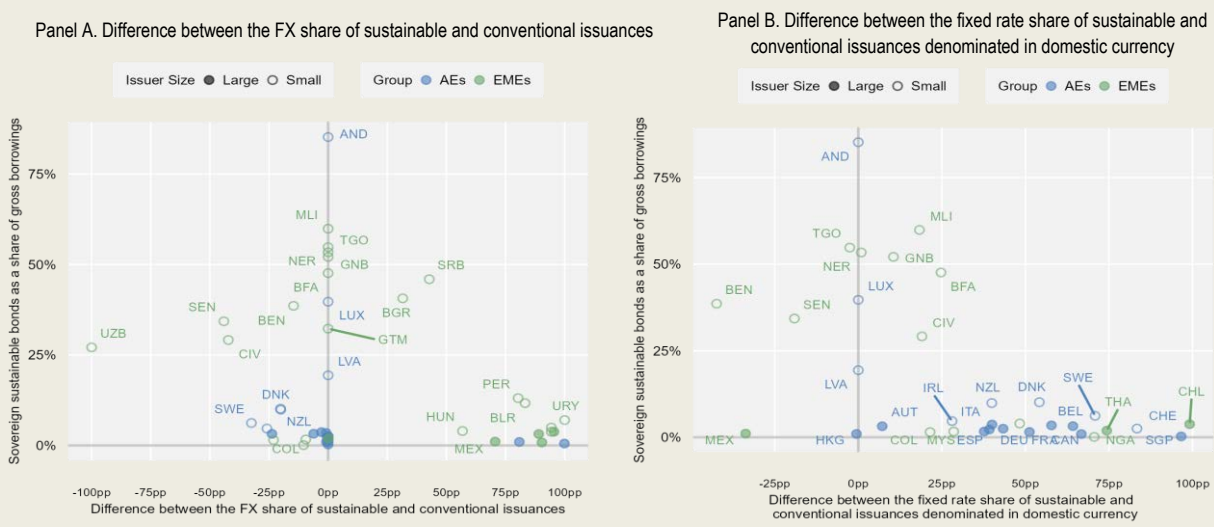
and Togo –saw the issuance of sustainable bonds reduce the share of fixed rates issued in domestic currencies. Benin, Senegal, and Togo issued short-term sovereign sustainable bonds, while Mexico issued sovereign sustainable bonds with floating rates.

A few countries have managed to reduce their debt portfolio risks by issuing significant amounts of sovereign sustainable bonds in domestic currency with fixed rates

Although labelled issuances are primarily fixed rates and tend to have longer ATMs, their impact on debt portfolios may be minimal if they only account for a small share of gross borrowings. Figure 2.7 examines the effect of sovereign sustainable issuances on debt portfolios by displaying the share of gross borrowings on a country-specific basis and the differences between labelled and conventional issuances concerning foreign currency denomination and instrument type. This analysis yields three notable findings.

First, labelled issuances constitute a considerably lower share of gross borrowings for large issuers than for small ones, implying that labelled issuances have a greater potential to alter the debt portfolios of smaller issuers. Second, some countries, particularly a few from the West African CFA franc monetary union (e.g. Burkina Faso, Guinea Bissau, and Mali), can moderately reduce their debt portfolios' sensitivity to interest rate risks by issuing a significant amount of labelled bonds in domestic currencies with fixed rates. Third, other countries, such as Benin, Senegal, and Uzbekistan, are moderately increasing their exposure to foreign exchange risk. This demonstrates that the impact of sovereign sustainable bonds on debt portfolios can be substantial and diverse across countries, with a few nations actively mitigating their risks through the issuance of sustainable bonds.

Figure 2.7. Country-specific analysis of the impact of sovereign sustainable issuances on debt portfolios



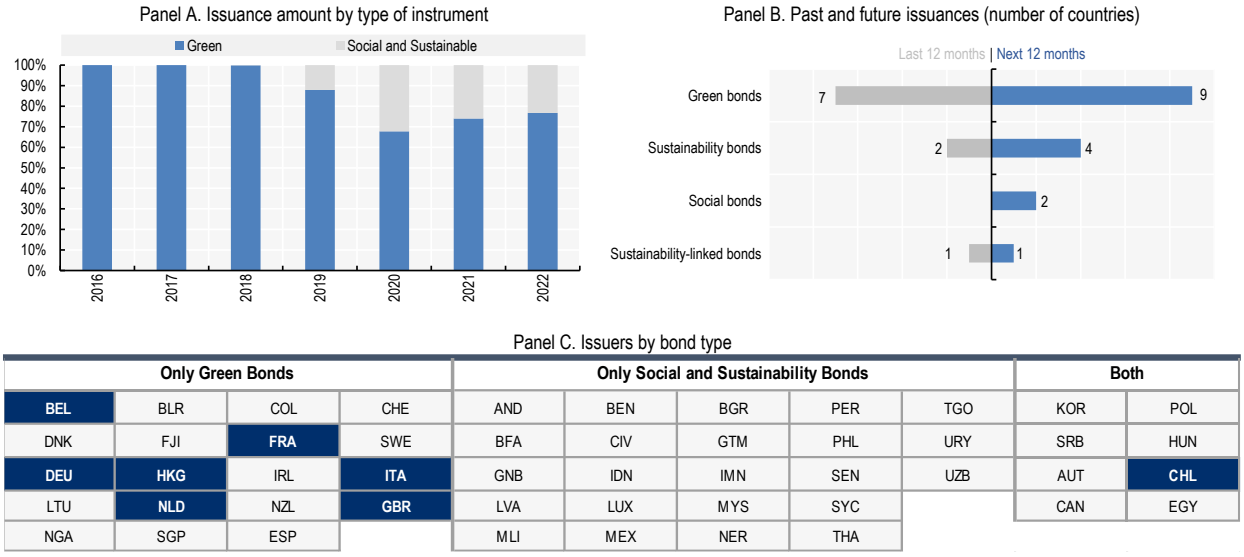
Notes: The data cover only countries that issued sovereign sustainable bonds. For each specific country, only the years in which at least one labelled issuance occurred are included. So, for instance, for a country that issued sovereign sustainable bonds in 2020 and 2022, with no issuance in 2021, the data will cover 2020 and 2022. Large issuers refer to the group of 26 issuers that issued more than 0.2% of all gross borrowings since 2017. Smaller issuers refer to the rest of the countries.
Source: OECD calculation based on data from Refinitiv.

2.3.3. AEs have predominantly issued green bonds while EMDEs also focus on social and sustainability bonds

Green bonds continue to be the top choice for labelling in the sovereign sustainable bond markets and are expected to remain the most frequently issued new product in the upcoming year. Since 2016, green bonds accounted for over 75% of all sovereign sustainable instruments (Figure 2.8 Panel A), though this share has decreased over time. Looking forward, according to the 2022 OECD Survey on Central Government Marketable Debt and Borrowing, although OECD countries are planning to issue more green bonds compared to sustainability, social, and sustainability-linked bonds, the share of countries planning to issue sustainability and social bonds is growing faster (Figure 2.9 Panel B).

In addition, transition bonds, proceeds of which are used in heavy-polluting sectors such as oil and gas, steel, aviation and shipping, or so called "brown" projects that aim to reduce environmental impact or emissions, have been considered by a few sovereign issuers including Canada and Japan. While green bonds require climate and other environmentally beneficial projects to be identified for financing or refinancing, transition bonds focus on the use of proceeds categories that help governments progress towards their decarbonisation goals, thereby supporting countries' transition from brown to "less brown" or "greener". For example, the Japanese Ministry of Finance announced its plan to issue 'GX Economy Transition Bonds' in 2023, as part of the government's plan to shift the current energy sources to greener power sources and to drive the country towards carbon neutrality by 2050 (Japanese Ministry of Finance, 2023[4]). However, this debt instrument has yet to become mainstream in sustainable financing due to a lack of widely accepted criteria for eligible transition projects. Similar to other sustainable bonds, it is important to establish transparency and clear criteria to help both issuers and investors navigate this complex market.

Figure 2.8. New issuance by type of instrument



Sources: 2022 OECD and accession countries Survey on Primary Market Developments. OECD calculations based on data from Refinitiv.

While AEs are more likely to issue green bonds almost exclusively, EMDEs are more likely to issue social, sustainability and sustainability-linked bonds. Out of the 50 issuers of labelled bonds up until 2022, 23 countries solely issue social and sustainable bonds, while only 19 exclusively issue green bonds. However, out of the eight countries that have issued over USD 10 billion since 2016, seven have exclusively issued green bonds, including Belgium, France, Germany, Hong Kong, the Netherlands, Italy,

and the United Kingdom, contributing to the dominance of green bonds in the global sovereign sustainable market. Box 2.2 summarises the theoretical considerations concerning the choice between green bonds and sustainability-linked bonds as well as the recent cases of Chile's and Uruguay's sustainability link issuances, the only sovereigns that have issued sustainability-linked bonds. It is worth noting that, differently from the sovereign sustainable bond market, sustainability-linked bonds are an important source of debt financing in the corporate sector. For instance, it accounted for 25% and 21% of all sustainable bond issuances in 2021 and 2022 for non-financial companies, respectively.

Box 2.2. Sustainability-linked or green bonds: theory and practice

A theoretical perspective: sustainability-linked bonds vs green bonds

Sovereign Green Bonds (SGBs) and Sovereign Sustainability-Linked Bonds (SSLBs) are both financial instruments that aim to finance environmentally sustainable projects. Although both instruments share a similar objective, the allocation of the proceeds and the methods to assess bond performance differ. SGBs are intended to finance green projects exclusively, such as renewable energy, energy efficiency, and clean transportation. The issuer uses the proceeds solely for these types of projects (i.e. proceeds are earmarked for green projects). In that way, the investor knows which green projects their investment helps to fund. On the other hand, SSLBs are issued with the issuer's commitment to meet specific sustainability goals, proxied by a set of KPIs. Examples include reducing carbon emissions by an established amount or increasing the share of the country's renewable energy production by a certain percentage. The bond's coupon is linked to the achievement of these objectives in a way that the country is penalised if the objectives are not met (i.e. investors get a higher return if the issuer fails to meet the established goals). The proceeds can be used for any purpose, not just for environmentally sustainable projects. Thus, SGBs are a device to channel funds to green projects while SSLBs are a commitment device that penalises governments if they do not meet sustainable goals.

Sovereign issuers have shown a preference for green bonds over sustainability-linked bonds for several reasons. Firstly, green bonds come with a transparent framework that displays how the proceeds were used (allocation report) and their impact (impact report). Secondly, from the sovereign issuer perspective, green bonds may offer a cheaper cost of financing, as they have no mechanism that increases yields if goals are not achieved, and might also have a "greenium" (i.e. lower yield compared to a similar conventional bond). However, there are challenges related to issuing green bonds. There are substantial operational costs to set up these frameworks while there might be a lack of eligible expenditures to be funded through the proceeds raised by SGBs. In addition, governments did fund green projects before the emergence of SGBs and an increase in the issuance of these bonds will not necessarily lead to greener projects – governments may simply change the funding source of green projects from taxes or conventional bonds to SGBs. In fact, some sovereign issuers allocated SGB proceeds to fund projects done in the past, highlighting that the issuance did not impact future expenditures.

SSLBs offer an option that sovereigns can explore to address challenges related to the use-of-proceeds instruments. As SSLBs' proceeds are not earmarked, they don't face the operational costs related to the allocation of funds and can enhance the commitment to sustainability goals even if there are no eligible expenditures available. SSLBs are also a closer replacement for conventional bonds, as, in essence, it is just a conventional bond with triggering criteria based on sustainability goals that might increase the coupon, and therefore a sort of hedge mechanism for investors against climate risks. However, challenges related to impact reporting are not entirely overcome, as SSLBs require a proper definition and monitoring of KPIs, which ideally should be ambitious, relevant, quantifiable, externally verifiable and benchmarkable. In addition, defining KPIs for climate adaptation that are consistent across countries is a challenge, given that climate change affects countries differently, with adaptation measures likely being country-specific and localised. SSLBs, therefore, can offer strong signalling towards achieving high-level climate change

mitigation policy objectives. This signalling effect of SSLBs would be effective in proportion to the strength of the KPIs and their financial penalty characteristics.

The cases of Chile and Uruguay: the two issuers of sustainability-linked bonds

The Republic of Chile seeks to transition from a middle-income to a high-income economy through a sustainable path built upon three key pillars: economic, environmental, and social. Over the years, Chile has strengthened its commitment to climate change mitigation and environmental protection through both national and international initiatives. It is in fact by far the largest issuer in the emerging market category, and after publishing its sustainability-linked bond (SLB) framework, Chile issued a USD 2 billion sustainability-linked bond in March 2022, the first sovereign SLB. This SSLB carries a 4.346% rate or 200 basis points above 20-year US Treasury notes and is linked to the country's ambitions concerning the Paris Agreement on climate change (S&P Global, 2022[5]).[2] The bond stipulates that the country will emit no more than 95 million metric tonnes of carbon dioxide by 2030 and that 60% of its power output will be derived from renewable energy by that time. If one or both of these criteria are not met, the coupon step-up will be 12.5 (25) basis points (bps) compounded over eight years, resulting in a maximum total penalty of 200 basis points (bps).

Table 2.1. Sustainability-linked Bonds and Green Bonds comparison

	Sovereign Green Bonds	Sovereign Sustainability-linked Bonds
Advantages	**Transparency:** Framework and Reporting (Allocation and Impact) **Proceeds** are exclusively used for environment and socially beneficial projects determined by a set of rules. **Might have a cheaper cost of financing** ("Greenium")	**Use of proceeds** is not restricted to a set of eligible expenditures **Hedging against climate risks** for investors **SSLBs and conventional bonds** are roughly interchangeable
Disadvantages	**Additional operational costs** with complex allocation process and impact reporting **Lack of eligible expenditures** **No hedging against climate risks** for investors	Difficulties in **defining targets for KPIs and pricing** Difficulties in **measuring variables** **KPIs** may not be well-suited for climate change adaptation

Sources: OECD analysis based on Lindner and Chung (2023[6]), Sovereign Sustainable Bond Issuance. A guide Note For Sovereign Debt Managers, https://www.imf.org/en/Publications/WP/Issues/2023/03/11/Sovereign-ESG-Bond-Issuance-A-Guidance-Note: for-Sovereign-Debt-Managers-530638; C. Hardy (Forthcoming[7]), Sovereign Sustainability Bonds: Can We Do Better?; S&P Global (2022[5]), World's 1st sovereign sustainability linked bond issued by Chile, https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/world-s-1st-sovereign-sustainability-linked-bond-issued-by-chile-69226229; Inter-American Development Bank (2022[8]), Uruguay Issues Global Sustainability-Linked Bond, with IDB Support, https://www.iadb.org/en/news/uruguay-issues-global-sustainability-linked-bond-idb-support; Ministerio de Hacienda, (n.d.[9]), ESG Bonds, https://www.hacienda.cl/english/work-areas/international-finance/public-debt-office/esg-bonds/sustainability-linked-bonds; Ministerio de Hacienda (2022[10]), Sustainability-linked bonds framework (Chile), https://www.hacienda.cl/english/work-areas/international-finance/public-debt-office/esg-bonds/sustainability-linked-bonds/chile-s-sustainability-linked-bond-framework; Uruguay DMO (2022[11]), Sustainability-linked bonds framework, http://sslburuguay.mef.gub.uy/30701/20/areas/sslb-framework.html; BIS (2022[12]), Quarterly Review: September 2022, https://www.bis.org/publ/qtrpdf/r_qt2209d.pdf.

A few months later, Uruguay issued its first SSLB on 24 October 2022.[3] The bond is aligned with the country's sustainable strategic priorities and establishes goals regarding performance indicators, one linked to the evolution of the intensity of greenhouse gas emissions and the other to the protection of native forests. Through that bond, USD 1.5 billion has been issued at a 5.75% rate. In this issuance, Uruguay innovated by becoming the first issuer to include a coupon step-down if it overperformed on the pre-defined targets by a certain threshold. In fact, Uruguay's SSLBs may be adjusted upwards or downwards by 25 basis points based on performance relative to 2025 targets for two KPIs, namely a reduction of economy-wide greenhouse gas (GHG) emissions per unit of real GDP relative to 1990 levels and the maintenance of native forest cover; performance is measured with a lag. For both KPI objectives, the same measures are used, and when a KPI is near its objective, no adjustments are made.

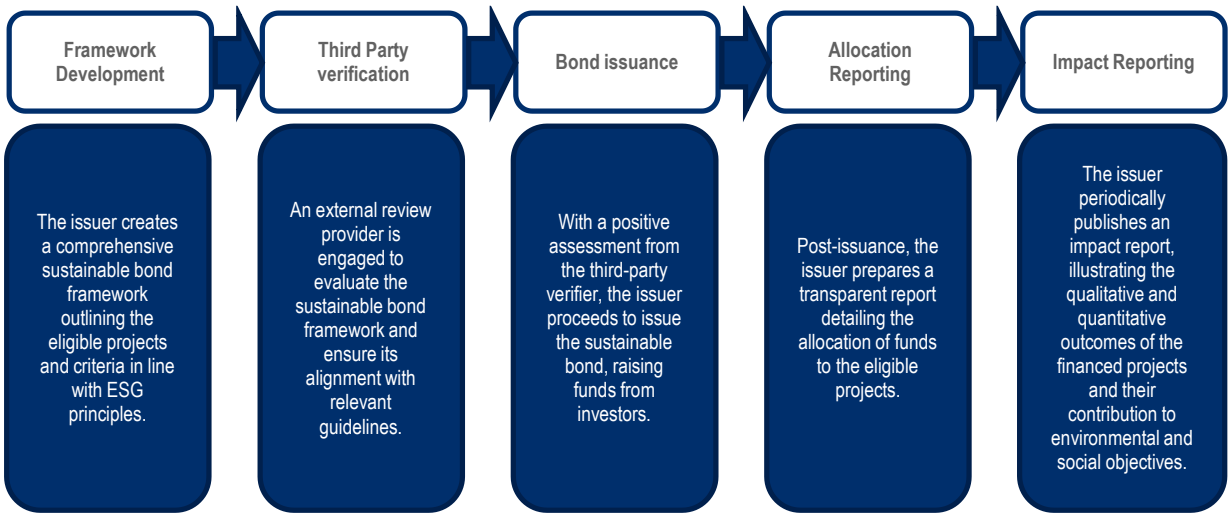
Both Chile's and Uruguay's SLB Frameworks have been reviewed by Sustainalytics,[4] which has provided a positive evaluation of the alignment of the SLB Frameworks and associated documentation with the International Capital Market Association (ICMA) Sustainability-Linked Bond Principles, including an evaluation of the relevance, robustness, and reliability of selected KPIs, the rationale and level of ambition of the proposed SPTs, the relevance and reliability of selected benchmarks and baselines, and the credibility of the proposed SPTs (Ministerio de Haciendo, 2022[10]; Uruguay DMO, 2022[11]).

Notes:
1. New Zealand has highlighted the operational costs of SGBs in the 2022 OECD and accession countries Survey on Primary Market Developments, while Colombia underlines the fact that sustainable instruments require a full-time team dedicated to them. In addition, 23 out of 41 countries view the limited size of eligible expenditures as a drawback to SGB issuance.
2. S&P Global is a leading provider of credit ratings, research, and analytics, offering a wide range of services to help investors, businesses, and governments manage credit risk and make informed decisions in the global financial markets. In this context, S&P Global provides information on the performance of various financial instruments, including the 20-year US Treasury notes mentioned.
3. The Inter-American Development Bank (IDB) is a regional development bank focused on improving lives in Latin America and the Caribbean. The bank supports efforts to reduce poverty and inequality, improve health and education, and advance infrastructure in the region. IDB's involvement in Uruguay's SSLB issuance highlights the institution's commitment to promoting sustainable development and financing in the region.
4. Sustainalytics is an independent provider of Environmental, Social, and Governance (ESG) research, ratings, and analysis, serving investors and financial institutions around the world. The firm evaluates and assesses ESG-related risks and opportunities for issuers, providing valuable insights to help market participants make informed decisions regarding sustainable bond issuances, such as Chile's and Uruguay's SLBs.

2.4. From setting up a framework to impact reporting: A dive into OECD practices

As explored in the previous edition of the SBO, the operational process of sustainable bond issuance is complex and labour-intensive, as it demands extensive collaboration between various government departments and a thorough understanding of environmental and social matters, all of which are not necessary for a conventional bond issuance (OECD, 2022[1]). In summary, issuing a sustainable bond requires developing a governing framework detailing eligible expenditures, management of proceeds, allocation and impact reporting, and third-party verifications, all in line with international standards and taxonomies (Figure 2.9). In addition, these steps require more expertise than a typical DMO often has, which makes it necessary to co-ordinate with relevant government departments, investors, and external reviewers, which is often operationalised through an interagency committee of experts from different ministries. This section aims to describe the different operational aspects, especially for OECD countries issuing sustainable bonds. It complements Chapter 2 of the 2022 edition of this publication by diving into each of these processes drawing on OECD countries' framework, allocation and impact reports.

Figure 2.9.Sovereign sustainable bond process: Main operational phases



Source: OECD analysis based on countries' sustainable bonds frameworks.

2.4.1. All sovereign frameworks in OECD countries are aligned with ICMA guidelines and most of the EU countries also are aligned with the EU Taxonomy

In recent years, sustainable finance has significantly progressed, driven by increased environmental and social considerations in investment strategies and regulatory developments. With the involvement of national governments, market associations such as the International Capital Market Association (ICMA), and supranational institutions such as the European Union (EU), these advancements aim to provide investors with confidence and assurance by clearly defining sustainable investments and facilitating policy implementation for tracking sustainable finance flows (OECD, 2022[1]).

By analysing OECD countries' sovereign sustainable bond frameworks, all 24 OECD countries that have issued sovereign sustainable bonds have developed their frameworks in alignment with the guidelines set by the ICMA corresponding to the type of sustainable security that they issued. The ICMA principles provide the core components of frameworks for different types of sustainable bonds, including the use of proceeds, the process for project evaluation and selection, management of proceeds, and reporting. In addition, the European Taxonomy has become a widely adopted classification system for sustainable investments, with 13 out of the 16 European member countries of the OECD incorporating it into their frameworks (only Ireland, Lithuania and Sweden do not mention the EU Taxonomy in their frameworks).

The European Union (EU) has been leading the development of standard frameworks and guidelines for sustainable bonds and on 28 February 2023, the European Parliament and member states agreed on the conditions for a European green bond standard (European Commission, 2023[13]). The EU Green Bond Standards help in promoting transparency and accountability in the market for sovereign sustainable bonds by providing a framework for green bonds issued by EU sovereigns and setting out eligibility criteria for projects, the use of funds, as well as reporting and disclosure requirements. The EU hopes that the European standard will be adopted worldwide and serve as a global benchmark for sustainable investments (European Commission, 2022[14]). Investors benefit from greater clarity and transparency regarding the environmental impact of their investments while promoting the transition to a low-carbon economy. As a result, the EU's leadership in this area is likely to be an important factor in attracting investors and promoting sustainable economic growth, as highlighted by OECD countries (Box 2.3).[5]

Box 2.3. The EU Taxonomy for Green Bonds: Origins and the perspective of sovereign issuers

The origins of the EU Taxonomy

The European Union developed the "EU Taxonomy" as a key component of the "Financing Sustainable Growth" action plan, established in 2018, to direct private financial flows towards sustainable investments and related economic activities.[1] This classification system defines and labels sustainable economic activities, supporting the EU's climate neutrality goal by 2050. The taxonomy serves as an essential financing tool for the transition to a sustainable, low-carbon economy.

The EU Taxonomy comprises environmental objectives and technical criteria, with the EU Taxonomy Regulation providing its legislative foundation. A Technical Expert Group (TEG) is responsible for creating and maintaining the taxonomy, and advising the European Commission, which maintains and regularly updates it.[2] The taxonomy's voluntary usage is anticipated to significantly influence the investment decisions of financial institutions and investors.

Sovereign issuers' perspective

Sovereign issuers face challenges in implementing the taxonomy due to its initial design for corporate issuers. Certain spending areas in the allocation report of OECD countries, such as research and development (e.g. France, Germany, Luxembourg, Italy, and Slovenia) and international co-operation (e.g. Germany), which indirectly influence the energy transition, are not included. The existing taxonomy delegated regulations, yet to be completed, exclude some economic activities with well-established positive environmental impacts.

Furthermore, since the EU Taxonomy targets private companies rather than governments, some governments struggle to fully align with the classification system. In France, for example, expenditures not covered by the taxonomy or where eligibility is not fully assessed amounted to 22% of the allocation in 2021 (Agence France Trésor (AFT), 2021[15]). These challenges highlight the need for adjustments to the taxonomy to better accommodate the unique requirements of sovereign issuers.

Using a taxonomy designed for the private sector in the public sector has significant implications due to the different ways in which private entities and governments contribute to climate change mitigation and adaptation. Governments have means that are not available to the private sector such as providing subsidies, fostering country-wide research and making commercial agreements. This disparity highlights the need for a tailored taxonomy considering the unique roles and responsibilities of governments in addressing climate change. A more inclusive taxonomy could foster greater collaboration and synergies between the private and public sectors, ultimately accelerating progress toward a more sustainable future.

Notes:
1. The European Commission's "Financing Sustainable Growth" action plan, introduced in 2018, seeks to reorient capital flows towards sustainable investments, manage financial risks arising from environmental, social, and governance (ESG) factors, and foster transparency and long-term in financial and economic activities. This comprehensive strategy is aimed at integrating sustainability considerations into the European Union's financial system and establishing a supportive framework for sustainable investments. The plan consists of a series of measures and initiatives, including the development of the "EU taxonomy," which is a classification system for sustainable activities.
2. The Technical Expert Group (TEG) on Sustainable Finance is a group of experts from various sectors, including industry, academia, and civil society, established by the European Commission in 2018. The TEG's primary objective is to assist the Commission in developing technical recommendations for the implementation of the "Financing Sustainable Growth" action plan.
Source: European Commission (2021[16]), EU Taxonomy Regulation, https://ec.europa.eu/info/law/better-regulation/have-your-say/initiatives/12252-EU-Taxonomy-regulation; European Commission (2022[17]), Technical Expert Group on Sustainable Finance (TEG), https://ec.europa.eu/info/publications/technical-expert-group-sustainable-finance-teg_en; European Investment Bank (European Investment Bank, 2022[18]), Green Bonds and the EU Taxonomy, https://www.eib.org/en/thEMDEs/sustainable-investment/green-bonds-and-the-eu-taxonomy; Agence France Trésor (2021[15]), Allocation and Performance Report, https://www.aft.gouv.fr/en/green-oat.

2.4.2. *The diversity in the eligibility of expenditures reveals diverse priorities and investment strategies, shaped by each country's characteristics*

The allocation report provides information on how the proceeds from bonds have been allocated to specific projects and activities. It is published annually across all OECD countries that issue sovereign sustainable bonds. This report may include details about the geographic distribution of the projects, the sectors in which the projects are located, and the expected timeline for completion. Figure 2.10 Panel A offers a summary of the various allocation sectors of SGBs proceeds based on the allocation reports published by DMOs, indicating the diversity of priorities and investment strategies among the 19 selected OECD countries.

The three most common sectors for allocation of proceeds from sovereign labelled bonds are renewable energy, energy efficiency, and clean transportation, considered relevant regardless of countries' sizes or geographic locations. Renewable energy emerges as the unanimous choice, reflecting the global urgency to transition towards sustainable energy sources and mitigate climate change impacts. Energy efficiency,[6] endorsed by approximately 95% of the countries, exemplifies the growing awareness of the need for sustainable technologies to optimise energy consumption. Clean transportation,[7] featured in roughly 95% of the countries, further underscores the ongoing shift towards eco-friendly transport options, such as electric vehicles and enhanced public transit systems. Other sectors of allocation include environmentally sustainable management of living natural resources and land use (75%), sustainable water and wastewater management (70%), climate change adaptation (60%), terrestrial and aquatic biodiversity (50%), pollution prevention and control (45%), green building (45%), research, innovation and raising awareness (30%), international co-operation (25%), and circular economy (25%).

The set of eligible expenditures also varies with countries' characteristics and understanding these patterns can provide valuable insights into the complexities of sustainable investment strategies worldwide and help identify areas for further collaboration and knowledge exchange. Countries with significant agricultural or forestry sectors, such as Austria, Canada, Hungary, Latvia, and New Zealand, make environmentally sustainable management of living natural resources and land use eligible expenditures. Countries with high exposure to climate change impacts, such as coastal or low-lying nations including Belgium, Canada, Ireland, and the Netherlands, make climate change adaptation expenditures eligible, likely to invest in measures to reduce vulnerability to extreme weather events such as sea-level rise. Countries that face challenges related to water scarcity or water pollution, such as Chile, Mexico, and Spain, can use the proceeds to invest in sustainable water and wastewater management. Countries with a high degree of international co-operation, such as Canada, Germany, and Switzerland, can use the proceeds of sovereign sustainable bonds to address environmental challenges through collaborative efforts (IEA, n.d.[19]), (Statista, 2023[20]).

2.4.3. Clean transportation often receives more than half of the proceeds

Figure 2.10 Panel B reveals a diverse allocation of funds from sovereign sustainable bonds, with clean transportation, energy efficiency, renewable energy, and sustainable water and wastewater management emerging as the primary sectors receiving the majority of proceeds in the selected OECD countries.

Several countries allocate more than 50% of their sovereign sustainable proceeds to clean transportation, including Chile, Luxembourg, Hungary, Belgium, Italy, Ireland and Germany. The focus on clean transportation can be attributed to each nation's unique characteristics, commitments, and strategies. Chile's emphasis on clean transportation is driven by its commitment to electric vehicles and the significant production of essential resources such as copper and lithium. Luxembourg, known for its efficient public transportation system, prioritises investments in this sector to further improve mobility and reduce emissions. Hungary's dedication to Clean Transportation is fuelled by its expanding automotive sector, which is increasingly focusing on the development and production of electric and hybrid vehicles. Germany,

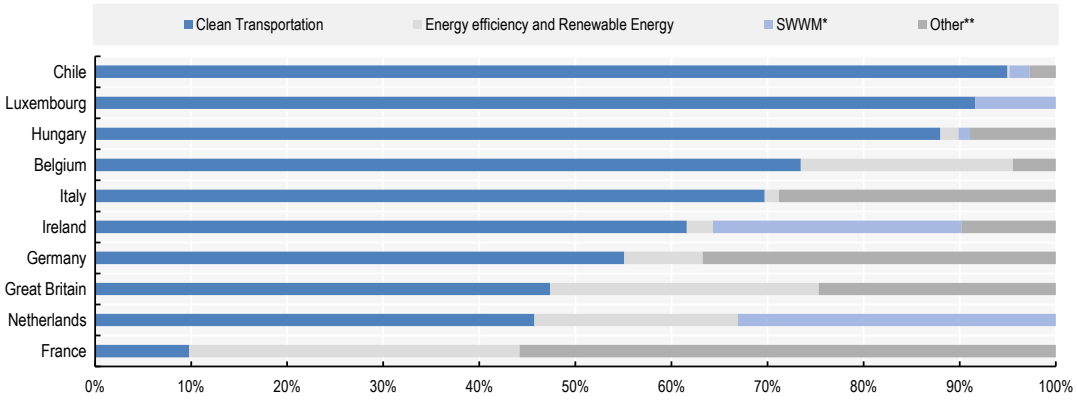
Ireland, Italy, and Belgium also invest heavily in Clean Transportation to promote sustainable mobility solutions and reduce greenhouse gas emissions (IEA, n.d.[21]).

Figure 2.10. Allocation composition by Green Sector in selected OECD countries

Panel A. Eligible expenditures for sovereign green bonds

	Renewable Energy	Energy efficiency	Clean Transportation	Environmentally sustainable management of living natural resources and land use	Sustainable water and wastewater management	Climate Change Adaptation	Terrestrial and aquatic biodiversity	Pollution prevention and control	Green Building	Research, Innovation and raising awareness	Circular Economy	International Cooperation
Austria	X	X	X	X	X	X	X	X				
Belgium	X	X	X	X	X						X	
Canada	X	X	X	X	X	X	X	X			X	
Chile	X	X	X	X	X				X			
France	X	X	X			X		X	X	X		
Germany	X	X	X		X	X	X	X	X	X	X	X
Hungary	X	X	X	X	X	X						
Ireland	X	X	X	X	X	X			X			
Italy	X	X	X				X	X		X		
Latvia	X	X	X	X	X	X	X		X		X	
Luxembourg	X	X	X	X	X				X	X		
Mexico	X	X			X	X	X					
Netherlands	X	X	X		X	X						
New Zealand	X	X	X	X	X	X	X	X				
Poland	X		X	X			X					
Slovenia	X	X	X	X	X				X	X	X	
Spain	X	X	X	X	X			X	X			
Sweden	X	X	X	X			X	X				
United Kingdom	X	X	X	X		X		X				
Switzerland	X	X	X	X		X	X		X	X		X

Panel B. Allocation amount by type of expenditure



Notes: Selected OECD Countries. The sectors above have been selected from the most commonly eligible sectors from countries' sustainable bond frameworks. Therefore, a country not having a particular sector as eligible does not mean the country is not investing in it. Panel B: Percentage of allocated amount for each sector project out of the total of Green Eligible expenditure projects.
*SWWM: Sustainable Water and Wastewater Management.
**Other type of expenditure includes pollution prevention and control, environmentally sustainable management of living natural resources and land use, terrestrial and aquatic biodiversity, climate change adaptation, circular economy, green buildings, international co-operation, research, innovation and raising awareness.
Source: Countries sustainable bonds frameworks (see Annex A for details).

Energy efficiency and renewable energy receive substantial investments in France, the United Kingdom, Belgium and the Netherlands. Sustainable water and wastewater management (SWWM) is a key area of focus for the Netherlands, which dedicates 33% of its proceeds to this sector given its low-lying geography and vulnerability to climate change. Other notable expenditures include France's investments in the circular economy. France's more diversified use of proceeds might also reflect the fact that it is the largest issuer of sovereign sustainable bonds and, thus, can fund more projects with these proceeds. Germany also invests in international collaboration in the green sector and research, innovation and awareness-raising, underscoring its recognition of the importance of cross-border co-operation and fostering innovation to combat climate change.

As the market for sovereign sustainable bonds continues to grow, it is essential that countries maintain transparency and accountability in their allocation of funds and reporting on the impact of their investments on specific environmental and social goals. This will help build investor confidence by ensuring that the funds raised through sustainable bonds are used according to the securities' prospects.

2.4.4. *Reporting the impact of green projects funded by the proceeds is the most challenging aspect of sustainable bonds*

The successful implementation and monitoring of sovereign sustainable bond issuances rely heavily on impact reporting (i.e. impact reporting in sovereign sustainable issuances refers to the process by which government entities disclose the outcomes and the progress towards achieving the intended environmental and social objectives). Ultimately, the goal of sovereign sustainable purchases is to have a concrete impact on climate change mitigation or adaptation, with the allocation of proceeds being just one means to achieve this end. Impact report is, thus, the pillar that links the use of proceeds to the impact that investors are aiming at. Without such a link, it is difficult to assert whether the expenditures, although being allocated accordingly to the bonds' prospects, achieved their objectives. It also is the most challenging aspect of sovereign sustainable issuance, given the difficulty of assessing the outcome of specific projects in a complex and interdependent problem.[8] Climate change is considered a "wicked problem", since its causes are multiple and complex, its impacts are uncertain and interrelated, and potential solutions to climate change might well cause further problems (Stang and Ujvari, 2015[22]). Any assessment in this context is challenging. In order to aid issuers in such a complex environment, ICMA has issued guidelines titled "Handbook for Green, Social and Sustainability Bond Issuers" (ICMA, 2020[23]).[9] These guidelines offer a framework for issuers to evaluate, measure, and report on the environmental and social performance of projects funded through sustainable bonds. The guidelines require annual reporting until the bond matures or until green projects are completed, whichever is later. This extended reporting period ensures investors are informed of significant deviations from previous reports and any unexpected results that may have occurred during project implementation. This approach highlights the importance of transparency in the sustainable bond market, enabling investors to make informed decisions based on the latest available information.

The methodologies used to assess the impact of sustainable bond proceeds vary depending on the specific bond and its objectives. Generally, the assessment process involves setting clear key performance indicators and targets aligned with international standards such as the UN Sustainable Development Goals (SDGs) or the ICMA Green Bond Principles (GBP).[10] Additionally, third-party verification by specialised agencies helps to ensure the credibility and reliability of impact assessments.

Nevertheless, it should be mentioned that there is no direct consequence for a green bond issuer if the proceeds of a green bond are not used for green projects, or if there are no resulting environmental benefits from using the proceeds as promised (BIS, 2022[12]). However, failure to meet investors' expectations could lead to exclusion from a green bond index or reputational costs that also influence the bond value.

The impact of sustainable bond financing is assessed using various methodologies that fall into four categories: project-level analysis, portfolio-level analysis, comparative analysis, and modelling. The

project-level analysis focuses on assessing the impact of individual projects funded by the proceeds of certain metrics, such as greenhouse gas emission reductions. The portfolio-level analysis evaluates the aggregate impact of a multitude of projects financed by sustainable bonds, providing a broader perspective on the overall performance and alignment with environmental and social objectives. A comparative analysis compares the impact of the projects funded by the sustainable bond to alternative investments or benchmarks. Modelling uses quantitative tools and techniques to estimate potential environmental and social impacts under various conditions and assumptions.

2.4.5. *GHG emission and renewable energy metrics are the most common in impact reporting*

Countries' impact reports use different metrics that reflect their environmental priorities and unique challenges. Greenhouse gas (GHG) emissions are a common metric in all nine of the selected OECD countries (Table 2.2), demonstrating the significance of reducing emissions to address climate change. Renewable energy generation and energy efficiency improvements are also essential metrics, indicating countries' efforts to shift towards cleaner energy sources and reduce energy consumption. Water conservation is a priority for eight of the nine selected countries, while biodiversity preservation is for six countries. Furthermore, seven of the nine selected OECD countries emphasise climate change adaptation and six economic benefits, recognising the need to reduce greenhouse gas emissions and adapt to the impacts of climate change while acknowledging the potential economic benefits of transitioning to a more sustainable economy. Five of the nine selected countries measure pollution-linked indicators and economic benefits in their impact reports.

A pattern that emerges in the selected countries is that they tend to measure the impact of their investments in the sectors in which they are eligible to use the proceeds of the labelled bonds. For instance, most countries invest in renewable energy and energy efficiency, and as a result, they also assess the impact of these investments using GHG emissions and energy efficiency improvement metrics. Similarly, countries investing in SWWM often measure their progress using water conservation metrics. Another conclusion is that countries that do not use a specific metric tend to not have eligible expenditures in the related sector. For instance, Slovenia does not measure adaptation to climate change or biodiversity preservation, and correspondingly, it does not have eligible expenditures in climate change adaptation or terrestrial and aquatic biodiversity.

It is crucial to note that the different metrics are interconnected and addressing one metric can have positive spillover impacts on others. For example, reducing greenhouse gas emissions can mitigate climate change impacts, improve air quality, and positively affect human health and biodiversity. Similarly, transitioning towards renewable energy sources can reduce greenhouse gas emissions, improve air quality, and conserve water resources. Hence, on the one hand, taking a holistic approach that addresses multiple metrics simultaneously can be a good solution to capture interdependencies and the breadth of climate change (IPCC, 2021[24]). On the other hand, countries have varying preferences, which are linked to their different degree of exposure to certain climate risks and their climate footprint. This makes it harder to standardise a core set of metrics across countries.

Table 2.2. Impact metrics used to assess the performance of eligible projects by selected OECD countries

	GHG	Energy efficiency improvements	Water conservation	Renewable energy generation	Adaptation to climate change	Biodiversity preservation	Economic benefits	Pollution linked indicators
Austria	X	X	X	X	X	X		
Chile	X	X	X	X				
France	X	X	X		X	X	X	X

Germany	X	X	X	X	X	X		X
Hungary	X	X	X	X	X	X	X	X
Italy	X	X	X	X	X	X	X	X
Luxembourg	X	X	X	X	X	X		X
Netherlands	X	X	X	X	X			
Slovenia	X						X	

Note: Examples of indicators for each type of indicator.
Source: Countries' sustainable bonds frameworks (see Annex A for details).

2.4.6. Most countries rely on the same companies as a third-party auditor of sovereign sustainable bonds

Third-party verification ensures transparency and credibility in sustainable bond issuances by assessing their alignment with established frameworks and standards. It offers significant advantages over internal verification by DMOs. Independent verification provides expertise in environmental and social criteria, access to specialised data, and a reputation for impartiality, enhancing the credibility of issuers' commitment to sustainable outcomes. ESG research and rating providers, such as Sustainalytics and Vigeo Eiris, and specialised third-party auditors, including ISS and CICERO Shades of Green, offer verification services for sustainable bond issuances in various countries, providing investors with confidence in the bonds' sustainability impact.

Sustainalytics and Vigeo Eiris focus on evaluating issuers' environmental and social strategies, governance structures, and methodologies. Their verification process involves assessing the alignment of bond issuances with the issuer's Sustainable Bond Framework and relevant international standards, such as the Green Bond Principles or the Social Bond Principles. Although both providers cover similar aspects of the verification process, their evaluation criteria, focus areas, and reporting formats may differ. For example, Sustainalytics adopts a risk-based approach that assesses the issuer's management of ESG risks and opportunities, while Vigeo Eiris emphasises the issuer's contribution to sustainable development objectives and its integration of environmental and social factors into its governance and risk management systems.

ISS and CICERO Shades of Green specialise in appraising environmental aspects of sustainable bond issuances. Both auditors evaluate bond issuances' alignment with internationally recognised standards, project eligibility, and impact reporting efficacy. However, their methodologies and rating scales may differ. ISS employs a more quantitative approach, using metrics such as greenhouse gas emissions reduction and energy efficiency improvements to evaluate projects. In contrast, CICERO Shades of Green focuses on a qualitative assessment of environmental risks and opportunities, examining factors like climate resilience, adaptation, and mitigation measures implemented within the projects.

2.5. Some challenges become more prominent over time

2.5.1. In addition to impact reporting, changes in taxonomies and lack of eligible expenditures pose significant challenges

The 2021 Survey on Primary Market Developments issuers reported major challenges in environmental and social sustainability-related communication practices including the identification of relevant information, co-ordinating among public institutions, accessing data, and having sufficient staff and technical resources (OECD, 2022[1]). DMOs often lacked the necessary expertise in environmental, climate and social-related policies and struggled to address investor questions or verify the reliability of the information. To overcome these challenges, the survey highlighted the importance of enhancing

co-ordination between DMOs and line ministries, as well as building capacity and raising awareness among staff.

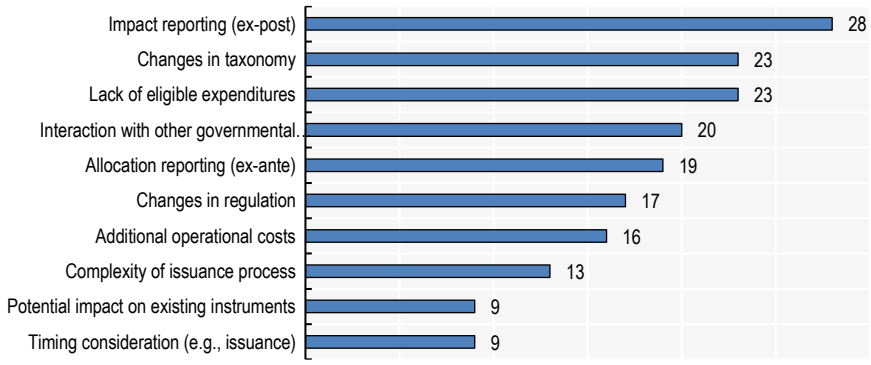
These challenges slightly changed in 2022s survey results. With 24 OECD countries having already issued sustainable bonds, challenges related to reporting emerge as the most common. Twenty-seven out of the 41 OECD and accession countries identified impact reporting as a challenge to sustainable bond issuance (Figure 2.11). Another challenge that debt managers face when issuing sustainable bonds is changes in taxonomy, which can create ambiguity and inconsistency in reporting. Taxonomy pertains to the categorisation of investments based on their environmental or social impact. Changes in taxonomy can make it difficult for debt managers to precisely report on the effects of their investments and could deter potential investors.

Furthermore, a lack of eligible expenditures can be a significant hurdle in the issuance of sustainable bonds. This could limit the potential pool of capital for socially responsible" or "environmentally friendly" projects and make it more challenging for debt managers to issue these types of bonds. For example, a significant challenge for the Spanish Treasury in its green bond programme is the limited eligible expenditure, despite substantial public spending on 'socially responsible' or 'environmentally friendly' projects in Spain. This is attributed to the highly decentralised nature of the public sector, which results in ESG-related spending being primarily carried out at the regional level, rather than by the central government. Consequently, regions have more eligible expenditures than the Central Government, with some regions even implementing their green bond programmes.

Debt managers face difficulties in co-ordinating with other government entities, which may prolong the process and add to its complexity. The procedure may involve numerous government agencies, necessitating the establishment of an interagency committee to ensure co-operation and communication between the DMO, the relevant Ministry of Finance units, and other line ministries. Seventeen issuers in the OECD have already formed inter-ministerial working groups to this end, while others have relied on collaboration with ministries without establishing a distinct entity. As part of the process, various ministries may evaluate projects under their jurisdiction to determine their suitability for funding based on the sustainable bond framework's criteria and required budget. Working groups collaborate with relevant agencies to identify qualifying projects with a positive environmental and social impact and may seek input from external stakeholders to ensure alignment with community priorities (see Box 2.4). However, this may lead to delays and additional administrative burdens on debt managers, making it challenging to issue sustainable bonds.

Moreover, as the sovereign sustainable market develops, changes in regulation can arise, increasing costs and administrative burdens for debt managers. This challenge was cited by 23 of the 41 OECD and accession countries in the Survey on Primary Market Developments, with Austria, the Netherlands, Spain, and Switzerland highlighting it in their responses, while Hungary identified it as the "main" challenge associated with sustainable bond issuance. This can lead to uncertainty and risk for debt managers, potentially discouraging investors.

Figure 2.11. Drawbacks or challenges associated with sustainable bond issuance for DMOs



Source: 2022 OECD and accession countries Survey on Primary Market Developments.

Box 2.4. Multi-agency co-ordination for sovereign sustainable bond issuance: Case of Canada

The organisation of a sovereign sustainable bond issuance requires a collaborative interagency process, involving several key ministries and government agencies. This is important to ensure that the issuance aligns with the country's broader economic and environmental objectives while also meeting the specific criteria of the sustainable label. The involvement of multiple government agencies in the issuance process can also help to create a more comprehensive and credible sustainable bond framework, increasing the likelihood of attracting sustainability-focused investors (IDB, 2021[25]).

In Canada, the interagency committee responsible for managing the issuance typically comprises representatives from the Department of Finance, the Ministry of Environment and Climate Change, and other relevant agencies (Government of Canada, 2022[26]). The committee works together to develop a set of criteria for the issuance that aligns with the country's broader economic and environmental goals. This process involves an assessment of Canada's current economic and environmental situation, including an evaluation of key environmental and social metrics and indicators.

Once the criteria have been established, the committee works with the Department of Finance to structure the bond issuance in a way that aligns with these objectives. This may involve selecting specific projects or initiatives that will be funded through the issuance or incorporating specific reporting and transparency requirements to ensure that the funds are used in a socially and environmentally responsible way. Throughout the process, the interagency committee works closely with other relevant ministries and agencies, including the Ministry of Foreign Affairs, Trade and Development, to ensure that the issuance aligns with Canada's broader international commitments and obligations. This approach helps to build investor confidence and support, while also contributing to the achievement of Canada's broader sustainable development goals.

Sources: Government of Canada (2022[26]), Green Bond Framework, https://www.canada.ca/en/department-finance/programs/financial-sector-policy/securities/debt-programme/canadas-green-bond-framework.html; IDB (2021[25]), How Governments can issue sovereign sustainable bonds to finance green recovery, https://www.iadb.org/en/news/how-governments-can-issue-sovereign-esg-bonds-finance-green-recovery.

2.6. Outlook for sovereign sustainable bonds

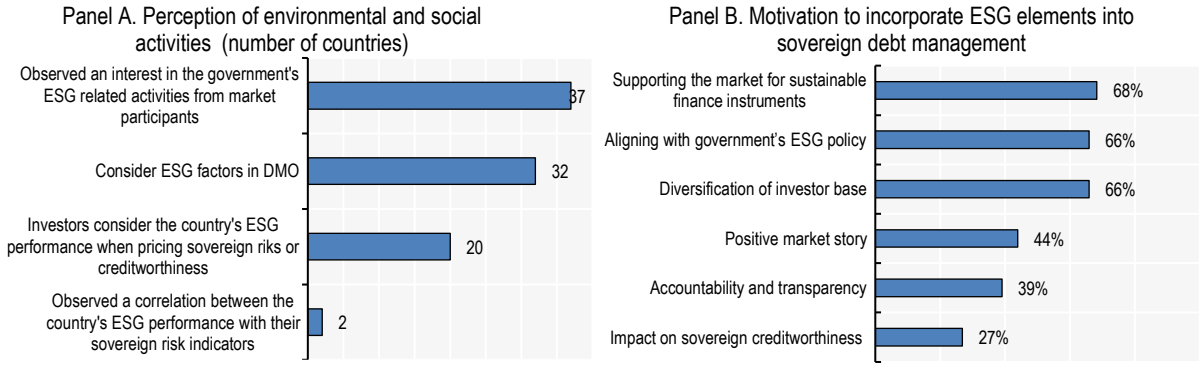
2.6.1. *Most sovereign debt managers observed an increase in the demand for sustainable bonds and are willing to increase their issuances*

The majority of OECD and accession countries have noted market participants' interest in the government's environmental and social activities and already incorporated environmental and social considerations into debt management policies (Figure 2.12 Panel A). Furthermore, 70% of responding countries experienced a surge in investor demand for sovereign sustainable bonds, 27% reported stable investor interest, and only 3% reported a decline. On the supply side, similar findings were observed, with 60% of countries willing to increase their issuances and the remaining countries aiming to stabilise issuance. No country reported interest in decreasing issuance.

Nevertheless, given the limited resources that constrain policy makers, the outlook for any government policy depends on its effectiveness in achieving its objectives. If not, alternative policies must be designed, implemented, and assessed for effectiveness, and this applies equally to sovereign sustainable bonds. Thus, in order to analyse the outlook for incorporating environmental and social matters in public debt management, it is essential to begin with the objectives that the incorporation of these matters seeks to achieve.

The integration of environmental and social matters into public debt management is motivated by various factors (Figure 2.12 Panel B), including supporting the market for sustainable finance instruments, aligning with government ESG policy, and diversifying the investor base

Figure 2.12. DMOs' views on the incorporation of environmental and social matters in public debt management



Source: 2022 OECD and accession countries Survey on Primary Market Developments.

The impact of sovereign ESG-related initiatives on sovereign creditworthiness is not a primary motivation for most OECD and accession countries. It should be noted, however, that these countries may differ from EMDEs. AEs are generally not among the countries most vulnerable to climate change and have virtually no credit risk. Conversely, some EMDEs, particularly in Africa and southern Asia, are among the countries most susceptible to climate change,[11] making them more likely to have their debt repayment abilities impaired by climate change episodes. As a result, sovereign sustainable activities may have a more significant impact on creditworthiness in countries more vulnerable to climate change. Supporting this point is evidence that investors are willing to pay a premium to hold sovereign sustainable bonds, predominantly for bonds issued by climate-vulnerable countries. In contrast, bonds issued in AEs have virtually no or very small "greenium" (Bolton et al., 2022[27]; OECD, 2022[1]).

2.6.2. *Some EMDEs issued sovereign sustainable bonds enough to significantly diversify their investor base, while most AEs did not*

For sovereign sustainable issuances to significantly impact the diversification of the investor base, the investor profiles for labelled bonds ought to differ from those of conventional bonds, and the volume issued cannot be insubstantial as a share of total issuances. With regard to the former, there is evidence suggesting that investors in labelled bonds are diverse and, to some extent, distinct from those who purchase conventional bonds. For example, France reported that their green inflation-linked sovereign bond was acquired by a varied group of investors worldwide, with only 29% based in France, and comprising diverse types such as banks, asset managers, pension funds, and insurance companies (Agence France Trésor, 2022[28]). Similarly, Spain disclosed the investor base of its 2021 inaugural sovereign green bond issuance, revealing that a mere 8.3% of investors were from Spain, with particularly strong demand from pension and insurance companies, which procured 47% of the issuance (Government of Spain, 2021[29]). The share of purchases made by foreign pension and insurance companies was notably high when compared to investors of conventional bonds.

In terms of the volume issued as a share of total issuances, considering only the countries and years in which at least one sovereign sustainable issuance occurred, sustainable bonds accounted for an average of 7.7% and 30% of AEs' and EMDEs' gross borrowings, respectively. Substantial disparities exist between large and small issuers, with sovereign sustainable issuances constituting 34% of the gross borrowings of small issuers versus 3.3% of large issuers during the same period.[12] These figures also fluctuated considerably, with some small issuers issuing exclusively sustainable bonds in a given year (e.g. Andorra in 2022, Isle of Man in 2021), while in other countries and years, these instruments accounted for less than 0.1% of all gross borrowings. Out of the 50 countries that issued sovereign sustainable bonds until 2022, in 21 these issuances represented over 10% of gross borrowings in the years where at least one labelled bond was issued – and all are small issuers and also EMDEs except for Andorra, Denmark, Latvia, and Luxembourg. This demonstrates that some small issuers, particularly from emerging market economies, issued sufficient sovereign sustainable bonds to significantly diversify their investor base. However, due to the limited demand for and challenges in the supply of sovereign sustainable bonds compared to conventional bonds, large issuers face greater difficulties in expanding the share of their labelled issuances than smaller issuers. One caveat is that although diversifying the investor base is advantageous, sustainable bond investors tend to retain these securities for longer durations, reducing the market free float and, consequently, the liquidity of these securities. This raises costs for both the sovereign and investors when trading substantial volumes.

2.6.3. *There are several synergies between the issuance of sovereign sustainable bonds and the adoption of green budgeting practices*

With respect to alignment with government sustainability policy, the issuance of sovereign sustainable bonds represents one optional step among many others in governments' sustainability policies. Other steps include developing a national plan on climate change and the environment, employing budgetary policy tools to finance projects related to the plan, and utilising reporting mechanisms to ensure transparency and accountability. Labelled issuances aim to raise revenue for green and sustainable projects, but these projects can also be funded through alternative revenue streams, such as taxes or conventional bonds.

The most pertinent aspect of governments' sustainability policies is the implementation of green and sustainable projects, with the means of raising revenue being less relevant due to the fungibility of money (i.e. the source of funds does not affect how they can be used). Given the importance of greening expenditure, an increasing number of countries are concentrating on green budgeting (i.e. employing budgetary policy making tools to help achieve climate and environmental objectives) and often combining this approach with sustainable bonds given their numerous synergies (Box 2.5).

Box 2.5. Green budgeting and sovereign sustainable bonds

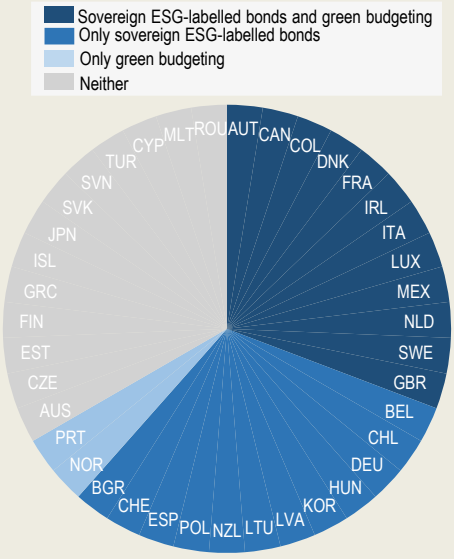
Green budgeting is the application of budgetary policy making tools to achieve climate and environmental goals. Just as budgets play a crucial role in co-ordinating public revenue and expenditure, green budgeting aligns revenue streams for green projects and can enhance the quality of green expenditures. As an outcome-based approach, green budgeting generates evidence to inform decisions on the potential climate and environmental impacts of a budget, creating an evolving fiscal policy that aligns with climate and sustainability goals through existing accountability and feedback mechanisms in the budgetary process. Furthermore, green budgeting can help address a diverse range of climate-related fiscal risks through contingencies for climate-related changes and measures related to climate change mitigation and adaptation. It can also improve the macro-fiscal and long-term sustainability analyses by incorporating climate change risks and elements.

Green budgeting and sovereign sustainable bonds share synergies that mutually reinforce their development and effectiveness in achieving their goals. First, developing a robust framework for tagging expenditures in green budgeting can help establish criteria for eligible projects in sustainable bonds given that both green budgeting and sustainable bonds require the identification of green and sustainable expenditures to ensure funds are allocated accordingly. Second, effective policy impact analysis used in green budgeting can contribute to more accurate and reliable impact reporting for sustainable bonds as both aim to demonstrate progress toward sustainability objectives. Third, strengthening expertise in environmental and sustainability issues across government can enhance the effectiveness of both green budgeting and sustainable bond issuance, as better-informed policy makers can make more strategic decisions in allocating funds and designing green and sustainability policies. Fourth, proceeds from green bonds can be linked to expenditures defined in the green budgeting process while for sustainability-linked bonds, green budgeting offers a way to maximise the chances of meeting the established goals, avoiding the payment of the premium.

Multiple OECD countries that issued sovereign sustainable bonds also are adopting elements of green budgeting (Figure 2.13). Based on a sample of 39 OECD and accession countries that answered a survey on green budgeting, half of the 24 countries that issued sovereign sustainable bonds also practise some form of green budgeting. Only Norway and Portugal adopted green budgeting elements without issuing sovereign sustainable bonds, while 13 countries did not engage in either. Among the challenges most mentioned in this survey, there is the lack of methodologies for assessing environmental impact and the lack of resources or technical expertise, which are closely aligned with the challenges that DMOs face when issuing sustainable bonds.

The broader perspective brought by green budgeting in comparison to the issuance of sustainable bonds might suggest that in the future the issuance of sovereign sustainable bonds will be only one element, if any, of the green budgeting process. The breadth of green budgeting, which encompasses the government's revenue streams and all expenditures combined with the involvement of multiple government stakeholders and a well-established feedback and accountability mechanism, is a more robust tool to achieve environmental and sustainability goals than the issuance of sovereign sustainable bonds. A greener and more sustainable future is more likely with the adoption of green budgeting elements with the optional support of revenues raised by or commitments made by sustainable bonds.

Figure 2.13. Green Budgeting and sovereign sustainable bonds across countries



Source: OECD analysis based on OECD, European Commission, IMF (2021[30]), Green budgeting: Towards common principles, 10.2765/51675; Refinitiv.

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Annex 2.A. Methods and sources

Primary sovereign bond market data and country groupings

Primary sovereign bond market data are based on original OECD calculations using data obtained from Refinitiv that provides international security-level data on new issues of sovereign bonds. The dataset covers sustainability bonds issued by sovereigns in the period from 1 December 2016 to 26 April 2023. The database provides a detailed set of information for each bond issue, including the proceeds, maturity date, interest rate and interest rate structure.

Refinitiv provides bond type information for most of its government securities entries. Sustainable bonds are those classified under ESG in the database. In addition, Refinitiv provides a categorical indicator variable to specify whether an ESG issue is a green bond. Hence, to further subset the data according to the specific bond label ("Green" and "Social and Sustainable"), securities that were classified as being ESG-labelled but not green were considered to be part of the "Social and Sustainable" category.

The definition of emerging markets used in this report is consistent with the IMF's classification of Emerging and Developing Economies used in its World Economic Outlook.

A number of bonds have been subject to reopening. For these bonds, the initial data only provide the total amount (original issuance plus reopening). To retrieve the issuance amount for such reopened bonds, specific data on the outstanding amount on each reopening date for the concerned bonds have been downloaded separately from Refinitiv. As the reopening data only provide amounts outstanding in order to obtain the issuance amount on each relevant date, the outstanding amount on the previous date is subtracted from the outstanding amount on that given date. These calculated issuance amounts are converted on the transaction date using USD foreign exchange data from Refinitiv. To ensure consistency and comparability, the same method is used for all bonds, including those which have not been subject to reopening.

Exchange offers and certain bonds in the dataset have been manually excluded when they did not have any identifier (ISIN, RIC or CUSIP) and when they have not been able to be manually confirmed by comparing with official government data.

Data gathered from countries' reports

The data examined in Section 2.4 was gathered from the countries' sustainable bond framework, allocation and impact reports (Austrian Treasury, 2022[31]) (Belgian Debt Agency, 2022[32]), (Government of Canada, 2022[33]), (Ministry of Finance (Chile), n.d.[34]), (Ministry of Finance and Public Credit (Colombia), n.d.[35]), (Ministry of Finance (Denmark), 2021[36]) (Agence France Trésor (AFT), 2017[37]) (Federal Ministry of Finance (Germany), 2020[38]; Ministry of Finance (Germany), 2022[39]), (Hungary Government, 2020[40]), (National Treasury Management Agency, 2018[41]), (BTP Green (Italy), 2021[42]), (Ministry of Finance (Latvia), 2021[43]), (Ministry of Finance (Lithuania), n.d.[44]), (Ministry of Finance (Luxembourg), 2020[45]), (Ministry of Finance (Mexico), n.d.[46]), (Ministry of Finance (Netherlands), 2019[47]), (Ministry of Development and Finance (Poland), 2016[48]), (Ministry of Finance (Slovenia), 2021[49]), (Instituto de credito official, 2021[50]), (Government of Sweden, 2020[51]), (Federal Finance Administration (Switzerland), 2022[52]), (UK Debt Management Office, 2021[53]).

Notes

[1] Against this trend, Germany, one of the top five issuers of sovereign sustainable bonds, increased its green issuances from euro 12.5 billion in 2021 to euro 14.5 billion in 2022.

[2] The feed-in tariff is a policy mechanism designed to encourage the adoption of renewable energy sources. It typically guarantees that energy producers using renewable sources will receive a set price for the electricity they generate and supply to the grid, promoting the growth of the renewable energy sector.

[3] Agence France Trésor (AFT) is a French Government agency responsible for managing the country's debt and cash positions. It operates under the aegis of the Ministry of Economy and Finance.

[4] Issuance of sustainable bonds has been an integral part of Chile's sovereign debt management since 2018. Chilean DMO seeks to promote the development of sustainable instruments to attract foreign investment and support the country's sustainable infrastructure needs, while diversifying the investor base. As of the end of 2022, the sustainable bonds with Green, Social, Sustainable or SLB labels amounting to a total of USD 31.7 billion constitute 31% of Chile's outstanding government bonds.

[5] Hungary, Italy, and Mexico highlighted the key role done by the EU in the 2022 OECD and accession countries Survey on Primary Market Developments.

[6] Energy efficiency refers to the process of reducing the amount of energy required to produce a given output, provide a service, or perform a specific function. This can be achieved through various means, such as utilising advanced technologies, improving insulation in buildings, adopting energy-saving practices, or implementing more efficient production processes.

[7] Clean transportation refers to the use of vehicles, systems, and infrastructure that minimise the environmental impact of transportation activities, reduce greenhouse gas emissions, and improve overall air quality. Examples of clean transportation solutions include electric vehicles (EVs), hybrid vehicles, fuel cell vehicles powered by hydrogen, and vehicles that run on alternative fuels like biodiesel, ethanol, or compressed natural gas (CNG). Clean transportation encompasses public transit systems, such as buses, trains, and trams, as well as non-motorised options like cycling and walking. Policies promoting clean transportation aim to reduce the reliance on fossil fuels, lower carbon emissions, and contribute to sustainable urban development.

[8] According to the responses of the 2022 OECD and accession countries Survey on Primary Market Developments.

[9] The International Capital Market Association (ICMA) "Handbook for Green, Social and Sustainability Bond Issuers" serves as a comprehensive compendium for market participants seeking to issue green, social, or sustainability bonds. This resource amalgamates best practices, case studies, and practical insights, enabling issuers to proficiently navigate the process of bond issuance in adherence to the ICMA's Green Bond Principles (GBP), Social Bond Principles (SBP), and Sustainability Bond Guidelines (SBG). The handbook aspires to support issuers in grasping the fundamental components of successful issuance, including the selection of eligible projects, the establishment of a robust framework, obtaining external reviews, and providing transparent reporting. It is an invaluable instrument for fostering growth and development within the sustainable finance market by encouraging the adoption of internationally recognised principles and guidelines.

[10] The United Nations Sustainable Development Goals (UN SDGs) is a collection of 17 global goals designed to address the most pressing social, economic, and environmental challenges facing the world. Established in 2015 as part of the 2030 Agenda for Sustainable Development, the SDGs serve as a blueprint for governments, businesses, and civil society to work collectively towards achieving a more sustainable, equitable, and prosperous future for all. The goals are comprehensive in nature, encompassing areas such as poverty alleviation, quality education, clean water and sanitation, affordable and clean energy, decent work and economic growth, climate action, and responsible consumption and production.

[11] According to the European Commission's INFORM Climate Change Risk Index.

[12] Large issuers refer to the group of 26 issuers that issued more than 0.2% of all gross borrowings since 2017. Smaller issuers refer to the rest of the countries.

3 Sovereign debt issuance trends in emerging market economies

Emerging market and developing economies (EMDEs) have been steadily increasing their borrowing from the markets following a long period of low interest rates and high levels of global liquidity since the 2008 global financial crisis. The debt levels of EMDE sovereigns reached record highs during the COVID-19 pandemic and have not yet returned to pre-pandemic levels. Against this backdrop, macro-financial conditions worsened in 2022 due to soaring inflation, monetary tightening, geopolitical uncertainties and a deteriorating growth outlook. Increasing capital outflows led to a depreciation of EMDE currencies against the US dollar, exacerbating external debt burdens. With further deteriorations in sovereign credit ratings in 2022 and substantial debt due in the coming years, many EMDEs continue to face significant financing risks. This chapter presents an overview of sovereign bond issuance trends in EMDEs in 2022.

3.1. Introduction

The primary objective of this chapter is to analyse the main trends in emerging market and developing economy (hereafter 'EMDEs') sovereign bond markets. It presents the structure of sovereign debt issuance, borrowing costs, exposure to interest rate hikes and an overview of credit quality over time across regions. The key source of information is a dataset comprising over 7 500 government securities issued by 102 different EMDEs between 2007 and 2022 (see Annex 3.A for details of the methodology used).

Key findings

- **EMDE sovereigns' gross issuances fell to USD 3.8 trillion in 2022, after peaking at USD 4.1 trillion in 2021**. The People's Republic of China (hereafter 'China') remained the largest EMDE sovereign issuer, accounting for 37% of the total gross debt issued, the highest share in over a decade.
- **On aggregate, EMDE sovereigns' net borrowing fell by 25% in 2022 compared to 2021, with significant differences across regions**. The sharpest decrease (88%) took place in the Middle East and North Africa (MENA), driven by developments in oil markets, and consequent improvements in the fiscal balances of oil-exporting countries. Latin America and the Caribbean (LAC) and European issuers, on the other hand, increased their net debt issuances compared to 2021.
- **The share of foreign currency-denominated debt issuances has continued to decrease for EMDEs, falling from 7% in 2021 to 4% in 2022**. The exception to this trend was the LAC region, where the share of foreign currency denominated debt remained constant at around 8%. Moreover, the currency composition of foreign currency denominated debt further tilted towards the US dollar, increasing from 72% in 2021 to 80% in 2022.
- **The average term-to-maturity (ATM) at issuance shortened across all regions, falling from 9.6 to 8.3 years on aggregate**, as issuers relied more heavily on shorter-term securities amid increasing uncertainties and rising borrowing costs.
- **The average yield to maturity at issuance of fixed-rate USD-denominated government bonds issued by EMDEs increased from 4.4% in 2021 to 5.3% in 2022**. Sub-Saharan Africa (SSA) had the highest yields (7.9%) while the LAC region issued with the lowest yield (4.6%). However, in terms of increases in borrowing costs, LAC saw a 1.45 percentage point increase in yields, the largest increase from 2021 to 2022 across all regions, while MENA saw the smallest increase of 0.21 percentage points.
- **The ATM of the debt stock is at record high levels, but about one-third of EMDE debt is coming due within the next three years.** In particular, low-income countries (LICs), with already low credit quality, face greater refinancing risk as 20% of their outstanding debt is due within one year and 42% within three years.
- **The value-weighted credit quality of issuance deteriorated in 2022, following a wave of 40 downgrades, 15 of which were related to European sovereigns, mostly reflecting the effect of Russia's war of aggression against Ukraine on risk premia and borrowing costs**. MENA became the region with the highest credit quality, surpassing Asia (excluding China), mainly due to the increased share of debt issuance by commodity-exporting countries with a high credit rating, such as Kuwait, Qatar, Saudi Arabia and the United Arab Emirates.

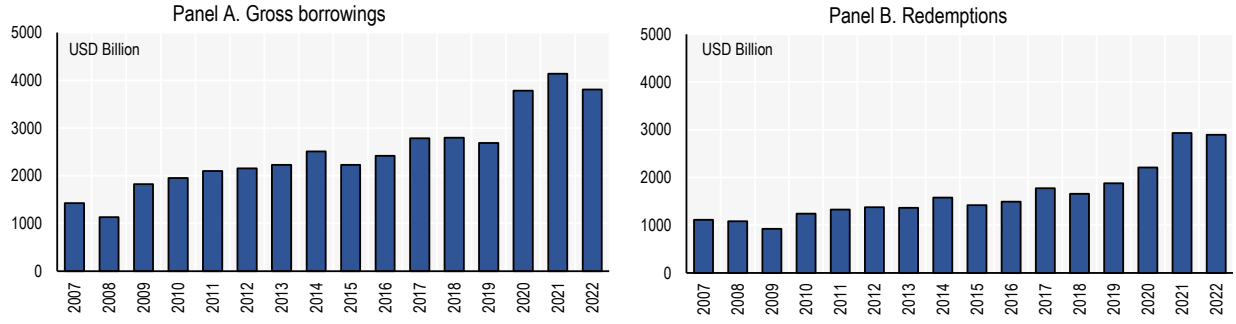
3.2. Trends in EMDE sovereign gross borrowing

Global financial conditions tightened considerably in 2022 amid a deteriorating growth outlook, high inflation and consequent monetary tightening. Geopolitical tensions following Russia's war of aggression against Ukraine fuelled the rise in inflation and weakened investor sentiment, causing capital outflows and currency depreciations for EMDEs. Against a backdrop of fiscal policy normalisation following the pandemic, sovereigns faced the challenge of refinancing substantial amounts of pandemic-related debt at higher costs, which weighed on debt issuance in 2022.

3.2.1. Gross borrowing by EMDE sovereigns from the markets declined in 2022 mainly due to a reduction in net borrowing requirements and a stabilisation of refunding needs

EMDEs issued significant amounts of debt during the pandemic, in response to heightened funding requirements and reduced government revenues. Issuance peaked at USD 4.1 trillion in 2021, marking a 50% increase compared to the three-year average prior to the pandemic and a 10% increase compared to 2020 levels. EMDE gross debt issuance remained high in 2022, albeit declining by 8%, reaching a total of USD 3.8 trillion, slightly higher than in 2020 (Figure 3.1 Panel A). This reduction is more pronounced across all regional categories excluding China. In contrast to other EMDEs, Chinese gross debt issuance increased by 23% last year, impacted by the country's restrictive zero-COVID-19 policy and extraordinary refinancing needs from special treasury bonds which were issued in 2007 and matured in December 2022, worth 8% of its gross issuances in 2022.[1] Without China, which represented 37% of total EMDE gross debt issuance in 2022, the decrease in issuance amounts to 25%. Looking at country-level data, the majority of EMDE sovereigns issued less debt in government securities in 2022 compared to their 2021 levels, with a few exceptions, including Argentina, Brazil, Bulgaria, China and Mexico.[2]

Figure 3.1. Central government gross debt issuance by EMDEs



Source: Refinitiv; and OECD calculations.

Two main factors are responsible for the significant decline in gross debt issuance in 2022. First, aggregate net borrowing needs declined from USD 1.2 to 0.9 billion partly linked to the lifting of COVID-19-related support measures and strong economic recovery after the pandemic (OECD, 2022[1]). When compared to 2021, 75 out of 102 EMDE sovereigns improved their fiscal balances in 2022, explaining the reduced borrowing from many EMDE sovereigns (International Monetary Fund, 2023[2]). Second, many EMDE sovereigns overborrowed in 2020 and 2021 to benefit from historically favourable funding conditions, using the augmented cash balances to smooth expected borrowings in 2022, a year of prospectively higher interest rates, amid mounting global inflationary pressures, reducing their medium-term borrowing costs.

EMDEs' refinancing needs remained largely stable in 2022 at USD 3.9 billion, similar to the level in 2021 due to the pandemic-related issuances of 2020 and 2021 (Figure 3.1 Panel B). When China is excluded, refinancing needs drop from USD 3.0 to 2.4 trillion, still 15% higher than average pre-pandemic levels.[3]

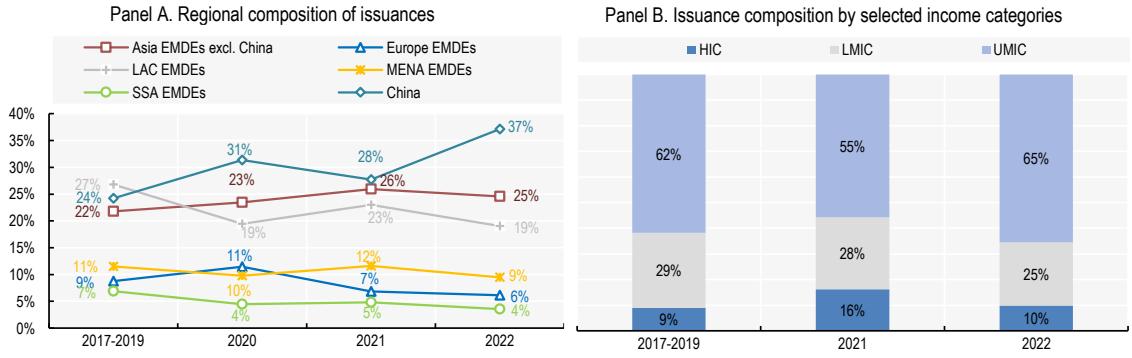
The persisting high refinancing needs reflect challenges to fund maturing debt through fiscal surpluses.[4] With the increase in interest rates and slower economic growth, it is unlikely that sovereigns will be able to generate enough surpluses to fund significant parts of their maturing debt. This increases their exposure to fluctuations in funding conditions. Refinancing needs can also be reduced through lengthening maturities, the opposite of what happened in 2022 as investors' appetite for longer-term EMDE sovereign declined amid rising inflation risks and debt management offices (DMOs) reacted to the most rapid surge in interest rates in decades by issuing shorter-term securities.

3.2.2. The nominal value of gross debt issuance declined across all regions

The regional composition of EMDE gross issuance reveals a relatively significant increase in the Chinese share since 2017, with corresponding decreases in other regions except for the rest of emerging Asia, whose share remained stable (Figure 3.2 Panel A). In 2022, the only two regions whose share of EMDEs' gross issuances increased were China and EMDE Europe.

However, in all regions except China, the nominal value of gross debt issuance declined considerably in 2022. The sharpest decrease occurred in SSA, where gross issuance fell 32%, followed by 25% in MENA, 25% in LAC, 17% in EMDE Europe, and 13% in EMDE Asia excluding China. Conversely, China's gross issuance rose by 23% in the same period. The decrease in gross issuances across regions was not primarily driven by EMDE currency depreciation (i.e. as values are converted to USD using the exchange rate of the issuance date, the amount issued in domestic currencies in 2022 declined compared to 2021 due to a pure exchange rate effect). Only about 31% of EMDEs issued a higher amount of domestic currency denominated debt in 2022 when compared to 2021 levels.[5]

Figure 3.2. EMDE sovereign gross debt issuance by regional and income categories



Source: Refinitiv; and OECD calculations.

There was no change in the ordering of the income categories by gross issuances – the largest issuer group remained as upper middle-income countries (UMIC), which accounted for more than half of all gross issuances in 2022, followed by low-middle-income countries (LMIC) and high-income countries (HIC) (Figure 3.2 Panel B). The share of UMIC also rose in 2022, due to China, which represents 37 percentage points (pp) of the 65 percentage points of the share of UMIC, and by a few countries (e.g. Algeria, Argentina, Azerbaijan, Bulgaria and Jordan) that increased their gross issuances in 2022 against the downward trend found in the majority of EMDEs in the period. On the other hand, several HICs such as Bahrain, Chile, Hungary, Oman, and Panama reduced their gross issuance compared to 2021, explaining the fall in the issuance share of HICs. In LMIC, all five largest issuers (in terms of the amount issued) reduced their gross issuances in 2022 – namely India, Egypt, Pakistan, Indonesia and the Philippines, ordering by the amount issued in the period. Of these, Egypt and Pakistan are in debt distress, suggesting that their decrease in gross issuances is not an indication of a healthier fiscal situation.

3.2.3. EMDEs net issuance increased in LAC and Europe in 2022, but decrease in Asia, MENA and SSA

Net borrowing requirements or needs refer to the difference between gross borrowing and refinancing needs. In AEs, the vast majority of funding needs are financed through marketable debt. Thus, net borrowing is more closely aligned with fiscal needs, with most of the differences being driven by movements in financial assets, especially cash balances. In other words, when net borrowing is higher than fiscal deficits, this might be attributed to overborrowing (as in 2020 and to some extent 2021) and when the opposite happens it might be attributed to a reduction in cash balances (as in 2022). In the case of EMDEs, however, this is not necessarily the case. EMDEs typically do not have as developed local bond markets as AEs and therefore more frequently rely on other means to fund their operations, notably loans and sometimes the accumulation of arrears. This means that movements in net borrowing needs can differ more strongly from fiscal balances. For instance, a country might see a decrease in its net borrowing needs measured in marketable debt despite an increase in the fiscal deficit as investors might not be willing to lend to an EMDE with difficulties to meet its obligations. In this case, the disparity between the movements in the fiscal balance and net borrowing needs measured in marketable debt could suggest a decline in market access. Another option is that countries could borrow at more favourable terms with private financial institutions or multilateral organisations. This means EMDEs' net borrowing needs in marketable debt require careful assessment, considering the state of each country's local bond market as well as its fiscal position.

Examples of disparities between movements in net borrowing needs and fiscal balances occurred at the peak of the COVID-19 crisis. Although surging significantly across all regions in 2020, net debt issuances by MENA and SSA countries did not follow the general trend, rising only by 2% in MENA and declining by 42% in SSA, as several issuers with weaker fundamentals, especially low-income countries, lost access to international bond markets during a time of financial turmoil in 2020. Although financing needs remained higher than pre-pandemic levels in 2021, all regions except MENA and SSA reduced their net debt issuance compared to 2020 levels, thanks to developments in vaccination rollouts and the lifting of some pandemic-related restrictions. In SSA and MENA however, net issuance increased significantly in 2021, by 139% and 32% respectively, reaching levels higher than prior to the pandemic in both cases. The surge in net debt issuance in the SSA region was mainly due to several issuers (including Benin, Cameroon, Kenya, Nigeria, and Senegal) regaining access to markets in 2021. Notably, Benin and Côte d'Ivoire issued large amounts of Eurobonds with a maturity of 22 years each, enhancing their future redemption profile and reducing their exposure to near-term deteriorations in financial conditions.

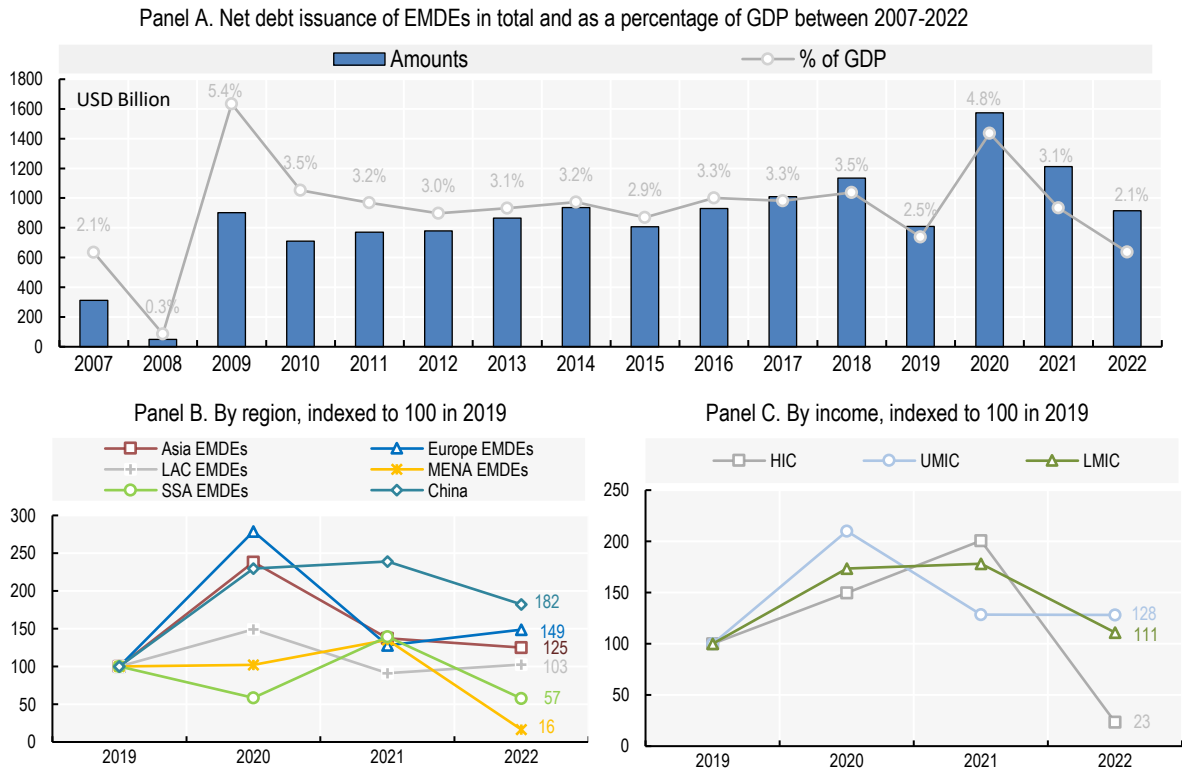
After peaking at nearly USD 1 570 billion in 2020 in the wake of the COVID-19 crisis, EMDEs' net borrowing needs have gradually decreased to USD 913 billion in 2022, a figure which is still 12% above the 2019 values (Figure 3.3 Panel A). This overall trend masks variation across regions, with net borrowing needs declining in all regions except for Europe and LAC. Asia (including China), MENA, and SSA significantly reduced their net debt issuance levels in 2022.

Of the 18 countries in Asia, ten reduced their net borrowing requirements in 2022. Overall, this decline suggests an improvement in these countries' fiscal stance, also implied by the improvement in their fiscal balances as well as the decrease in their total debt-to-GDP ratios. China was the only issuer among these ten whose fiscal deficit widened between 2021 and 2022, from 6% to 8% of GDP. Its debt-to-GDP ratio also increased from 72% of GDP to 77% with the country's zero-COVID-19 policy being in place during large parts of 2022. Other notable exceptions to this positive trend in their fiscal stances are Bangladesh, Myanmar, Pakistan, and Sri Lanka, with the latter two being in significant debt distress.

In MENA, countries issued the lowest net amount in more than a decade, plummeting from USD 177 to 21 billion between 2021 and 2022. One of the drivers of this decline is the increase in commodity prices, particularly benefiting the fiscal positions of oil and natural gas exporters following the unwinding of COVID-19-related measures.[6] Net issuance was positive only in five out of 13 MENA issuers, namely

Algeria, Egypt, Jordan, Saudi Arabia, and the United Arab Emirates, and the amounts were below those in 2021 with the exception of Algeria and Jordan. In SSA, 17 out of 23 issuers reduced their net borrowing in 2022.

Figure 3.3. EMDE net debt issuances



Source: Refinitiv; IMF (2022[3]), World Economic Outlook, https://www.imf.org/en/Publications/WEO/Issues/2022/10/11/world-economic-outlook-october-2022; and OECD calculations.

In SSA, net debt issuances decreased with several large issuers such as Ghana, Kenya and Nigeria reducing their net debt issuance by more than 50% compared to 2021, driving the aggregate decrease in net borrowing in the region. As opposed to Asia, the fall in net borrowing of SSA issuers was not accompanied by a stronger fiscal stance and improved debt-to-GDP ratios. With the exception of a few countries, including Gabon, Mauritius and Tanzania, the debt-to-GDP ratios increased in most SSA countries. Similarly, 13 out of 17 issuers which reduced their net borrowing from the markets experienced an increase in their debt-to-GDP ratios in 2022, suggesting some SSA issuers borrow less from markets and possibly met some of their financing needs through other means.

Conversely, net borrowing needs measured in marketable debt rose in EMDEs in Europe and LAC – the amounts of the three largest emerging Europe issuers (in terms of the amount issued), namely Russia, Türkiye and Hungary, increased by 29%, 27% and 25% respectively in 2022, driving the upward trend in the region. In particular, Russia had a primary fiscal deficit of 2.2% in 2022, as opposed to a 0.8% surplus in 2021 while the deficit of Ukraine grew from 4% in 2021 to 17%, showing the impact of the war on sovereign financing needs. In the LAC region, the increase in net debt issuance was due to Argentina, Brazil and Mexico, who issued significantly higher net amounts in 2022 compared to 2021. The fiscal balance of Brazil and Mexico also worsened in 2022.

Contrasting movements in the net debt issuance in marketable debt as a percentage of GDP to movements in total debt as a share of GDP can also provide insights into the structure of countries' debt funding. For instance, Ukraine issued net marketable debt equal to 3% of its GDP in 2022, while its outstanding gross public debt-to-GDP ratio increased by 33 percentage points (International Monetary Fund, 2023[2]). Similarly, Sri Lanka's net marketable debt issuance to GDP ratio of 8% in 2022 contrasts with the rise in its total indebtedness of 15 percentage points of GDP from 2021 to 2022. One of the ways in which countries are funding their needs outside of bond markets is through loans. In recent years, China has become the largest bilateral creditor to developing economies in the world, holding a substantial amount of debt, especially for low-income countries in Africa and several Asian countries. Given that Chinese loans often have higher interest rates and shorter maturities than loans offered by official creditors (such as IMF and the World Bank), repayment of Chinese loans may be challenging for some debtors (Horn et al., 2023[4]). In addition, the opaqueness of the terms of most bilateral loans makes it complicated to produce a complete picture of LIC indebtedness, exacerbating debt transparency problems. Box 3.1 explores the role played by China as a bilateral creditor for EMDEs.

Lastly, Figure 3.3 Panels B and C illustrate the net borrowing needs across regions and income categories compared to their pre-pandemic values of 2019. It shows that in all regions except MENA and SSA, net borrowing needs in marketable debt are still above pre-pandemic figures, especially in China and EMDEs in Europe. In terms of income categories, then only in HIC net borrowing needs in marketable debt returned to pre-pandemic levels.

Box 3.1. China's role as a creditor to EMDEs

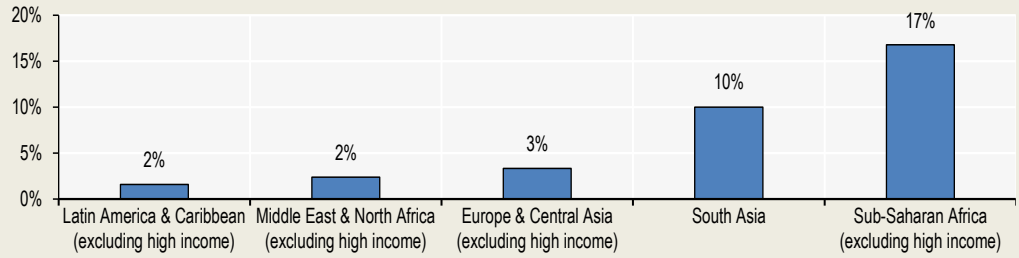
China's lending activities

Over the past two decades, China has emerged as a significant creditor to emerging markets and developing economies. This development is the result of several factors, including China's rapid economic expansion, its consequent increasing global influence, and its desire to foster closer economic ties with other developing countries. The sheer magnitude of China's lending activities to EMDEs has placed it among the top creditors in the global financial system. In this context, it is essential to analyse the composition and nature of China's lending portfolio. This includes the distribution of loans across regions and sectors, the terms and conditions associated with these loans, and the overall impact on the recipient countries' debt sustainability.

China's lending activities encompass a wide range of sectors, with a particular focus on infrastructure, energy, and transportation projects. These investments often align with China's broader strategic objectives, such as the Belt and Road Initiative (BRI), which aims to enhance connectivity and economic integration across Asia, Europe, and Africa. By investing in critical infrastructure projects, China is able to strengthen trade links, promote regional development, and establish itself as a key player in the global economy. In addition to infrastructure investments, China's lending also extends to other sectors, including agriculture, manufacturing, and technology.

China is lending to several regions, covering countries in Africa, Latin America, and Asia. In fact, 17% of Sub-Saharan (excluding high-income) and 10% of South Asian external sovereign debt was held by China in 2021 (Figure 3.4). While there are variations in the scale and scope of lending across these regions, the overall trend points to a growing presence of Chinese lending to EMDEs. This has led to a reconfiguration of the global creditor landscape, with China now playing a prominent role in shaping the financial dynamics between developed and developing countries.

Figure 3.4. Share of China as a creditor in external debt by region



Note: Includes marketable debt and loans as of 2021.
Source: World Bank (2023[5]), International Debt Statistics, https://databank.worldbank.org/source/international-debt-statistics#.

Debt vulnerabilities and implications for emerging markets

Despite the abovementioned mutually beneficial incentives, China's lending activities in emerging markets can also lead to external vulnerabilities and balance of payments risks for the recipient countries. The repayment of loans extended by China may put pressure on the foreign exchange reserves of these countries, especially considering that they often carry relatively high rates (Horn et al., 2023[4]), leading to a potential balance of payments difficulties.

Another concern related to China's lending activities in emerging markets is the issue of debt transparency and governance. China's lending practices have often been characterised by a lack of transparency, with limited information available on the terms and conditions of the loans. This opacity can hinder accurate assessments of the debt sustainability and risk exposure of the recipient countries. Furthermore, weak governance and institutional capacity in some emerging market countries can exacerbate these risks. Inadequate oversight, corruption, and mismanagement of public funds can undermine the effectiveness of the financed projects and impede debt sustainability.

Source: Based on Wang (2022[6]), China Belt and Road Initiative (BRI) Investment Report 2022 and World Bank (2023[5]), International Debt Statistics, https://databank.worldbank.org/source/international-debt-statistics#.

3.3. Composition of EMDE debt issuances

3.3.1. The share of foreign denominated debt continued to decline in 2022 in all regions, except LAC

In sovereign debt literature, the "original sin" refers to the inability of many EMDEs to borrow in their domestic currency, forcing them instead to borrow in foreign currencies, causing a currency mismatch between tax receipts and debt servicing costs and preventing their local bond markets from developing (Eichengreen and Hausmann, 1999[7]; Eichengreen, Hausmann and Panizza, 2005[8]). Countries suffering from the original sin struggle to participate in and benefit from greater currency flexibility due to the limitations of monetary policy and reliance on foreign currencies. This results in more volatile interest rates, fragile financial positions, and greater macroeconomic volatility, including wider output fluctuations and unstable capital flows. These countries have lower credit ratings and can face challenges in accessing international capital markets, making their economies less stable and more crisis-prone compared to advanced countries, especially in times of significant exchange rate volatility, growing fiscal needs and rising interest rates. The problem is especially pressing in countries with low levels of exports, since this

limits the availability of hard currencies, increasing debt servicing costs in domestic currencies during periods of local currency depreciation.

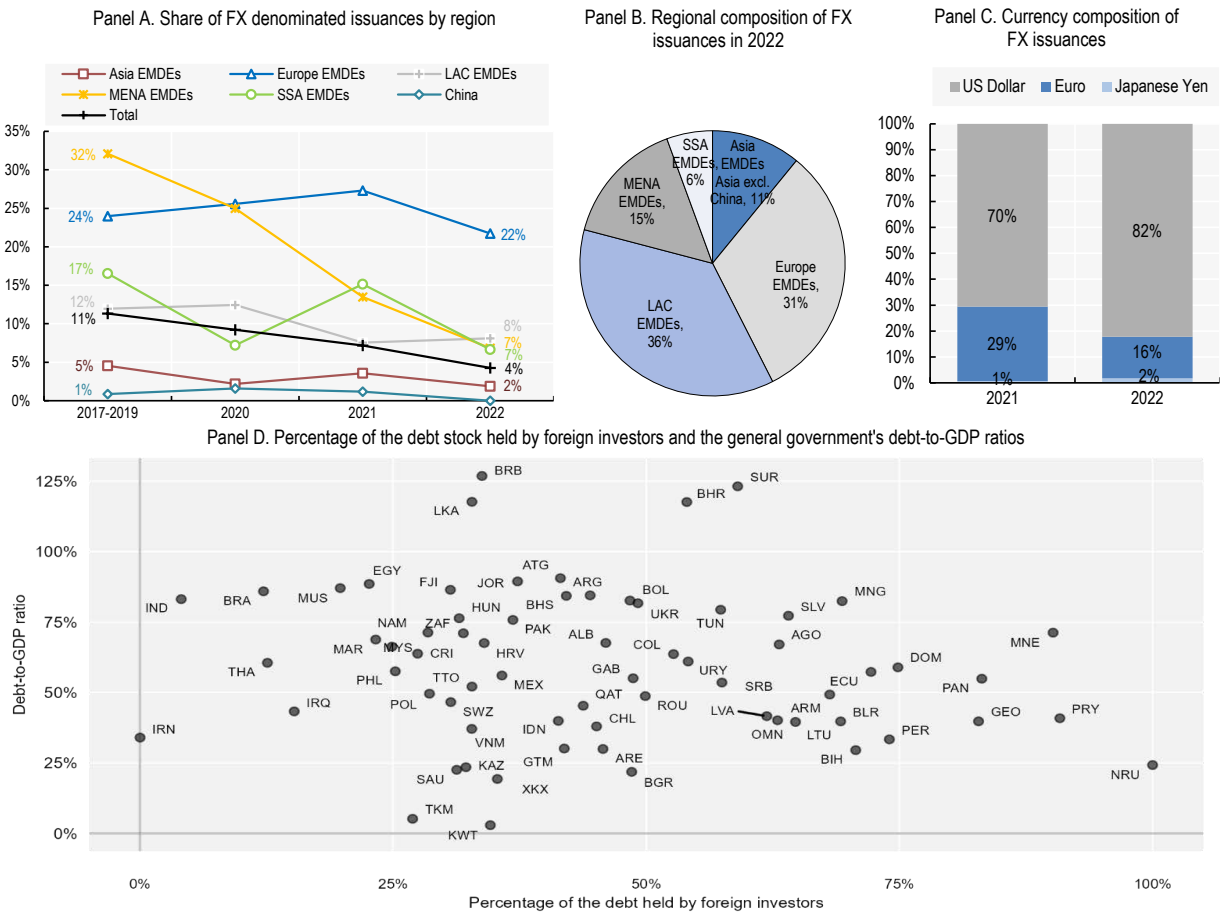
Following an improvement in EMDE macroeconomic policy frameworks, some EMDEs have greatly improved the development of their local bond markets, with the average share of foreign currency-denominated bonds in total issuance falling from 15% in 2005 to 11% in 2019, prior to the COVID-19 pandemic. This development was widespread, with the share shrinking in all regions except Europe. Following the COVID-19 pandemic, the dominance of the domestic currency bond market became even more prevalent, with the share of foreign currency-denominated debt declining to 4% in 2022 (Figure 3.5).[7]

In 2022, all regions except LAC significantly decreased their shares of debt issued in foreign currency. The sharpest decline took place in Sub-Saharan Africa, where foreign currency issuance fell from 15% to 7% of total issuance – only three sovereigns from Sub-Saharan Africa issued foreign currency-denominated debt in 2022, compared to nine in 2021. Countries in Asia (excluding China, which did not issue any foreign currency denominated debt in 2022) issued 2% of their gross debt in foreign currency, the lowest level since 2007, and slightly lower than 2020 figures.[8] In Europe and MENA, foreign currency issuance represented 22% and 7% of 2022s gross borrowing, respectively, a decrease of roughly 6 and 7 percentage points compared to 2021.

However, some countries still rely heavily on foreign currency-denominated borrowing. For instance, in 13 out of 38 countries that issued foreign currency debt in 2022 more than half of their marketable gross issuances were in foreign currency. Six of these countries were in LAC and three were in Europe. Concerning loans, it is worth emphasising that many EMDEs rely on loans in hard currencies to fund their needs, meaning that their exposure to foreign currency risk can be much greater than what is implied considering only marketable debt.

In terms of the currency composition of foreign currency debt, the euro and US dollar are dominant, together accounting for more than 98% of all foreign denominated debt issuance by EMDEs since 2015. While varying in time and size, other foreign currency borrowing has mainly been in Japanese yen, Swiss franc, British pound, Russian rouble and Chinese yuan. Historically representing the largest share among in foreign currency borrowing, US dollar debt accounted for 73% of the foreign currency denominated debt issued by EMDEs in 2019, before the COVID-19 pandemic. This share decreased slightly in both years during the pandemic, falling to 70% at the end of 2021, while the share of the euro increased from 24% to 29% during the same period. In 2022 however, this composition changed significantly, as the share of USD issuance jumped to 82% and the euro share declined to 16%, although it still represents about half of all issuances from EMDE in Europe (with the other half being denominated in USD). These fluctuations were driven by Argentina, Indonesia, Mexico, Romania and Türkiye. In particular, out of 27 countries that issued euro-denominated debt during 2020 and 2021, only nine did so in 2022, while 33 out of 52 EMDEs continued to issue USD-denominated debt, driving the change in the relative shares of euros and the US dollar.

Figure 3.5. EMDEs' exposure to foreign markets in terms of currency and investor base



Note: Values as of 2022 for the Debt-to-GDP ratios and as of 2021 for the percentage of the debt held by foreign investors.
Source: OECD calculations based on Refinitiv data and IMF Sovereign Debt Investor Base for EMDEs.

3.3.2. EMDEs still have significant room to diversify their investor base domestically and to improve their debt transparency

There are data gaps regarding the indebtedness of many EMDEs whose information is scattered across creditors that provided bilateral loans to sovereigns. This lack of readily and timely available debt data frustrates attempts to analyse debt sustainability and risk exposure, in turn making the improvement of portfolios and exploring hedging options more difficult. Addressing the lack of debt transparency for EMDEs, including the challenges associated with non-marketable debt, is crucial to ensuring financial stability and effective risk management. For these reasons, efforts have been undertaken to enhance debt management capabilities and openness via global programmes like the World Bank's support for debt management in low- and middle-income nations and the OECD's Debt Transparency Initiative.

Another challenge pertains to the development of a diversified domestic investor base. Although the development of local bond markets can decrease the risk of debt distress, it only does so to a certain extent. Many EMDEs relied on foreign investors' willingness to lend in local currencies when the domestic investor base was small. Although this has reduced exposure to exchange rate fluctuations, it also made capital flows more volatile (Onen et al., 2023[9]; OECD, 2022[10]). Specifically, to roll over their debt, countries rely on foreign investor demand, which fluctuates with global financial conditions. In times of high borrowing needs and unfavourable funding conditions, foreign investors might be reluctant to fund

sovereigns with weaker fundamentals, creating a net capital outflow, devaluating the countries' local currencies and affecting the economy accordingly (Önder and Sunel, 2021[11]).

Figure 3.5 Panel D illustrates how EMDEs are vulnerable to foreign investor demand by examining their debt-to-GDP ratios and the percentage of their debt that is held by foreign investors. On average, 44% of EMDEs' sovereign debt is held by foreign investors, with this percentage exceeding 25% in roughly 90% of them. In addition, in 35% of the cases, the percentage of the debt held by foreign investors exceeds half of the sovereign debt outstanding, and in 55% of these cases, the debt-to-GDP ratio is above 50%, meaning that these countries own at least one-quarter of GDP to foreign investors. Contrasting to AEs, only five countries are in this situation (namely Austria, Belgium, Cyprus, Greece and Slovenia) and these are all from the euro area, which means that their debt is often held by other EU countries to which they also tend to export significantly due to the free trade policy agreed between EU members and to their geographical proximity. Therefore, for EMDEs that were already able to reduce their exposure to foreign currency risk, the next step is to build a strong domestic investor base, ideally consisting of varying types of investors, such as pension funds, insurance companies, and personal investors.

3.3.3. EMDEs face difficult trade-offs concerning lengthening maturities and reducing reliance on securities denominated in foreign currencies

The average value-weighted term-to-maturity at issuance (henceforth "ATM of issuances") measures the maturity of issuances in a given year, weighted by issue size. All else equal, a higher ATM implies a lower rollover risk in the future. Conversely, a shorter average term-to-maturity of issuance translates into higher rollover risk in the future as the issuer is more sensitive to changes in financial conditions. In addition, ATM of issuances also reflects how long the current market borrowing costs will be borne by the issuer for fixed rate securities (i.e. this does not apply for floating rates and index-linked debt as the principal or coupons of these instruments are already sensitive to market fluctuations before maturity). In times of tight financial conditions, issuing securities with a longer maturity means that these costs will be paid for a longer period and *vice versa*. There is also typically a term premium, meaning that the yield for long maturities tends to be higher than for shorter maturity securities. Sovereign issuers aim at minimising borrowing costs and risks and face difficult trade-offs when deciding the maturity of their issuances. In times of monetary tightening, this trade-off implies difficult choices as lengthening maturities can reduce the exposure to further interest rate hikes but at the cost of locking in a higher yield for a long time while shortening maturities can further expose the issuer to future deteriorations in funding conditions and high debt redemptions.

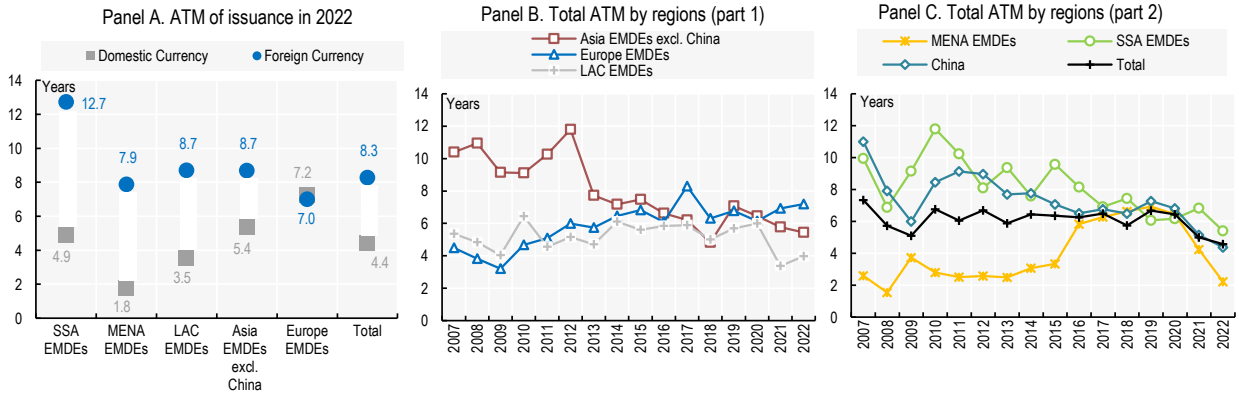
In the case of EMDEs, the choice of lengthening the maturity structure of the debt portfolio tends to be even more challenging given that the demand for long maturities depends on the securities' currency denomination. Investors are not as willing to buy long maturities denominated in local currencies due to the inflation risk in contrast with buying long maturity bonds in hard currencies like the US dollar or the euro. Therefore, the choice of some EMDEs is between either lengthening their maturities to reduce their refinancing risk and their exposure to fluctuations in funding conditions at the cost of higher foreign currency risk and higher borrowing costs or, alternatively, issuing securities with a relatively shorter maturity in domestic currency, bearing higher refinancing risk and sensitivity to fluctuations in funding conditions to reduce their exposure to foreign exchange risk. For instance, in 2022 the ATM of issuances of debt denominated in foreign currency is 7.8, 6.1, 5.2, and 3.3 years longer than those borrowed in domestic currency in SSA, MENA, and EMDE Asia (excluding China), respectively (Figure 3.6 Panel A). In EMDEs in Europe, the ATM of issuances are roughly the same regardless of the currency of denomination. In times of distress, however, even the debt denominated in foreign currency can be considered a higher risk for some investors to bear – in these cases, EMDEs with relatively weak fundamentals are forced to borrow both short term and in foreign currencies.

3.3.4. The securities issued in 2022 have, on average, a shorter maturity than those issued in 2021 in Asia and SSA, but longer in LAC and Europe

Recent movements in the ATMs illustrate the challenges faced by EMDEs in lengthening the maturity structure of their debt portfolio (Figure 3.6 Panels B and C). In 2020, the deterioration in investor confidence due to the COVID-19 pandemic resulted in a decline in ATM of issuances, from 6.7 to 6.4 years on average across EMDEs. Turning more to their domestic debt markets, sovereigns issued a higher percentage of short-term securities, reducing the ATM of their domestic currency denominated debt issuance. In particular, EMDEs' ATM of issuances in domestic currency fell across all regions except SSA. On the other hand, the ATMs of foreign currency denominated issuances exhibited the opposite behaviour, increasing from 12.9 years to 14.7 years between 2019 and 2020. Two exceptions to this pattern were China and SSA whose ATM of foreign currency denominated debt issuances decreased by 2% and 12%, respectively. Especially the case of SSA serves as an example of how in times of distress, issuers with weaker fundamentals are unable to borrow with long maturities, even in hard currencies, as the ATM of foreign currency denominated debt issued by SSA sovereigns continued to decline also in 2021 and 2022, falling from 16.8 years in 2019 to 12.7 years in 2022. In 2021, despite some developments in rollout of vaccines and a strong recovery from the COVID-19 crisis, the pattern of shortening maturities for gross debt issuance continued except in Europe and Sub-Saharan Africa, which have the highest shares of foreign currency denominated debt in gross borrowing, at 27% and 15%, respectively, against 7% of the EMDEs average for 2021.[9]

In 2022, heightened macroeconomic and geopolitical uncertainty negatively affected the ATM of issuances, which fell for all regions except Europe and LAC (Figure 3.6 Panels B and C). The average decrease was from 5.0 to 4.6 years. The smallest decrease occurred in Asia excluding China, from 5.8 years to 5.4 years. The steepest fall, on the other hand, was observed in MENA with a decline of 48%, from 4.2 years to 2.2 years. LAC, which was the region with the lowest ATM of issuances in 2021, became the region with the second lowest one after MENA in 2022, increasing its ATM by 17%. This movement was due to Argentina, Brazil and Mexico whose ATM of issuances increased by 19%, 17% and 16% respectively.

Figure 3.6. The average term-to-maturity (ATM) of issuance for EMDE regions, weighted by issue amounts



Source: Refinitiv; and OECD calculations.

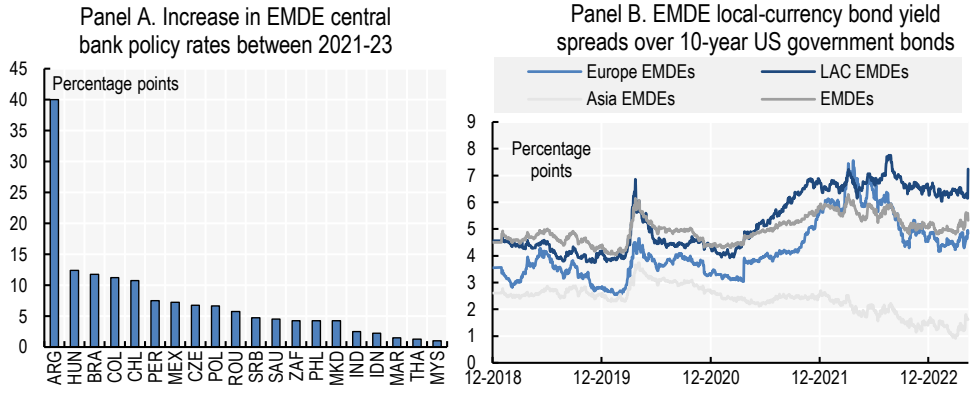
3.4. Borrowing costs rose sharply due to global monetary tightening in the face of surging inflation

3.4.1. Central banks vary in the timing and the pace of monetary tightening, with Asia seeing a delayed and smaller increase in policy rates

During the period from December 2021 to December 2022, central bank policy rates displayed distinct regional patterns, with AEs and EMDEs responding differently to inflationary pressures. In order to curb soaring inflation and anchor inflation expectations, many central banks increased interest rates in 2022, tightening financial conditions for EMDEs considerably (Figure 3.7). Only a few EMDE central banks, notably in Türkiye and Russia, reduced their policy rates in 2022 when compared to the level at the end of 2021.[10]

There were significant regional differences between central banks in the timing and the pace of the increase in policy rates, with AEs and EMDEs in Asia displaying a tendency to raise rates later and less than other EMDEs. 11 out of the selected 14 EMDE central banks outside Asia rose policy rates before the United States, in March 2022, and only Morocco did so after the European Central Bank (ECB), in July 2022. On the other hand, all six Asia EMDEs rose rates in or after March 2022.[11] The pace of the monetary tightening also was slower in Asia, with the average increase in policy rates reaching 2.6 percentage points in the region in this monetary tightening cycle, below the average of 7.5 percentage points in other EMDEs in the same cycle (excluding the outlier Argentina). The strongest movements in policy rates were experienced by LAC countries, with all six LAC countries covered in this analysis being among the seven countries in which policy rates rose the most. This strong movement in LAC partially reflects relatively higher inflation rates in the region in 2022 of 72.4% in Argentina, 11.6% in Chile, 10.2% in Colombia and 7.9% in Mexico with the average in EMDEs in Asia being 3.8% per annum (IMF, 2022[3]).

Figure 3.7. Change in the main policy interest rate of EMDE central banks and EMDE local currency bond spread over ten-year US Government bond yields



Panel C. Starting month of policy rate hikes

Mar-21	Jun-21	Jul-21	Ago-21	Oct-21	Nov-21	Feb-22	Mar-22	Apr-22	May-22	Ago-22	Set-22
BRA	CZE	CHL	PER	COL	ZAF	ARG	SAU	MKD	IND	IDN	MAR
	HUN			POL				SRB	MYS	THA	
	MEX			ROU					PHL		

Note: Panel A displays the difference between the maximum and the minimum policy rate between January 2021 and March 2023 for EMDEs that experienced a rise in policy rates in the period. EMDEs that decreased policy rates in that period, and are not covered by the Panel, are China, Russia and Türkiye.
Source: Bank of International Settlements; Refinitiv; and OECD calculations.

3.4.2. EMDEs' sovereign bond spreads have risen substantially since 2021

In times of monetary tightening with high macroeconomic and geopolitical uncertainty, yield spreads of EMDE bonds over AE bonds tend to increase. In these cases, investors tend to opt for safe havens, causing a flight-to-quality movement with capital flowing to AE securities, perceived as more secure, and away from vulnerable economies, especially those with lower credit ratings, which are already exposed to capital outflows. In addition, before this monetary tightening cycle, many investors in EMDE sovereign bonds benefitted from positive real yields. However, 2022 marked a reversal in the trend of low interest rates in AEs (see Chapter 1), allowing investors to obtain positive real yields by investing in economies with strong fundamentals. For EMDE borrowers, these movements translate into higher borrowing costs and less liquid markets, both of which exacerbate debt sustainability risks.

The evolution of the spread of EMDE local currency sovereign bond yields over ten-year US Government bonds has shown notable dynamics across regions in the post-pandemic period (Figure 3.7 Panel B). First, EMDE spreads started to rise in early 2021, significantly earlier than major AEs' central banks started to raise policy rates, reflecting the fact that EMDEs' central banks reacted more swiftly to the rising inflationary pressures and capital outflows in 2021.[12] Second, after Russia's war of aggression against Ukraine, in February 2022, there was a 0.4 percentage point increase in the spreads on average across EMDEs in one month, driven mainly by the especially acute hike for EMDEs in Europe, from 6.0% to 6.9%. However, this increase was small compared to the surge that took place in the 12 months before the start of the war, from 3.16% to 5.96%. Third, the increase in spreads caused by the geopolitical uncertainty following the war in Ukraine was gradually reversed throughout 2022, reaching roughly the same level it had prior to the start of the war around September 2022. Fourth, the market stress caused by the banking turmoil in early 2023 has caused yet another flight-to-quality movement, impacting EMDE spreads, with an increase in March 2023 still relatively small compared to the increase prior to the war in Ukraine. As EMDE sovereign bond yields are much higher than prior to the war, this suggests that the main driver of 2022s upward trend in EMDE yields pertains to the reaction of the yield curve to adjustments of AEs' yields, and not to movements in spreads. There are, however, many exceptions – this analysis considers only the main issuers in each region whereas some specific countries suffered substantial distress.

In terms of regional patterns, the current macroeconomic and geopolitical developments affected Asia's EMDEs in a very distinctive way. Yield spreads in EMDEs in Asia over the 10-year US Government bonds have peaked in the wake of the COVID-19 pandemic and has followed a clear decreasing trend since then, reaching less than 1% in February 2023. Overall, this reflects the superior fundamentals witnessed in major EMDEs in Asia. In particular, they rely less on securities denominated in foreign currency, which account for less than 2% of their issuances in 2022,[13] against 10% for all other EMDEs, and they suffered less from recent inflationary pressures, allowing their central banks to increase rates less aggressively. Conversely, large issuers from LAC suffer from a deteriorated fiscal situation while EMDEs in Europe are located closer to the war zone and have large commercial ties with Russia and Ukraine, making them more vulnerable to the war. For instance, preceding the war, exports to Russia and Belarus were between 2% and 3% of GDP for some EMDEs in Europe such as the Czech Republic, Hungary and Poland, while for all major AEs in Europe such as France, Germany, Italy, Spain and the UK, this share is below 1% of GDP (OECD, 2022[12]).

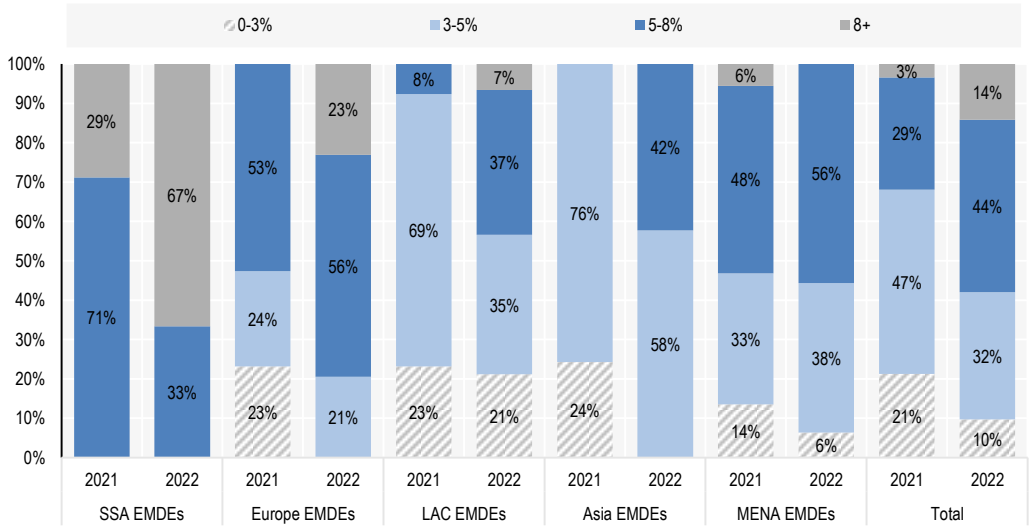
3.4.3. EMDE borrowing costs soared with global macro-financial tightening

Another indicator of sovereign bond yields explored in this chapter is the average yield to maturity at issuance (YTM) of fixed-rate USD-denominated government bonds. This indicator is drastically different than the one just explored, of EMDE local-currency bond yield spreads over ten-year US Government bonds, in two main regards. First, the YTM captures the actual borrowing costs borne by sovereign issuers while the spread captures the difference in benchmark yields – that is, the difference between the yields of EMDEs and US sovereign bonds, both priced based on transactions in secondary markets. Second, the

YTM here is of securities issued in foreign currency while the spread was based on domestic currencies. This implies that the spread captures the difference in inflation expectations across the EMDE and the US. There is a major implication of this fact for debt sustainability analysis given that the interest rates used in these assessments are expressed in real terms and not in nominal terms, meaning that a country with a high nominal rate might have a low real rate and, therefore, no debt sustainability issues (Debrun, Ostry and Wyplosz, 2020[13]). It is worth noting, though, that despite the fact that inflation can initially improve fiscal balances and reduce public debt in the short to medium term, relying on expected inflation as a strategy for reducing debt ratios is neither desirable nor sustainable, with attempts to continuously surprise bondholders proving futile or harmful (International Monetary Fund, 2023[2]).

The volume share of fixed-rate USD-denominated government bond issuances across yield to maturity (YTM) categories weighted by their issue amounts has increased. by 1.1 percentage points in 2022, from 4.2% in 2021. In total less than 10% of the EMDE fixed-rate USD-denominated government bonds were issued with a yield under 3%; 32% with a yield between 3% and 5% and 58% with a yield above 5% in the primary markets. The percentage of debt issued with higher yields increased significantly across all regions in 2022 compared to 2021, with some regions breaching the 8% threshold for some issuances, which did not occur in 2021. The region with the highest yield on fixed-rate USD-denominated government bonds remained in SSA. On the other hand, EMDEs in Asia issued more than 50% of its debt at less than 5% yield in 2022 with an average yield of 4.6%, the lowest across all regions. However, this is still an increase of 33% compared to 2021. In MENA, the cost of issuing fixed-rate USD-denominated bonds remained relatively stable in 2022.

Figure 3.8. Volume share by yield group of fixed-rate USD-denominated bond issuance in 2022



Notes: Yields are calculated using fixed-rate USD-denominated securities with a maturity longer than 365 days. Comparison between EMDE yields between 2022 and 2021 is based on 34 EMDE sovereigns that issued in 2022 and the corresponding yields of 22 issuers who also issued fixed-rate USD denominated bonds in 2021.
Source: Refinitiv; and OECD calculations.

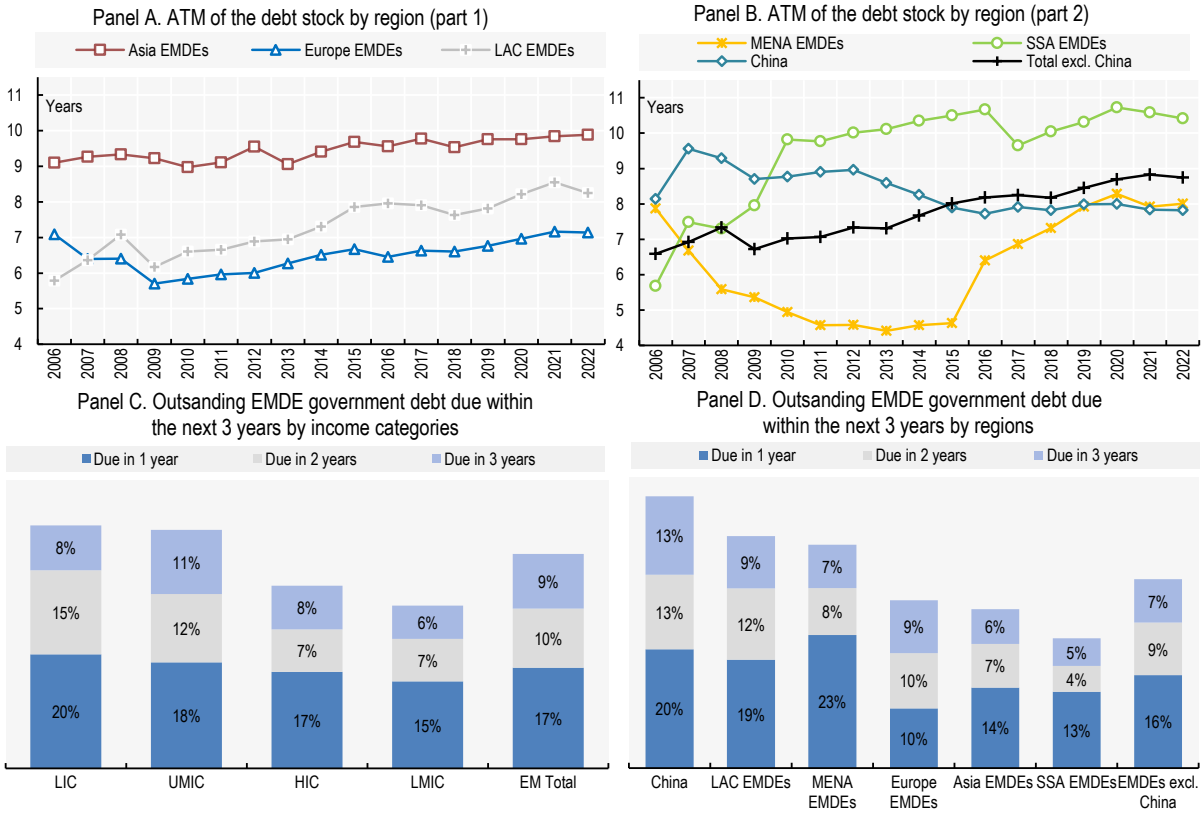
3.4.4. Average term-to-maturity is at record highs, but about one-third of EMDE sovereign marketable debt is coming due within the next three years

The pace at which market interest rates affect borrowing costs depends greatly on the maturity profile of the debt portfolio. In that light, EMDE's bond maturities have increased since the 2008 global financial crisis, reaching its highest level in more than 15 years in an environment of extraordinarily good funding

conditions, thanks to supportive monetary policy in AEs (Figure 3.9, Panel A and B). On average, EMDEs' (excluding China) debt stock ATM rose from 6.1 to 8.2 years between 2006 and 2022. This growth encompassed all regions except China. It is worth noting that since 2020, the EMDE debt stock's ATM has remained largely unchanged across all regions despite the heightening macroeconomic and geopolitical uncertainties brought by the COVID-19 crisis, Russia's war of aggression against Ukraine and monetary policy tightening.[14]

These averages mask the fact that the ATM still varies significantly across countries, revealing a wide range of exposure to refinancing and interest rate risks. For instance, among countries in which the debt-to-GDP ratio is above 50% in 2022, there are those with a very short debt portfolio, such as Algeria (2.4 years), Guinea-Bissau (three years), Zambia (3.3 years), Pakistan (3.3 years); and those with a relatively long debt portfolio, such as El Salvador (14.3 years), Fiji (14.8 years), Panama (15.2 years), and Gambia (19.5 years). Similarly, there also are disparities in the trends in the ATM of the debt stock, with Argentina, Albania and Kazakhstan experiencing a decrease respectively of 2.8, 1.4 and 1.4 years in the ATM of their debt stock in 2022, while the United Arab Emirates, Tunisia and Bolivia were able to significantly lengthen the maturity structure of their debt portfolios, by 20.0, 2.0 and 1.9 years, respectively.[15] These wide disparities in ATM movements and levels reflect the corresponding asymmetries in the economic and financial situation of EMDEs.

Figure 3.9. The average term-to-maturity (ATM), weighted by outstanding debt



Note: ATM considered all securities except those with maturity below 30 days.
Source: Refinitiv; and OECD calculations.

Despite record-high ATMs, more than one-third of total outstanding EMDE debt will mature by the end of 2025, with roughly half of this amount coming due in 2023, reflecting the high rollover risk EMDE sovereigns face (Figure 3.9, Panels C and D). Following the surge in funding needs and future

uncertainties in the wake of the COVID-19 pandemic, EMDE sovereigns have increasingly borrowed at short-maturities, most of which is still being refunded through the issuance of more short-term debt, increasing the exposure to short-term market risks. Among all the income categories, low-income countries (LIC) remained the group facing the highest rollover risk, as 20% of their outstanding debt is due within one year and 42% within three years, reflecting the reluctance of investors to bear the risk of long maturities in LICs. Some UMIC issuers also have a considerable share of debt maturing by the end of 2023. Notably, 60% of Argentina's debt is maturing in one year, followed by Algeria (48%), Iraq (35%) and Thailand (30%), making these countries' borrowing costs especially vulnerable to short-term fluctuations in market rates.

Looking at the regional level, MENA countries have the highest share of outstanding debt coming due in one year as 23% of the region's outstanding debt will have to be repaid or refinanced by the end of 2023. As opposed to China, which also has a significant portion of the debt (20%) maturing in one year, MENA countries have higher exposure to international markets as historically a considerable share of the debt issued by MENA sovereigns is denominated in hard currencies to match the currency they receive from their exports, whereas, in China, foreign currency denominated debt issuance has been less than 2% over the past years. Following the MENA region, LAC countries also carry a high rollover risk with 19% of the outstanding debt coming due by the end of 2023, higher than the 17% average of EMDE countries. The heterogeneity of regions in their redemption structure is even more pronounced when China is excluded from the calculation, which has a significantly higher share of debt maturing until 2025 than the average of the rest of EMDEs weighted by their outstanding debt. EMDEs excluding China have 32% of their debt maturing in three years whereas including China this number jumps to 36%, suggesting a significant portion of the refinancing need belongs to China alone, which relied greatly on short maturities to fund their zero COVID-19 policies. Both Asia and Europe have relatively a low share of debt due in 2023, constituting 14% and 10%, respectively, of their total outstanding debt.

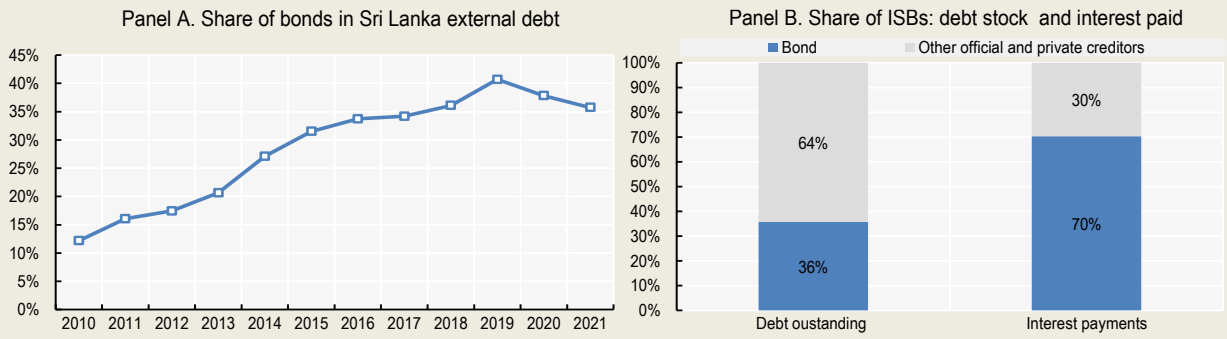
It is worth noting that the maturity of this substantial amount of debt will occur concurrently with the unwinding of major AE central banks' balance sheets (see Chapter 1). Although EMDE central banks have engaged only mildly in bond purchase programmes and predominantly only during the COVID-19 crisis (Aguilar and Cantú, 2020[14]), foreign investors account for a substantial share of the investor base for EMDE bonds. Thus, EMDEs will likely compete for foreign funding at a time when the supply of AEs' government bonds will increase. As many of these bonds have long maturities, the capacity of the market to buy duration risk,[16] which is directly proportional to the maturity of the fixed-income security, might be insufficient to allow AEs and EMDEs to roll over their debt at the current historically high level of ATMs. And this is happening at a time when investors can obtain real positive returns by purchasing fixed-income securities from safe AEs. Going forward, this implies that EMDEs that rely on foreign investors to fund their borrowing needs will face challenges in lengthening their debt portfolio and issuing more in domestic currency. This in turn could exacerbate debt sustainability concerns.

Box 3.2. Examining Sri Lanka's debt crisis of 2022

A combination of high exposure to international markets and macroeconomic shocks affected Sri Lanka

Sri Lanka faced a debt crisis in April 2022, predominantly due to its substantial exposure to international sovereign bonds (ISBs) issued at high interest rates. Between 2007 and 2019, Sri Lanka issued USD 17 billion worth of ISBs,[17] resulting in the public external debt stock to GDP ratio increasing from 29% in 2010 to 44% in 2021. The proportion of ISBs in Sri Lanka's external debt stock rose from 12% in 2010 to 36% in 2021, accounting for a considerable 70% of the government's annual interest payments in 2021 (Figure 3.10). Elevated coupon rates and the presence of traditional collective action clauses in no more than 36% of these ISBs made debt restructuring more difficult.

Figure 3.10. Gross external debt position, breakdown by instrument



Note: External Debt refers to External Debt Stock Public and Publicly guaranteed (PPG).
Source: World Bank (2023[5]), International Debt Statistics, https://databank.worldbank.org/source/international-debt-statistics#.

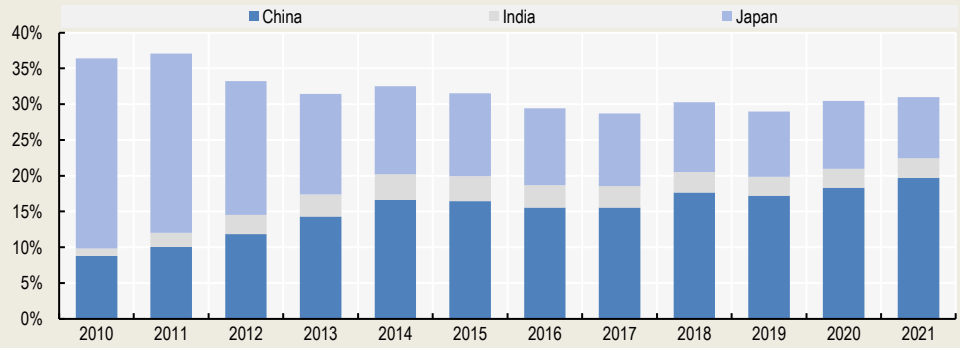
This high exposure to foreign markets was combined with a weak fiscal stance and external shocks, such as the COVID-19 pandemic and the conflict in Ukraine, setting the scene for the crisis. Sri Lanka lost approximately 24% of its annual export revenue due to the halt of tourism in 2020 and 2021 and faced escalating global oil and commodity prices as a result of the war in Ukraine. The considerable cost of ISBs in outstanding debt and the diversity of bondholders' interests complicated the government's efforts to negotiate a restructuring or secure alternative financing options.

Addressing the crisis: the support from the IMF

To address the crisis, authorities implemented exceptional measures, including import restrictions, the balance of payment measures, a digital fuel rationing system, and scaling up social transfers with external humanitarian support. Decisive policy actions since mid-2022 included reducing monetary financing, raising policy rates to control inflation, introducing tax measures to improve fiscal balance, increasing electricity prices, implementing automatic energy pricing mechanisms, and initiating institutional and structural reforms.

The International Monetary Fund (IMF) approved a USD 2.9 billion Extended Fund Facility (EFF) arrangement on 20 March 2023, to assist Sri Lanka in tackling its ongoing economic crisis. This 48-month extended arrangement aims to provide the necessary capital to fund essential imports and offer policy space for the Sri Lankan Government to stimulate economic growth and implement structural reforms.

Figure 3.11. Share of Sri Lanka's external debt held by China, India and Japan



Source: World Bank (2023[5]), International Debt Statistics, https://databank.worldbank.org/source/international-debt-statistics#.

The Sri Lankan EFF comes with stringent conditionalities for economic reform, such as ambitious revenue-based fiscal consolidation to restore fiscal and debt sustainability. The IMF suggests that the Sri Lankan Government reform its tax mechanisms and manage expenditures to address persistent budget deficits, aligning spending with income. Moreover, the IMF encouraged the government to continue implementing progressive tax reforms while introducing stronger safety nets to protect the poorest and most vulnerable in the society.

Ahead of the first IMF review in six months, Sri Lanka is set to engage in debt restructuring discussions with bilateral and private creditors. The country received support guarantees from China, India, and Japan, holding more than 30% of Sri Lanka's PPG external debt (Figure 3.11) before the approval of the IMF programme. Of these 30%, China holds roughly 20pp alone, with its share following a rising trend since 2010 (for details on the role of China as a lender see Box 3.1). The IMF programme is expected to catalyse further external funding from other multilateral organisations and inject more capital into the Sri Lankan economy, which will fund essential imports and public investments, and replenish foreign exchange reserves.

Sources: Based on IMF (2023[15]), Sri Lanka: Request for an Extended Arrangement Under the Extended Fund Facility-Press Release, https://www.imf.org/en/Publications/CR/Issues/2023/03/20/Sri-Lanka-Request-for-an-Extended-Arrangement-Under-the-Extended-Fund-Facility-Press-531191; The Diplomat (2023[16]), The Real Cause of Sri Lanka's Debt Trap, https://thediplomat.com/2023/03/the-real-cause-of-sri-lankas-debt-trap/.

3.5. Overall credit quality of EMDEs slightly deteriorated following the record number of downgrades in Europe

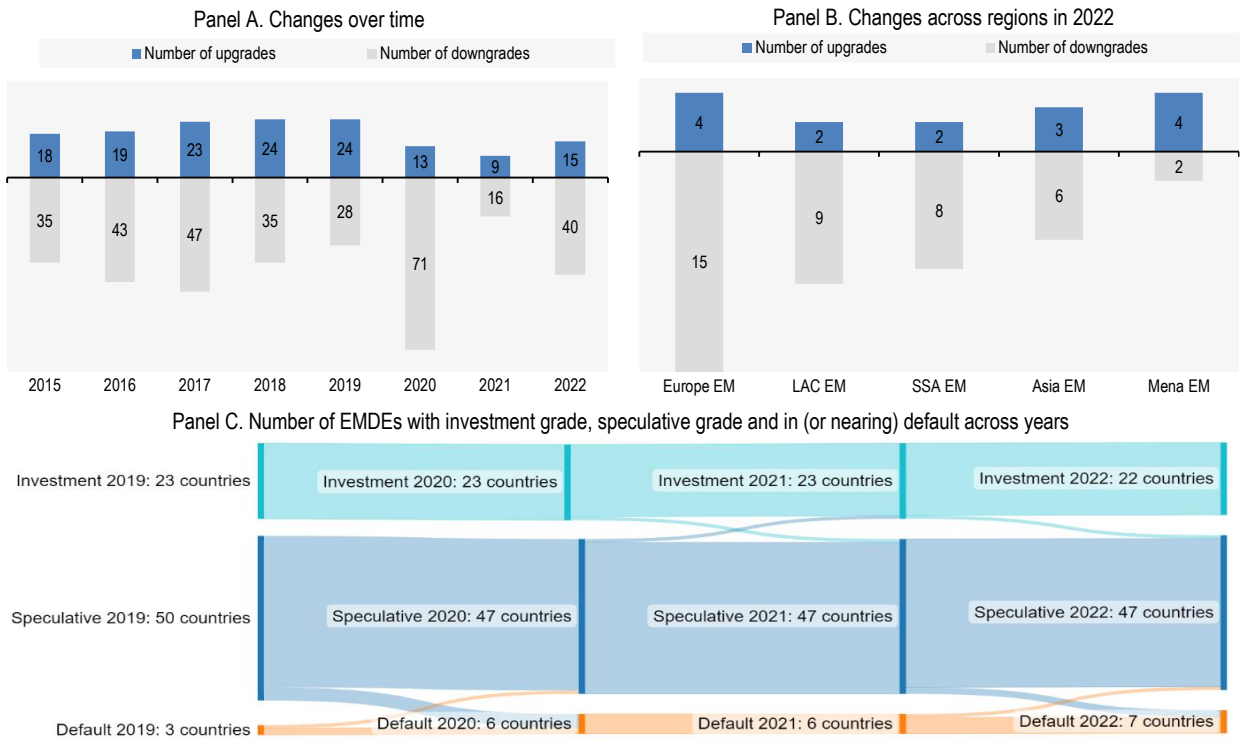
3.5.1. 2022 was a year with a large number of downgrades, with most of them concentrated in six countries

Financial conditions have tightened globally, with central banks raising policy rates at a record pace. Russia's war of aggression against Ukraine has spurred food and energy price increases, eroding purchasing power globally. This has made 2022 the year with among the highest ever number of sovereign rating downgrades with risks still to the downside (Fitch Ratings, 2022[17]). In this scenario, EMDEs face difficult choices as supporting the population's purchasing power through fiscal policy can lead to an increase in borrowing costs at a time of already high policy rates and might be offset by future increases in inflation. Investors are more sensitive to EMDEs' fiscal policy than they are to AEs' and, thus, a

simultaneous deterioration of their fiscal and financing conditions can more easily spiral, resulting in insolvency.

Two years after the 71 downgrades that were issued for 28 countries in 2020 driven by the COVID-19 pandemic, 40 downgrades were given to EMDE sovereigns in 2022 (Figure 3.12 Panel A and B).[18] As opposed to previous years, in 2022 the region which was downgraded the most was Europe, receiving 15 of 40 downgrades, followed by LAC (9) and SSA (8). Looking deeper at the composition of downgrades in 2022, the record number of downgrades given to EMDEs in Europe does not reflect a general worsening of debt quality in the whole region but rather is mainly driven by four sovereigns being downgraded by several agencies and sometimes more than once. These countries are those impacted by the war, with Ukraine accounting for five downgrades (see Box 3.3 on the Ukrainian debt management during the war) and Russia for two, while the remaining eight were split evenly between Belarus and Türkiye.[19] Similarly, in Asia, six downgrades were given to only two issuers, but four times for each: Sri Lanka and Pakistan. In total, only six countries accounted for 25 out of 40 downgrades in 2022 – namely Belarus, Ghana, Russia, Sri Lanka, Türkiye and Ukraine.

Figure 3.12. Trends in EMDE sovereign credit ratings



Note: Investment grade covers ratings equal to or better than BBB- or Baa3; speculative grade covers ratings between CCC+ or Caa1 and BB+ or Ba1; and the default category covers ratings equal to or below CCC- or Caa3. For Panel C, the grade in force on 31 December of the respective year was considered.
Source: Refinitiv; and OECD calculations.

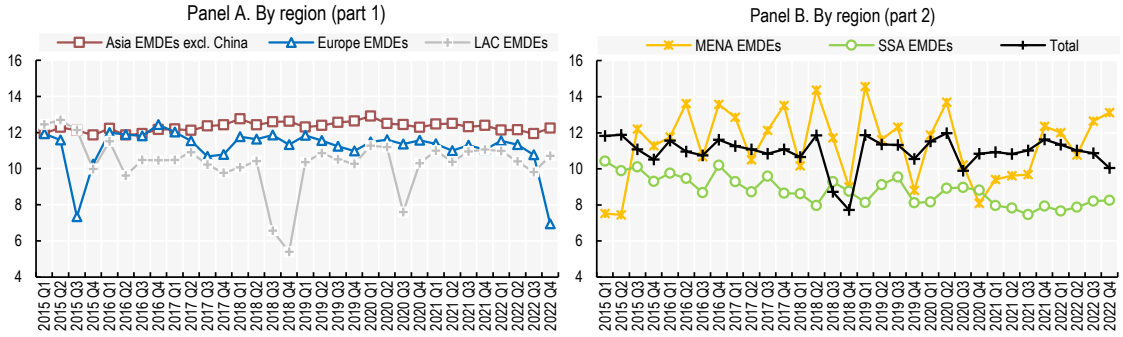
Figure 3.12 Panel C examines the distribution of EMDEs since 2019 across three rating categories: investment grade, speculative grade, and in or approaching default (i.e. ratings equal to or below CCC- or Caa3), providing valuable insights. Firstly, 62% of EMDEs fall within the speculative grade category, 30% in the investment grade, and 8% in the default category. Secondly, these figures have remained relatively stable since 2019, notwithstanding the COVID-19 crisis, Russia's war of aggression against Ukraine, escalating inflationary pressures, and the deterioration of funding conditions. As a result, upgrades and

downgrades primarily occurred within these categories. More specifically, countries that improved their rating category since 2019 include: Argentina (2019) and Belise (2021), which transitioned from default to speculative; and Croatia (2021), which advanced from speculative to investment grade. In contrast, Belarus (2022), Belise (2020), Lebanon (2020), Sri Lanka (2022), Suriname (2020), and Zambia (2020) shifted from speculative to default, while Colombia (2021) and Russia (2022) moved from investment to speculative grade. This implies that, despite numerous downgrades and upgrades since 2019, countries rarely lose or achieve investment grade status or exit from or enter into a default situation, even in light of significant macroeconomic and geopolitical developments.

3.5.2. Following a slight improvement in 2021, the credit quality of EMDE issuance slightly deteriorated in 2022

Value-weighted sovereign credit ratings at issuance for EMDEs between 2015 and 2022 has deteriorated in 2022 relative to historical norms (Figure 3.13). Credit quality had first deteriorated in 2020, with the exception of Asia and Europe, where debt quality has remained relatively stable over time. Especially EMDEs in Asia, excluding China, have remained on average at investment grade ratings thanks to large issuers with sound credit standing (such as India, Indonesia, the Philippines and Thailand) that dominate the region's issuance by amounts. On the other hand, LAC and MENA experienced a sharp decline in their overall credit quality as they received most of the downgrades given to EMDEs in 2020. In addition, the weighted credit quality of SSA was not heavily affected by the significant number of downgrades given in 2020 as many issuers were effectively shut out of debt markets, concealing the effect of the downgrades.

Figure 3.13. Evolution of credit quality for a selected group of EMDEs



Note: Credit quality reflects the value-weighted average rating of gross debt issuance at each quarter. It is not a measure for rating quality of the outstanding debt. The value of 12 in the weighted rating is equivalent to BBB or Baa and, thus, constitutes a threshold for investment grade debt issuance (Annex 3.A).
Source: Refinitiv; and OECD calculations.

In 2021, the overall credit quality of EMDEs slightly improved, driven especially by MENA and to a lesser extent by LAC; while it decreased slightly in SSA and in EMDEs in Europe. This substantial improvement in MENA credit quality in 2021 is worth explaining. In the fourth quarter of 2021, the weighted credit quality of MENA rose from around 9 to more than 12 (equivalently from BB- to BBB-), altering the status of the region from non-investment grade to investment grade. However, given that there was no upgrade given to MENA countries during 2021, this improvement in the weighted debt quality of the region was mainly due to a change in the composition of issuers and the weight of their debt. For instance, in 2020, the group of high-rating MENA countries (each having a rating of 18, equivalent to AA-), namely Kuwait, Qatar, Saudi Arabia and the United Arab Emirates, accounted for 21% of the gross debt issuance of the region, whereas in 2021, their share increased to 29%. In the fourth quarter, the share of gross debt issued by these four high-rated countries rose to 38% with Kuwait issuing for the first time during the year, which explains the jump observed in the weighted debt quality of MENA towards the end of 2021.

In 2022, the overall debt quality of EMDEs has slightly deteriorated, mainly due to a sharp decline in the weighted debt quality of EMDEs in Europe, especially in the second half of the year. Russia and Türkiye, being the two largest issuers of the region, were downgraded a total of six times, and accounted for 39% of the total debt issued by EMDEs in Europe in 2022, which largely explains the steep fall in the weighted debt quality of the region. Asia (excluding China) continued to maintain a stable level of weighted credit quality in 2022, while MENA, after receiving four upgrades, became the region with the highest weighted rating, surpassing Asia. In addition to four upgrades, the composition of issuers also played a role in the rising average rating in the region, as the share of debt issued by high-rating MENA countries (Kuwait, Qatar, Saudi Arabia and the United Arab Emirates) rose from 29% in 2021 to 37% in 2022.

Box 3.3. How to manage debt in times of war: Ukraine experience

Debt management plans prior to the crisis were in good shape thanks to a stable economy

In a recent interview with the OECD, Yuriy Butsa, Ukraine's Government Commissioner for Public Debt Management, provided insights on the implications of the Russian aggression on Ukraine's public debt management and funding conditions (OECD, 2022[18]). Prior to the invasion on 24 February 2022, Ukraine's economy was on a stable growth trajectory, characterised by a relatively low budget deficit of 3.6% of GDP in 2021, a declining debt-to-GDP ratio that had decreased from about 80% in 2016 to below 50%, and an annual GDP growth rate of 3.4%. The nation was also witnessing a recovery from the COVID-19 pandemic, with the central bank tightening monetary policy in 2021 to curb rising inflation.

In the wake of these favourable economic conditions, Ukraine's government funding needs for 2022 were manageable from a debt-management perspective. The government planned to meet its financing requirements through a combination of domestic debt (accounting for around two-thirds) and loan disbursements from international financial institutions such as the IMF and the World Bank. The inclusion of Ukraine's bonds in the JPM GBI-EM Index from 2022 was expected to attract more non-resident flows to the domestic market. The primary challenge for Ukraine at that time was to decide whether to borrow from external commercial sources or focus on maximising domestic market resources, given the anticipated external market backdrop.

Russia's invasion forced Ukraine to restructure its debt and led to a sequence of downgrades

Russia's war of aggression against Ukraine has significantly disrupted Ukraine's borrowing landscape and funding conditions, leading to a market panic sell-off and a considerable increase in yields on foreign currency-denominated bonds. This situation has severely limited Ukraine's access to international capital markets, compelling the government to rely on domestic financial institutions, external donors, and the central bank in its capacity as a lender of last resort.

The country took action and decided to collaborate with creditors to restructure its debt so it could deal with extraordinary funding needs in times of war on its territory. In August 2022, the Ministry of Finance of Ukraine announced that overseas creditors backed the country's request to freeze the country's payments on eurobonds, accounting for 75% of Ukraine's external debt until 2024.

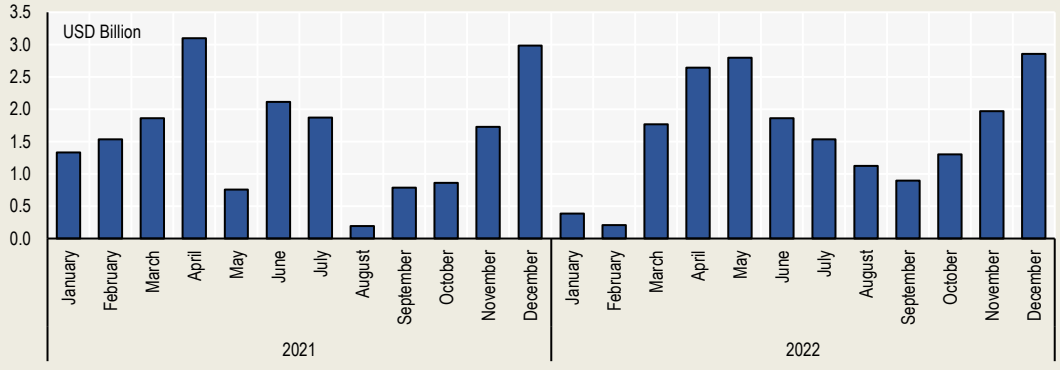
Following the debt restructuring, both Fitch Ratings and Standard & Poor's lowered Ukraine's foreign currency ratings on 12 August. Fitch assigned a restricted default (RD) rating, while S&P assigned a selective default (SD) rating, reflecting the country's debt restructuring. However, both agencies subsequently revised their ratings to CC (Fitch) and CCC+ stable (S&P) on 17 August and 19 August, respectively. Nevertheless, these ratings remain lower than the pre-war B stable ratings provided by both agencies. On 10 February 2023, Moody's downgraded Ukraine's rating from Ca to Caa3, reflecting the heightened risks and uncertainties associated with the country's economic and fiscal outlook following the debt restructuring.

The debt management office adopted several measures to meet funding needs

In the face of these challenges, the government has had to adapt its borrowing strategies to accommodate the increased cash needs, which are estimated at approximately USD 5 billion per month. This adaptation has led to several innovative changes in borrowing techniques. For instance, Ukraine has re-designated its bonds as "war bonds" to support the nation during the conflict. Furthermore, the government has lowered the minimum purchase amount to 1 000 Ukrainian Hryvnia (approximately USD 34), making these bonds more accessible to a broader range of investors, including retail investors. Additionally, Ukraine has engaged with commercial banks to launch mobile applications and web-based solutions that enable individuals to participate in bond auctions more conveniently. This effort has successfully attracted 90 000 retail and business investors, demonstrating the efficacy of these initiatives.

Another strategic change has been the reduction of maximum bond maturities from five years to 1.5 years, a decision made at the request of the Primary Dealers. This adjustment reflects the difficulties in pricing long-term bonds amidst the uncertainties associated with the ongoing conflict and rising inflation. By implementing these changes, Ukraine has been able to maintain some degree of stability in its public debt management, despite the unprecedented challenges posed by the war (Figure 3.14).

Figure 3.14 Amount of the central government marketable debt issued by Ukraine



Source: Refinitiv; and OECD calculations.

By ensuring the availability of funds for social programmes, the government has also indirectly strengthened the banking sector, as increased deposits have led to improved liquidity. This improved liquidity has, in turn, enabled banks to participate more actively in the purchase of government bonds, creating a positive feedback loop that benefits both the financial sector and the government's funding needs.

Future challenges are daunting as Ukraine needs to raise funds to reconstruct the country

Looking ahead, Ukraine faces the immense challenge of securing the necessary resources for resistance, support, and reconstruction efforts in the aftermath of the ongoing conflict. Addressing these needs requires a comprehensive funding strategy that leverages both domestic and international resources. To achieve this, the government aims to attract private investors by enhancing the credit quality of Ukrainian bonds. This could be accomplished by seeking official guarantees from other countries, which has provided such guarantees in the past. By offering credit enhancement facilities, Ukraine could decrease the risk for investors and reduce the costs associated with rebuilding the nation.

Furthermore, the government is considering issuing sustainable sovereign bonds to engage ESG-sensitive investors. By tapping into this growing market segment, Ukraine can diversify its funding sources and potentially access more cost-effective financing for its recovery and reconstruction efforts.

Sources: Based on OECD (2022[18]), Public Debt Management in Wartime: Interview with Ukraine's Yuriy Butsa, https://oecdonthelevel.com/2022/07/04/public-debt-management-in-wartime-interview-with-ukraines-yuriy-butsa/; IMF (2023[19]), Ukraine: Request for an Extended Arrangement Under the Extended Fund Facility and Review of Program Monitoring with Board Involvement-Press Release; Staff Report; and Statement by the Executive Director for Ukraine, https://www.imf.org/en/Publications/CR/Issues/2023/03/31/Ukraine-Request-for-an-Extended-Arrangement-Under-the-Extended-Fund-Facility-and-Review-of-531687.

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Annex 3.A. Methods and sources

Primary sovereign bond market data and country groupings

Primary sovereign bond market data are based on original OECD calculations using data obtained from Refinitiv that provides international security-level data on new issues of sovereign bonds. The data set covers bonds issued by emerging market sovereigns in the period from 1 January 2007 to 31 December 2022 and includes both short-term and long-term debt. The data set covers bonds issued by emerging market sovereigns in the period from 1 January 2007 to 31 December 2022 and includes both short-term and long-term debt. Short-term debt ("bills") is defined as any security with a maturity less than or equal to 365 days but no less than 30 days, as bill issuances with a maturity less than 30 days are considered to be done for cash management purposes and excluded from calculations. The data provides a detailed set of information for each bond issue, including the proceeds, maturity date, interest rate and currency structure.

The definition of emerging markets used in this report is consistent with the IMF's classification of Emerging and Developing Economies used in its World Economic Outlook. The regional definitions are also those used by the IMF, while the income categories used (high income, low income, lower middle income, upper middle income) are defined by the World Bank according to GNI per capita levels.

A number of bonds have been subject to reopening. For these bonds, the initial data only provide the total amount (original issuance plus reopening). To retrieve the issuance amount for such reopened bonds, specific data on the outstanding amount on each reopening date for the concerned bonds have been downloaded separately from Refinitiv. As the reopening data only provide amounts outstanding, in order to obtain the issuance amount on each relevant date, the outstanding amount on the previous date is subtracted from the outstanding amount on that given date. These calculated issuance amounts are converted on the transaction date using USD foreign exchange data from Refinitiv. To ensure consistency and comparability, the same method is used for all bonds, including those which have not been subject to reopening.

Exchange offers and certain bonds in the dataset have been manually excluded when they did not have any identifier (ISIN, RIC or CUSIP) and when they have not been able to be manually confirmed by comparing with official government data.

The issuance amounts are presented in 2022 USD and adjusted by US CPI.

Credit ratings data

Refinitiv provides rating information from three leading rating agencies: S&P, Fitch and Moody's. For each country that has rating information in the dataset, a value of 1 to the lowest credit quality rating (C) and 21 to the highest credit quality rating (AAA for S&P and Fitch and Aaa for Moody's) is assigned. There are 11 non-investment grade categories: five from C (C to CCC+); and six from B (B- to BB+). The ratings data are observed on a monthly basis. If a country has received several ratings in one month, the lowest one is used, except when that is a default rating (SD or D for S&P; RD or DDD for Fitch and C or / for Moody's).

The rating in question is then assigned to each relevant bond issued by that country (as at issuance or transaction date). In the case that there are ratings available from several agencies, their average is used. When differentiating between investment and non-investment grade bonds, if the final rating is higher than or equal to 12 it is classified as investment grade. All other bonds are considered non-investment grade.

The weighted debt quality analysis uses the rating information from three rating agencies (S&P, Fitch and Moody's). Every gross debt issuance is then assigned a rating by each rating agency based on the date of transaction and the last rating the sovereign was given by that agency. Overall, the average of these assigned ratings is used and weighted by their corresponding issuance amounts to calculate the weighted monthly debt quality of each region.

Notes

[1] China's redemptions in 2022 summed up to more than USD 105 billion, constituting 75% of its debt issuance in the period. This number was also the highest level of redemption done by China and 177% more than China's average redemption prior to the pandemic. This expectational level of refinancing need was mainly due to the remaining rollover of special treasury bonds worth CNY 1.55 trillion issued in 2007, 750 billion of which matured in December 2022.

[2] Argentina faces a scenario of nearly triple-digit inflation, tightened import restrictions, low international reserves and severely limited fiscal space, hampering investment and private consumption; Brazil has experienced fiscal deficits since 2014 and its central bank has introduced a frontloaded monetary tightening; Bulgaria was impacted by weak growth in its main trading partners nearing the warzone and implemented several costly policies to mitigate the impact of rising inflation on households; in China, disruptions due to pandemic-related lockdowns persisted, hampering growth, while fiscal policy was supportive with tax cuts, deferrals and spending of reserve funds; Mexico has taken steps to mitigate price pressures, including a retail fuel price stabilisation mechanism and the temporary elimination of import tariffs for basic goods (OECD, 2022[20]).

[3] Proxied by the average between 2017 and 2019.

[4] In principle, refinancing needs can also be reduced by funding maturing bonds with the sale of assets or the use of excess cash holdings. Nevertheless, both of these options are limited in EMDEs given that they are constrained by the size of the government's asset holdings and might also be undesirable as some assets are strategic for governments.

[5] This ratio considers only the 70 EMDEs that issued debt denominated in domestic currency in both 2021 and 2022.

[6] For instance, Kuwait had a primary fiscal surplus of 12%, Oman and Iraq 6%, the United Arab Emirates 9% and Saudi Arabia 3%, which partially explains the lower financing needs of some MENA issuers in 2022 (International Monetary Fund, 2023[2]).

[7] While this broadly reflects more developed domestic markets, in some cases it can also reflect hampered access to foreign debt.

[8] Looking further into the issuer composition for Asia, the majority of the issuance of foreign currency denominated debt came from three countries, namely Malaysia, Indonesia and the Philippines, which together constituted 87% of the foreign debt issued in the region in 2022.

[9] In Europe, the average term-to-maturity of debt weighted by issue amounts was 6.2 and 10.2 years for domestic and foreign currency denominated debt respectively. In particular, Hungary, Romania and Russia, who constituted 44% of the total long-term gross debt issuance of the region in 2021 had an ATM at issuance of 16.7, 13.6 and 12.4 years respectively on their foreign currency denominated debt. Türkiye

is an exception, with a much lower average term-to-maturity of issuance in foreign-denominated debt, even lower than its domestic currency denominated debt, the former being 5.6 and the latter being 5.9 years.

[10] Following a series of interest rate hikes after the invasion of Ukraine, the Central Bank of Russia gradually reduced the policy rate to 7.5% in July 2022, to an even lower level than before the start of the war, mainly due to weaker consumer demand and the strength of the Russian Rouble against the US dollar. In the case of Türkiye, despite an annual inflation of around 85%, the Central Bank cut the interest rates several times from 14% to 9% between July and November.

[11] This selection includes countries for which the Bank of International Settlements provides data.

[12] Major central banks started to raise interest rates in November 2021 for the UK, February 2022 for the US and June 2022 for the EU (see Chapter 1 for more details).

[13] These figures exclude China.

[14] During the COVID-19 pandemic, ATM of issuances (excluding issuances with a maturity of less than 1 year) fell from 10 years to 9.6 years on average while the ATM of outstanding debt remained mostly stable, decreasing slightly from 8 years to 7.9 in the 2020-22 period.

[15] The United Arab Emirates lengthened its debt maturity structure as 80% of its outstanding amount matured in 2022 and all these bonds had maturity below one year. At the end of 2022, the bond with the shortest maturity in the country's debt portfolio had a maturity of roughly nine years and more than 70% of its debt portfolio was constituted of two bonds that mature only in 39 years. This long-maturity debt was issued in 2021, but its effect on the country's ATM was limited due to an enormous amount of short maturity debt outstanding.

[16] Duration risk refers to the price sensitivity of fixed income security to interest rate movements and is directly proportional to the maturity of the coupon and principal payments.

[17] International Sovereign Bonds (ISBs) refer to bonds issued by a sovereign government in a currency other than its own, typically to raise capital from foreign investors.

[18] A record level of 71 downgrades was issued to 28 countries in 2020, reducing the debt quality of EMDE sovereigns significantly. Especially some regions with higher risk and weaker fundamentals were affected more deeply. Only nine out of 71 downgrades were given to Asia (8) and Europe (1) while Latin America and the Caribbean (25), MENA (17) and Sub-Saharan Africa (20) received 62 of 71 downgrades issued to EMDEs in 2020. On the contrary, Asia and Europe received the majority of the upgrades in 2020, namely nine out of 13, deepening the difference in debt quality across regions during the pandemic. Even though the pattern of downgrading Latin America and the Caribbean (7), MENA (5) and Sub-Saharan Africa (2) seemed to continue in 2021, the significantly lower number of 16 downgrades in total reflected an improvement of investor risk sentiment and economic outlook.

[19] The rating of Belarus was downgraded to restricted default (RD) in July, following the failure of fulfilling the eurobond 2027 coupon payments under the original terms. In the case of Türkiye, a combination of factors including surging inflation, approaching elections and currency depreciation risk resulted in a downgrade of the credit rating.

4 Buyback and switch programmes: Evidence-based recommendations for sovereign debt managers

This chapter provides policy guidance for sovereign debt management offices on how best to develop and implement buyback and switch programmes as a debt management tool. It first describes policy objectives regarding refinancing and liquidity risk management, and then gives an overview of country practices of buyback and switch operations including selection of bonds, methods, timing of operations, size limitations, and other operational constraints. Finally, it provides recommendations for sovereign debt management offices when introducing or reviewing such debt management facilities. This chapter draws mainly on a recent survey conducted among OECD government debt managers on the use of bond buybacks and switch programmes.

4.1. Introduction

Buybacks and switches (or exchanges) have long been and still are important debt management tools for several sovereign debt management offices (DMOs). These tools are often used by sovereign issuers to manage debt redemption profiles, enhance market liquidity, efficiently manage cash, and reduce debt service costs. Against this background, this chapter aims to provide both policy and technical recommendations to sovereign debt management offices when creating or reviewing their buyback and switch programmes. It discusses objectives, and design features such as the selection of bonds, pricing, and auction designs as well as communication aspects of buyback and switch operations in light of country experiences.

It draws mainly on a survey carried out among OECD government debt managers on the use of bond buybacks and exchange operations in 2022. When it is possible and relevant, it compares the results of the initial survey conducted in 2011.

Key findings

- **Debt buyback and exchange operations can support sovereign DMOs in fulfilling their objectives under a variety of budget and market conditions.** DMOs conduct buybacks and switches mainly to smooth out debt repayment profiles and to support a liquid and well-functioning government bond market.
- **Implementing a well-designed buyback/switch programme may also help to minimise borrowing costs over time for governments by reducing the liquidity premiums.** This can be achieved by building up a larger benchmark issues by buying back older (off-the-run) securities from investors at the expense of selling newer (on-the-run) securities. Buyback operations can also be used in times of acute market stress to cushion volatility; however, they often have a limited capacity to address severe market liquidity disruptions.
- **Most sovereign debt management offices in the OECD area use bond buybacks (and to a lesser extent switches) regularly.** To provide predictability and transparency to market participants, they often announce broad guidelines on buyback/switch programmes as part of their annual or quarterly funding programmes, and further specifications on operations closer to the date of operations.
- **Authorities should carefully consider various options and parameters** including investor demand, cost-effectiveness, and impact on existing market dynamics when deciding on setting up a buyback and switch programme -or when revising the existing programmes.
- **To achieve successful results, authorities must exercise maximum care in both the design and execution phases of these programmes**, including determining eligible participants, timing of buybacks, size limitations, and communication of the operational aspects.
- **Particular attention needs to be given to market conditions before, during and after the buyback/switch operations.** Authorities should actively monitor market liquidity to identify the most suitable bonds to target, select offers to accept during operations and evaluate the success of the operations. These activities would help inform decisions about future adjustments to the size or focus of the buyback programme and guide decisions about individual buyback operations.
- **After establishing a programme, it is recommended to re-assess the need and effectiveness of buyback and switch programmes and adopt suitable changes over time.** In particular, DMOs should assess both direct and indirect benefits to the taxpayer, either through providing liquidity support to the market that results in lower financing costs and/or mitigating refinancing risk through reducing roll-over peaks and extending the average life of outstanding debt profile.

4.2. Overview of buyback operations

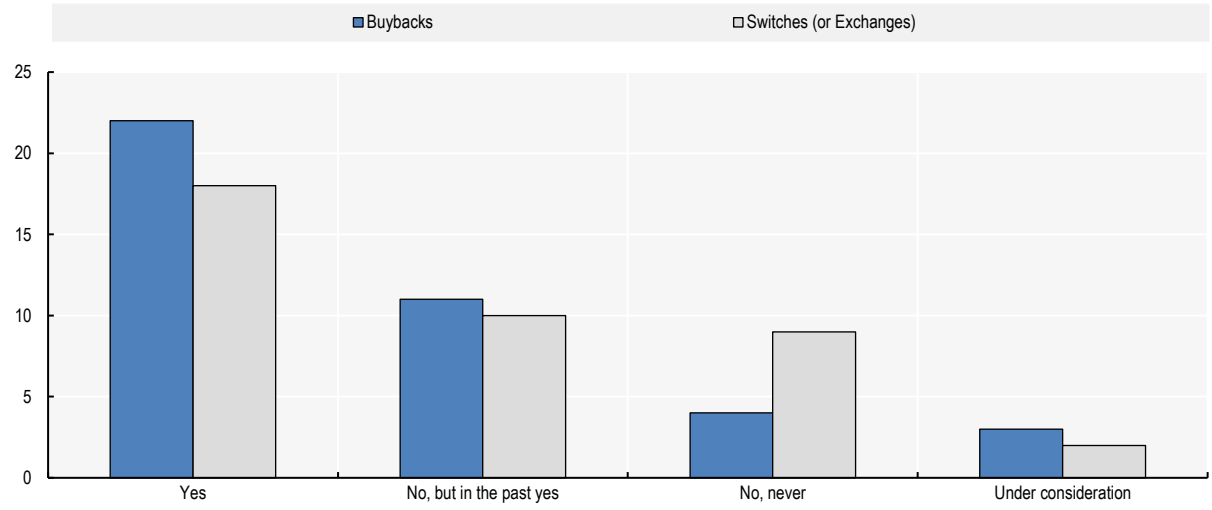
Sovereign debt management offices (DMOs) can purchase some of their outstanding securities from investors through two different mechanisms – buybacks or switches. Buybacks, by definition, involve the DMO (or central bank as its fiscal agent) offering to purchase outstanding sovereign debt from investors at a mutually agreed price, using cash. In contrast, switches (or exchanges) involve the DMO offering to exchange existing outstanding securities with investors for newly issued securities at a mutually agreed price. Unlike other auctions, these operations provide no additional funding to the government, but they have implications for the composition of the debt portfolio and market liquidity of selected bonds.[1] These tools offer sovereign debt managers a means to support market liquidity, efficiently manage cash, provide greater precision to liability management, and reduce debt service costs.

Given the recent large increases in the level of global sovereign debt, current concerns about secondary-market liquidity for sovereign debt in a number of global markets, the removal of accommodation by several large central banks, the strained intermediation capacity of primary dealers, and changes in market structure, a number of DMOs are exploring revisions to, or creation of, such programmes. At the same time, a few countries, such as Ireland and Denmark, that have started producing budget surpluses again after the fiscal expansionary period in 2020 and 2021, are looking at ways of enhancing market liquidity due to limited borrowing needs.[2] Against this background, it is timely to develop a better understanding of the prevalence of and motivation for, DMO's current use of buybacks and exchanges, as well as the various processes and considerations associated with the use of these tools.

4.2.1. Use of buyback and switch operations in the OECD area

The use of both buyback and switch operations is a common practice amongst DMOs. The responses from 39 OECD member and accession countries to the 2022 survey on Debt Buybacks and Switches indicate that a majority of the respondents currently conduct buybacks (22 countries), while a slightly smaller group (18 countries) currently conduct switches (or exchanges) (Figure 4.1).[3] Most countries that answer 'Yes' to this question use both of these operations (14 countries).

Figure 4.1. Use of buybacks and switches in the OECD area



Notes: The figure summarises the responses from 39 OECD member and accession countries. The total number of responses in the figure does not add up to the total number of respondents, as a few countries have checked both 'no' and 'under consideration' options.
Source: 2022 Survey on Debt Buybacks and Switches by the OECD Working Party on Debt Management.

Some countries used these facilities in the past but then stopped them, mainly because of fiscal reasons. For example, the US Treasury executed a regular buyback programme in 2000-02, during a period of fiscal surplus.[4] In effect, this enhanced the Treasury's ability to avoid a decision to discontinue a benchmark maturity without also being compelled to shrink new issue sizes. As borrowing needs increased, the US Treasury ceased its buyback programme. However, since 2014, Treasury has periodically executed small-value buyback operations to ensure operational readiness of all necessary buyback infrastructures. Similarly, a few countries including Australia, Canada and New Zealand, ceased their regular buyback programmes in 2020, when borrowing requirements significantly increased and central banks started performing quantitative easing in the wake of the pandemic. In several OECD countries, central bank quantitative easing resulted in reduced the free float of government securities and thus reduced the demand for a buyback programme.

The DMOs that already have such programmes in place review their frameworks and design features to improve efficiency, considering various factors, including changing market structures, financial conditions and investors' needs. For example, Sweden shifted its switch operations to smaller volumes in favour of larger issuance at primary auctions in 2021 and 2022. The UK DMO extended the buyback window in which primary dealers can request a bid on near maturity bonds from 12 months out from redemption to 18 months in 2021.

Among the 39 respondents, only four countries reported never having carried out buyback operations and three reported that such facilities are under consideration including the US Treasury. With regard to switch operations, nine countries reported having never carrying out them and two reported having them under consideration. It is important to note that the most common reason cited for not conducting these operations was 'limited investor interest', followed by 'operational complexity' and 'insufficient outstanding securities'.

4.2.2. Objectives of buyback and switch operations

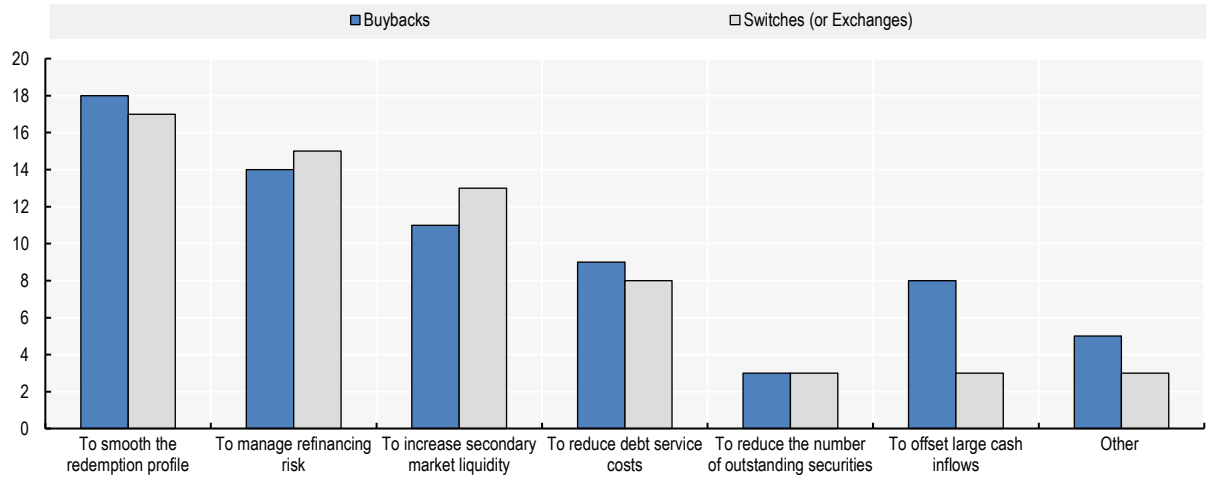
Debt buyback and exchange operations can serve a variety of primary and secondary objectives of debt management, depending on how they are designed. First, buyback and exchange programmes can support the management of the redemption profiles and mitigate roll-over peaks by reducing the outstanding amount of targeted issues. For instance, a country that financed large borrowing needs in the past may have a large stock of outstanding debt concentrated on a specific date. These roll-over peak could also be a result of benchmark bond programmes.[5] By addressing such large stocks ("bullets") in a timely fashion, debt managers can limit roll-over risk, and possibly help DMOs navigate challenging market conditions (OECD, 2013[1]). Depending on the size and design of the operations this would help manage refinancing risk. For example, a country may choose to use cash surpluses or other available funds to buyback some of its existing debt from the market to reduce the refinancing needs in the future.[6]

Second, these tools could allow debt managers to provide direct liquidity to support both specific securities and a liquid benchmark curve under different budgets and financial conditions (OECD, 2013[1]). Promoting the efficient functioning of the government securities market stands as a secondary objective for sovereign debt management in many OECD countries. Buybacks and switches enable DMOs to adjust the structure and range of instruments to support liquidity in the government securities market. Buying back older and typically less liquid securities (off-the-run) could address concerns about the difficulty in being able to trade certain government securities in the market and, at the same time, provide a reference price point for other market participants. From an investor's perspective, the presence of an end-buyer that is willing to purchase off-the-run securities along the curve is perceived as providing comfort. In addition to improving liquidity in off-the-run securities, these operations can help support a liquid benchmark yield curve. DMOs aim to maintain a certain benchmark issuance size to ensure good liquidity and reduce any liquidity premium. This can be particularly challenging in an environment of fiscal surplus. For example, Denmark greatly benefited from buyback and switch operations to support a well-functioning domestic financial

market in 2022, on the back of a fiscal surplus (Box 4.1). In addition, these operations can be conducted to address unforeseen distortions in the market liquidity during periods of stress. Providing additional liquidity to the system through buybacks would act as a cushion against market volatility. However, it should be noted that these programmes often have a limited capacity to address severe market liquidity disruptions, therefore they are not a substitute for actions taken by the monetary authority.

In addition, DMOs can benefit from these operations to offset large cash inflows; balance cash buffers and smooth out issuance volatility; reduce the number of outstanding securities; correct instances of perceived "mispricing" along the yield curve, and; help investors recycle capital further out the yield curve (by switching different maturities). According to the survey results, smoothing redemptions and managing refinancing risks were the most common reasons for conducting both operation types, followed by enhancing market liquidity (Figure 4.2).

Figure 4.2. Purposes of the use of buybacks and switches



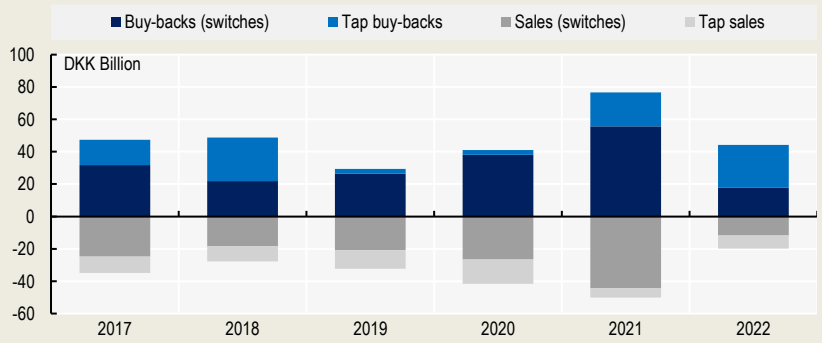
Notes: The figure summarises the responses from 39 OECD member and accession countries. The total number of responses in the figure does not add up to the number of respondents, as countries are allowed to check more than one option.
Source: 2022 Survey on Debt Buybacks and Switches by the OECD Working Party on Debt Management.

Box 4.1. Use of buybacks to support liquidity in government securities market: Case of Denmark

The Debt Management Office of Denmark has been an active market participant in the secondary market, where, for example, it continuously buys government securities in off-the-run issues (tap buybacks). The DMO also holds switch auctions with an aim at building up outstanding volumes in new bonds more quickly.

Buybacks were particularly important in 2022, as the Danish debt management office aimed to maintain a certain size to ensure good liquidity in the securities amid low funding needs and budget surpluses. In 2022, the central government sold bonds for just under Danish krona (DKK) 12 billion and bought back bonds for DKK 18 billion via switch auctions (Figure **4.3**). The total buybacks by the central government in 2022 amounted to DKK 43 billion, while the central government issued bonds totalling DKK 73 billion when the central government's issuances in connection with switch operations are included.

Figure 4.3. Buybacks and sales in 2022



Source: Danmarks Nationalbank, Central Government borrowing and debt 2022, https://www.nationalbanken.dk/en/governmentdebt/publications/Pages/Danish-Government-Borrowing-and-Debt-2022.aspx.

4.2.3. Operational aspects of buyback and switch operations

As discussed in the previous section, debt buyback and exchange operations can support sovereign DMOs in fulfilling their objectives under a variety of budget and market conditions. In order to achieve successful results, both the design and execution of these programmes requires careful attention. For example, the price-setting criteria should be clear and transparent, and the results of any activities should be publicly reported. At the same time, designing an operational framework for a buyback/switch programme is a complex exercise, as it requires a number of operational, analytical, and market judgements. For example, these programmes should be consistent with the regular and predictable debt management framework, while the issuer should preserve a level of flexibility regarding executing any specific operation in view of the government's cash forecasts and market liquidity conditions.

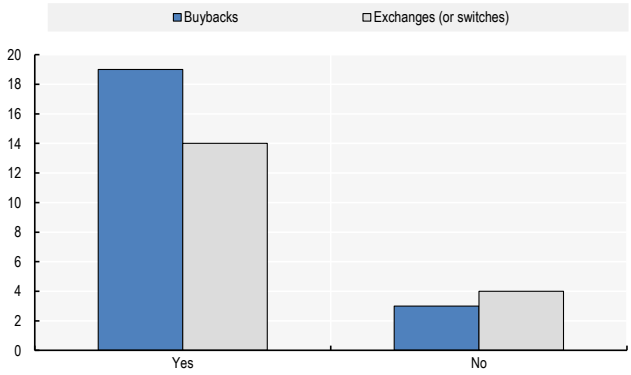
Regularity of the programmes and choice of the securities

Many sovereign issuers (including Belgium, Chile, France, Italy, Korea and Portugal), regularly conduct buyback and switch operations (Figure 4.4 Panel A). When operations are held regularly, they are typically announced as part of annual borrowing plan communications, and investors are given notice of one business day or less prior to an operation. There is less visibility for market participants on the target

volume. Only a few countries adopt a discretionary approach and make the decision to conduct these operations on an 'ad hoc' basis taking into account the DMO's needs, market conditions and investor demand. For example, Brazil has performed multiple liability management operations both in domestic and international markets in recent years without having a regular programme (Box 4.2). A few countries make use of these operations on a regular basis, but also use extraordinary operations when required.

Figure 4.4. Regularity and the use of buybacks and switches

Panel A: Regularity of the use of buybacks



Panel B: Average of annual buybacks/switches size relative to outstanding debt (in percentage terms)

	2019	2020	2021	2022(e.)
Buybacks				
Maturing in current year t	0.35%	0.49%	0.26%	0.12%
Maturing in t+1	1.08%	6.48%	0.25%	0.33%
Maturing in t+2	1.36%	0.12%	0.46%	0.37%
Longer maturities	0.12%	0.11%	0.12%	0.21%
	2.91%	7.20%	1.09%	1.03%
Exchanges				
Maturing in current year t	0.91%	0.56%	1.09%	0.44%
Maturing in t+1	4.36%	1.20%	3.74%	0.57%
Maturing in t+2	0.68%	0.60%	0.29%	0.10%
Longer maturities	0.66%	1.39%	0.86%	0.64%

Notes: Panel A summarises the responses to the question 'do you conduct the following operations on a regular basis (e.g. at least annually)'.
Source: 2022 Survey on Debt Buybacks and Switches by the OECD Working Party on Debt Management.

In terms of the maturity selection, DMOs generally target securities for repurchase that are nearing redemption (i.e. maturing in t+1) (Figure 4.4 Panel B). It is important to highlight that compared to 2019 and 2021, the use of buybacks was significantly higher in 2020, in the wake of the pandemic, with an aim to help ease the selling pressure in the markets. A few countries conducted buybacks in order to take advantage of a historically low interest rates environment. For example, Mexico bought back two foreign currency-denominated bonds due in 2022 from the market in 2020. In Japan, the buyback programme is used for Inflation-Indexed Bonds to improve the supply-demand balance and liquidity.

Switch operations can be carried out to change the average maturity of the outstanding debt or on a duration-neutral basis. In recent years, a few countries, including Mexico and use switch operations to extend the average maturity of the outstanding debt by exchanging securities with short remaining with new long-dated securities.

Box 4.2. The use of buybacks in Brazil in the wake of the COVID-19 pandemic

The Brazilian National Treasury (BNT) conducts buyback operations in different markets and different sizes for a variety of purposes, including to reduce the amount of short-term debt maturing, increasing average term-to-maturity, absorbing excessive flows, and providing market price references. While the BNT doesn't have a formal (or regular) programme, it has performed multiple liability management operations (e.g. buybacks, switches, spread auctions, and early redemptions) both in domestic and international markets since the late 1990s. During the late 1990s and early 2000s, Brazil utilised switch operations in which the Treasury buys back bonds close to maturity and sells other bonds based on market preferences to handle low cash positions and reduce risks in the domestic market sovereign debt management. In the 2000s, Brazil conducted a number of liability management operations in foreign-currency-denominated securities, including early redemption of Brady Bonds from the market, to restructure its debt portfolio.

More recently, in order to mitigate the significant volatility and uncertainty in financial markets due to the COVID-19 pandemic, the BNT actively used liability management operations in the government bond market. Between 12-16 March 2020, buyback auctions were held for fixed-rate and inflation-linked bonds. During this period, liquidity reserves allowed for greater flexibility in adjusting issuances to market conditions. Later in the year, market conditions improved, and bond issuances reached historical highs, averaging BRL 126.7 billion in the second half of 2020 compared to BRL 58 billion in 2019. Amidst a scenario of uncertainties, risk aversion and a steepening yield curve, the debt issuance average maturity declined, resulting in a shorter public debt maturity structure.

In the months of February and March 2021, the National Treasury held switch auctions, which consisted of exchanging a number of securities that were soon to mature for longer-term securities. In February 2021, the buyback of floating rate notes (*Letra Financeira do Tesouro* – LFT) 1 March 2021 (target bond) was carried out with the placement of LFT securities maturing on 1 March 2022, 1 September 2023, and 1 September 2027 (destination bonds). In March 2021, the buyback of the zero-coupon instruments (*Letra Financeira do Tesouro* – LTN) 1 April 2021 (target bond) was carried out with the placement of LTN securities maturing on 1 April 2022, 1 January 2023, and 1 July 2024, and fixed rates with by-annual coupons (*Notas do Tesouro Nacional série F* – NTN-F) 1 January 2025 (destination bonds). The switch auctions in 2021 reached a large financial volume, reaching approximately 25% of the stock of the LFT 1 March 2021, and 7% of the stock of the LTN 1 April 2021.

Brazil's long-standing experience with liability management operations suggests these tools have proven to be a useful tool to mitigate refinancing risks and to provide price references in moments of extreme volatility. However, the authorities highlight that they tools should be used with caution and with a precise goal, considering it has the potential to change the behaviour of market participants and, consequently, the price formation dynamics in the government bonds market, and long-term market stability.

Source: Authorities of the Brazilian National Treasury.

Criteria used for bond selection

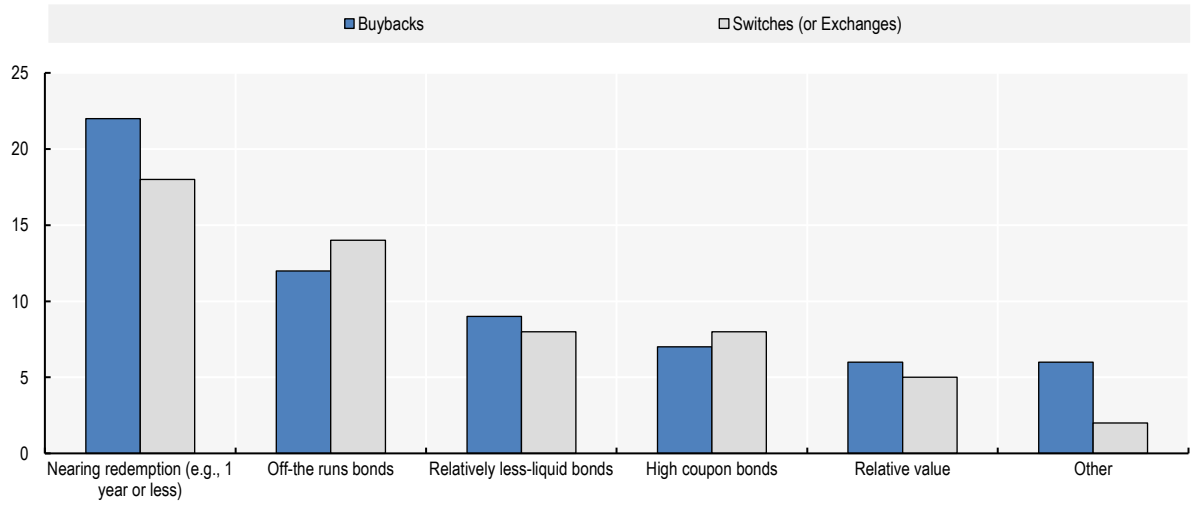
The process of bond selection should involve formal consultations with market participants, in particular with primary dealers. This consultation is important for the programme to be successful in meeting its objectives. Since these operations imply investors reallocating their assets, understanding their preferences and constraints is critical. For example, the Japanese Ministry of Finance holds meeting with JGB Market Special Participants to discuss the details of the buyback programme for the next quarter. The

frequency and the purchase amount of buyback are determined based on the discussions at the Meeting of JGB (Japanese Government Bond) Market Special Participants.

Although the criteria for selecting bonds differs across countries, “the remaining maturity of the security” is the most important selection criterion for identifying buyback target bonds. In addition, several DMOs also consider “off-the-run” bonds more broadly, less-liquid bonds, and high coupon bonds (Figure 4.5).

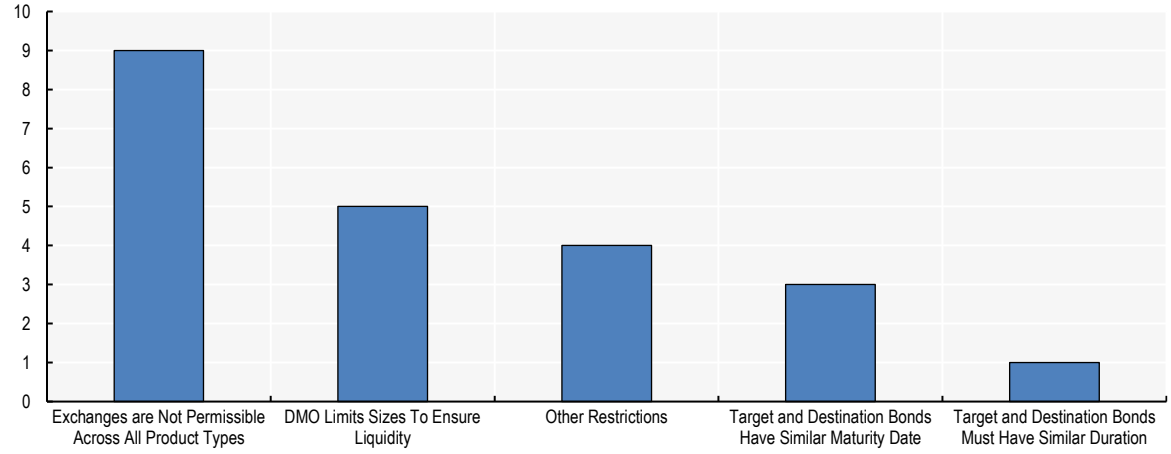
It should be noted that conducting buybacks of medium- and long-maturity securities can be more complex than buybacks of shorter maturities, since longer maturity securities have greater duration risk, increasing the exposure of DMO to potentially large yield changes.

Figure 4.5. Criteria for selecting the target bond(s) for buybacks and switches



Notes: The figure summarises the responses from 39 OECD member and accession countries. The total number of responses in the figure does not add up to the number of respondents, as countries are allowed to check more than one option.
Source: 2022 Survey on Debt Buybacks and Switches by the OECD Working Party on Debt Management.

Figure 4.6. Restrictions on target bonds



Source: 2022 Survey on Debt Buybacks and Switches by the OECD Working Party on Debt Management.

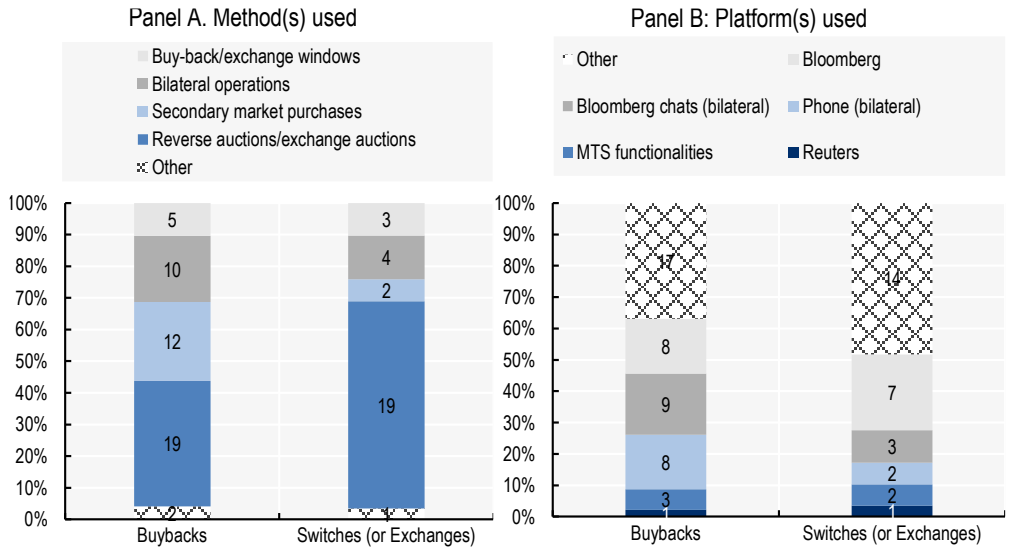
In terms of the bonds that are offered in switch operations, the selection depends on the purpose of the operations. For example, if a DMO that aims to extend the maturity of its debt portfolio, it would consider long maturities as target bonds, whereas for liquidity enhancement purpose, on-the-run bonds (newly issued bonds) may be more preferrable. The survey results reflect this perspective (Figure 4.6). The most common restriction reported for exchange operations is that exchanges are not permissible across all security types. Several DMOs noted that they consider size limits and match the maturities of target and destination bonds.

Choice of methods and platform to execute buybacks and switches

In terms of purchase methods, 18 OECD respondents use auctions for both buybacks and switches. DMOs typically price their switch operations through auctions. Among these, several countries reported holding traditional auctions for the destination bonds, while target bond prices are fixed. Following auctions, the second most common method for buybacks is secondary market purchases, while for switches it is bilateral operations.

In most cases, DMOs conduct buybacks and switches within debt management offices, while some *via* their respective central banks as their fiscal agents. Only a few conduct buybacks via brokers. DMOs choose the platform(s) suitable for the preferred method(s) for the operations. The majority of DMOs use proprietary/custom platforms to conduct buybacks and switches. For example, in Italy, the exchange operation can be carried out using the telematic trading system (with a dedicated segment of the same system for interdealer activity) or the auction system managed by the Bank of Italy. In Japan, the Ministry of Finance uses the Bank of Japan Financial Network System. Several DMOs also use Bloomberg for both types of operations, while several conduct buybacks by phone. Regardless of the platform choice, typically, transactions settle target and destination bonds on the same day.

Figure 4.7. Methods and platform used to execute buybacks and switches



Source: 2022 Survey on Debt Buybacks and Switches by the OECD Working Party on Debt Management.

Announcements of operation parameters including size, eligible investors, bonds and timing

Most commonly, DMOs announce their intentions to hold buyback/switch operations as a part of their annual or quarterly funding programme. Further details are often announced closer to the date of

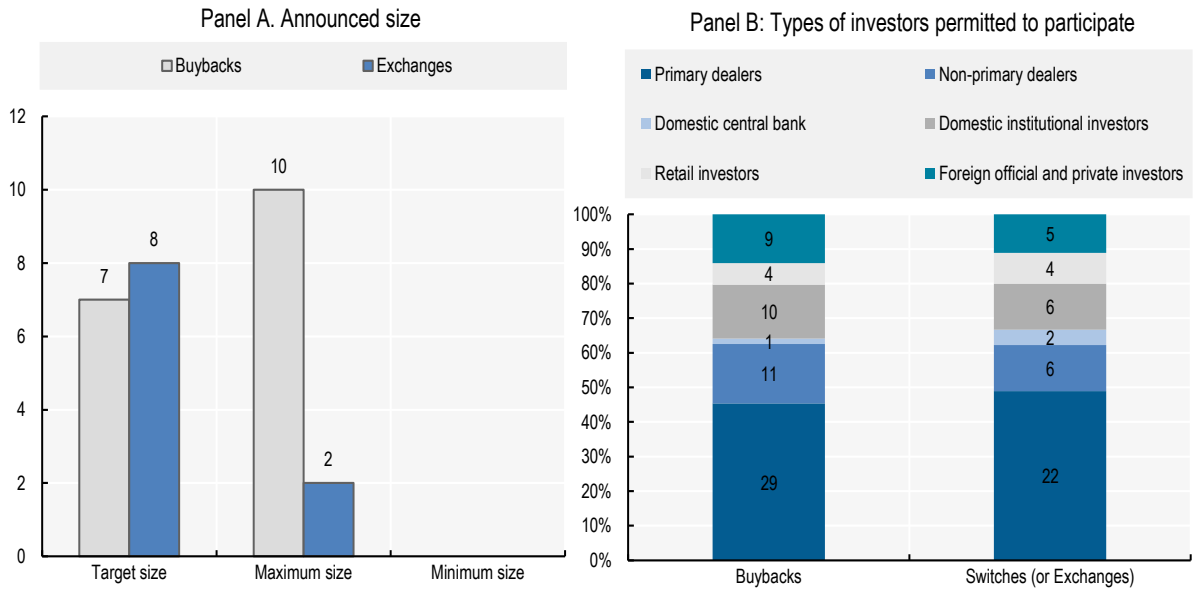
operations (e.g. a few days before the auction dates) in order to mitigate price deviations. Such public announcements may include information on the following operational parameters:

- List of eligible securities
- Operation date
- Operation start time and close time
- Settlement date
- Offering formats
- Offering amount limits
- Par amount to be bought

Typically, DMOs publish summary results shortly after the operation. Post-transaction reporting may include detailed information including offered and accepted total amounts and number of accepted issues.

In terms of operation's size, the survey results indicate that DMOs tend to either announce target or maximum sizes for their operations, with a maximum size announcement being the more prevalent paradigm for buyback operations (Figure 4.8 Panel A). No respondents announce minimum sizes. The respondents highlighted that the announced size of the operation should leave the DMO with flexibility in the event that offers received in buyback operations are either insufficient in size or too expensive in price. Hence, DMOs reserve the right to buyback less than the maximum amount. The size of each operation can be measured as a proportion of gross issuance, as a proportion of debt held by the public, or as a proportion of available float of the security.

Figure 4.8. Announcements of size and eligible investors



Source: 2022 Survey on Debt Buybacks and Switches by the OECD Working Party on Debt Management.

Several DMOs have specific minimum float amounts for any outstanding security, while several others evaluate size limits on a case-by-case basis. The reason to introduce limits to the amount of bonds repurchased relative to the original issue amount is to ensure that the security being bought back has sufficient remaining supply to support secondary market liquidity. The size of each operation can be determined considering both investor- and issuer-side factors including the purpose of the operation,

market capacity (e.g. investors' balance sheet), investors' interest in participating, and overall funding needs and cash balances. For example, during periods when sovereign financing needs are lower and on-the-run issue sizes are relatively small, there is likely to be more capacity to increase auction sizes and support a larger buyback programme (US TBAC, 2023[2]). It should be noted that when primary dealers have limited risk-bearing capacity, a large buyback operation could temporarily push up the prices of bonds that are eligible for repurchase. Similarly, if the issuer aims to preserve the maturity structure of the debt, this will affect the size of buyback/switch operations.

Most DMOs limit participation in their operations to their primary dealers, which is often designed as part of primary dealership agreements (Figure 4.8 Panel B). Several countries allow non-primary dealers and/or domestic institutional investors to participate, largely depending on their holdings and/or market-making capacity. Only a few allow retail and foreign investors to participate as well.

In terms of the number of bonds offered, most DMOs that conduct exchanges allow multiple target bonds (bonds purchased) to be exchanged for a single destination (newly issued) bond. A summary of the survey results on a selection of eligible bonds is the following:

- The number of target bonds eligible ranged from 2 to 5 for most respondents.
- Most respondents evaluate which target bonds are selected based on relative-value pricing.
- A majority of DMOs limit buyback amounts on specific securities to ensure sufficient secondary market supply (float).
- Several DMOs have specific minimum float amounts for outstanding securities, while several others evaluate size limits on a case-by-case basis.
- A slightly smaller group limits the types of securities that are eligible for buybacks.

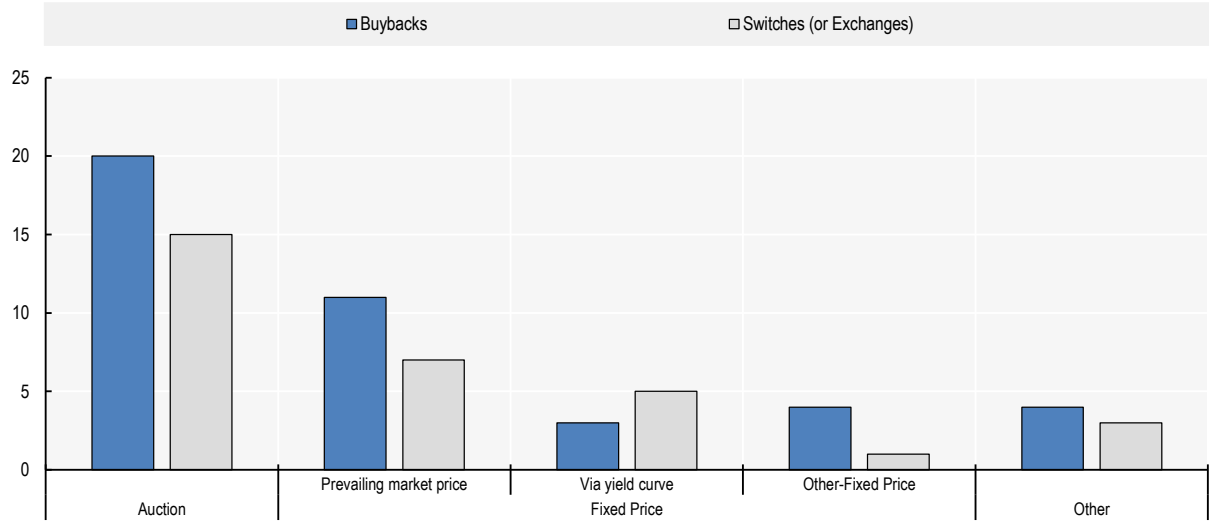
While offering multiple bonds provides flexibility to a DMO, it might pose some pricing disadvantages.

Most DMOs do not conduct or settle buybacks on the same day as other financing operations (e.g. auctions, syndications).

Pricing method for conducting buyback and switch operations

DMOs typically price their buyback and switch operations through auctions, which is considered the most efficient and transparent method of pricing. However, many countries also offer a fixed price for buybacks at the prevailing market rate, although to a lesser extend for switches (Figure 4.9).

Figure 4.9. Pricing method for conducting buyback and switch operations

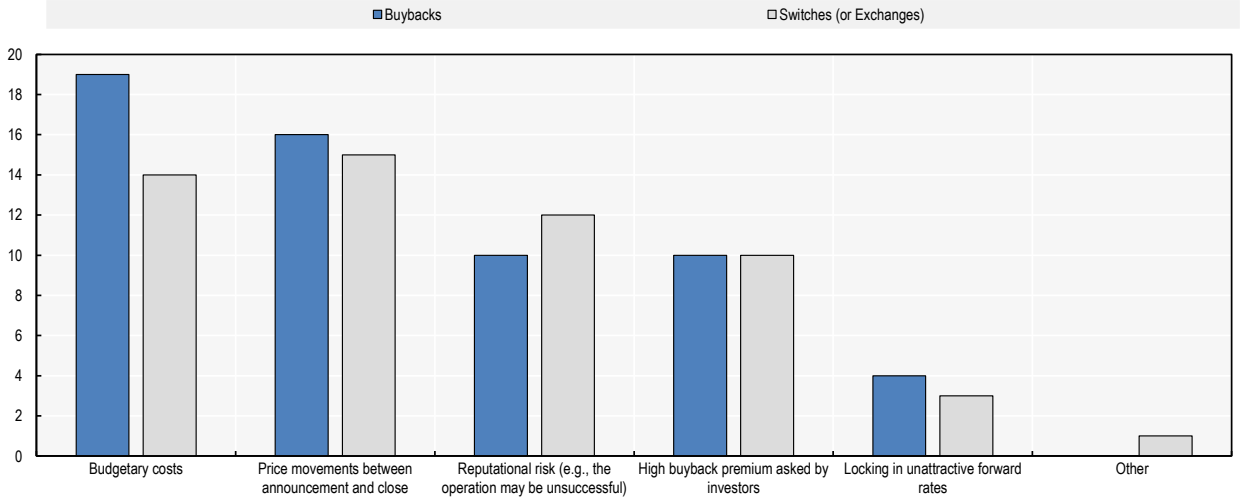


Source: 2022 Survey on Debt Buybacks and Switches by the OECD Working Party on Debt Management.

4.2.4. Associated costs and risks

Sovereign debt managers take a long-term perspective and carefully consider various factors including investor demand, impact on existing market dynamics and cost-effectiveness when making a decision on introducing a new instrument or setting up a new facility such as buyback and switch programmes. DMOs may face various financial costs and reputational risks associated with these operations.[7] The survey results indicate that the largest potential costs and risks are 'budgetary costs' for buybacks, and 'price movements between announcement and close of the operation' for switches. This is followed by 'price movements between announcement and close of the operation', 'reputational risk' and the possibility of 'high premium asked by investors' (Figure 4.10).

Figure 4.10. Associated costs and risks



Source: 2022 Survey on Debt Buybacks and Switches by the OECD Working Party on Debt Management.

In terms of cost-effectiveness, the buyback of illiquid bonds may crystalise illiquidity costs on the public sector´s balance sheet (Chang, Yang and Parker, 2018[3]). In addition, when bonds maturing beyond the current fiscal year are repurchased, future interest costs are brought forward to the current year. Before 2022, the interest cost was typically realised as a capital loss on buybacks, as the interest rate level was falling (i.e. bonds are redeemed at a price above 100). This has changed recently with the rising interest rate environment. For example, the Danish DMO reports that the rising interest rates have led to falling bond prices, which actually resulted in a capital gain on buybacks in 2022 (Danmarks Nationalbank, 2023[4]).

Unlike a call option, a buyback operation is not based on contractual requirements, and it depends on investors' willingness to sell their holdings back to the issuer. Therefore, it might be challenging when investors are unwilling to sell their holdings. In the survey responses, the most common reason cited by DMOs for not conducting buybacks and switches was a lack of investor interest.

Another important source of challenge is that these operations have several phases, ranging from the initial announcement to the final reporting announcement. Operationally, switches are more complex than buybacks. Reflecting this, the survey results indicate that operational complexity is cited among the most common reason for not conducting switches.

In practice, pricing can be challenging in switch operations, especially in volatile market conditions. In response, countries use different types of pricing mechanisms for different market conditions. A prerequisite for the central government's involvement in the secondary market is that the trades can be conducted at fair market prices and avoid distortions in the market. This means that there is a reasonable correlation between the prices of the central government's buyback securities and on-the-run securities.

4.2.5. Measuring effectiveness

The effectiveness of exchange and buyback operations can be measured through various indicators, which may vary depending on the key objectives of the operations. The survey results reveal that most DMOs measure the impact of their transactions. Some of the various indicators and measures listed below:

- Positive impact on the average term-to-maturity of the debt (comparison of average term-to-maturity and/or average term-to-refixing before and after transactions)
- Positive impact on the average cost of the debt (net interest payments impact, opportunity cost related to investing the same cash amount in other ways or instruments, the spread between the market price and the buying price in the auction)
- Contribution to reducing refinancing risk
- Contribution to smoothing the redemption profile
- Fostering the liquidity and efficiency of the secondary market of the government bonds.

4.3. Recommendations for sovereign debt managers

Sovereign debt managers should take a long-term perspective and carefully consider various parameters including investor demand, cost-effectiveness, and the impact on existing market dynamics when making a decision on setting up a new facility such as buyback and switch programmes -or when revising the existing programmes. In addition to policy aspects, they would need to consider a number of operational aspects to facilitate a buyback/switch programme, including determining eligible participants, the timing of buybacks, size limitations, and other operational constraints.

Drawing on the key points from the implementation experiences of OECD countries, this section proposes recommendations for DMOs when creating or reviewing their buyback and switch programmes.

- *Regular and predictable framework*: These debt management operations should be consistent with the regular and predictable framework of DMOs. In particular, DMOs should publish the objectives pursued and the mechanics of the procedure in advance. At the same time, they should reserve flexibility in terms of the specific timing and size of each operation.
- *Transparency and accountability*: Authorities should consider price and operational transparency features of different methods and platforms to be used for buyback and switch operations. In addition to publishing of the guiding framework, clear and timely communication of the operation is important to avoid potential misinformation as well as mitigating the risk of price manipulation.
- *Market consultation at different stages:* Sovereign debt managers should consult with market participants, in particular with respect to primary dealers' balance sheet capacity, when creating the buyback and switch programmes, and the implementation of the operations. This includes both procedures in general and specific offerings. This will help sovereign debt managers keep abreast of investors' needs and expectations, which is critical for attracting high demand for these operations and to avoid any potential adverse impacts on the functioning of markets.
- *Active monitoring of the secondary market*: Sovereign debt management offices would need to actively monitor market liquidity, in particular when accepting offers during operations and evaluating the success of the operations. These activities would help inform decisions about future adjustments to the size or focus of the buyback programme and guide decisions about individual buyback operations.
- *Aim for broad participation:* DMOs should aim for broad participation in buyback/switch operations. Similar to the debt issuance process, greater participation fosters competition, which drives better price outcomes and contributes to cost-effectiveness. In this regard, participation in these programmes should be encouraged with a clear purpose and timely announcement of operations. In addition, regularly scheduled programmes would contribute to greater participation.
- *Review and assessment of the programmes:* Authorities should assess the need and effectiveness of buyback and switch programmes and adopt suitable changes over time if necessary. They should assess both direct and indirect benefits to the taxpayer, either through providing liquidity support to the market that results in lower financing costs and/or mitigating refinancing risk through reducing roll-over peaks and extending the average life of the outstanding debt profile.

References

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Notes

[1] Liquidity of a security can be defined as the ability to quickly transact large trades at low cost and at any given time. One of the prerequisites for liquidity of government bonds is that there is a sufficiently large outstanding volume of bond. If liquidity is low, it becomes expensive for investors to trade through liquidity premium, which will ultimately result in a lower bond price (OECD, 2018[6]).

[2] In the context of disappearing funding needs, maintaining liquidity of government securities hence promoting the efficient functioning of the markets, becomes challenging for sovereign issuers. In addition to buyback/switch operations, countries under a declining debt environment use the following tools: i) cutting issuance volumes and frequencies; ii) reducing the number of on-the-run bonds; iii) closing some security lines; iv) consolidation of funding needs of public institutions, and; v) setting a minimum level of debt.

[3] The following countries responded the 2022 OECD Survey on Debt Buybacks and Switches: Australia, Austria, Belgium, Brazil, Canada, Chile, Croatia, Colombia, Costa Rica, the Czech Republic, Estonia, Finland, France, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Lithuania, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Romania, the Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom and the United States.

[4] During 2000 and 2001, the Treasury purchased more than USD 65 billion of existing bonds from the market and enhanced the liquidity of benchmark issues (Garbade and Rutherford, 2007[5]). In effect, this enhanced the Treasury's ability to avoid a decision to discontinue a series without also being compelled to shrink new issue sizes.

[5] Typically, DMOs build up benchmarks by issuing large volumes at key tenors (i.e. 3-, 5-, 10-, and 30-year maturity segments) cross the yield curve. By providing an adequate supply of standardised securities, benchmark bond programmes help to enhance liquidity and thereby lower liquidity premia, or sometimes create negative liquidity premia (OECD, 2018[6]).

[6] For example, in Italy, the Sinking Fund was set up in 1993 aimed at reducing the government debt stock by buying back bonds or repaying at maturity. The Sinking Fund's financial resources include privatisation revenues and (other) extraordinary income.

[7] Reputational risk may arise occur if the operation is not successful, for example due to the lack of market interest, or bad operational risk management.

Annex A. OECD 2022 Survey on Primary Markets Developments

This annex belongs to the OECD Sovereign Borrowing Outlook 2022. Thirty-seven of the 38 OECD countries responded to this survey. Countries which responded to the survey but did not provide comments to a question may not appear in the table of answers. The requested date for a response to the survey was 10 October 2022.
Source: 2022 Survey on Primary Markets Developments by the OECD Working Party on Debt Management.

Table A A.1. Overview of issuing procedures

Country	Auctions: Long-Term	Auctions: Short-Term	Auction Type: Single-Price	Auction Type: Multiple-Price	Tap Issues: Long-Term	Tap Issues: Short-Term	Syndication	Private Placement
Australia	X	X		X			X	
Austria	X	X	X	X	X	X	X	X
Belgium	X	X		X	X	X	X	X
Brazil	X	X	X	X	X	X		
Bulgaria	X	X		X	X			
Canada	X	X	X	X	X	X	X	
Chile	X	X	X		X		X	
Colombia	X	X	X		X		X	X
Costa Rica	X			X	X			
Croatia		X	X		X		X	
Czech Republic	X	X	X	X	X			
Denmark	X	X	X		X	X		
Estonia		X		X			X	
Finland	X	X	X		X	X	X	
France	X	X		X	X	X	X	
Germany	X	X		X	X	X	X	
Greece		X	X			X	X	
Hungary	X	X		X	X	X	X	
Iceland	X	X	X				X	
Ireland	X	X	X		X	X	X	X
Israel	X			X	X			
Italy	X	X	X	X	X	X	X	X
Japan	X	X	X	X				
Korea	X	X	X	X	X	X		
Republic of Latvia	X			X	X		X	
Lithuania	X	X		X	X	X	X	X
Luxembourg							X	
Mexico (Local)	X	X	X	X	X	X	X	
Netherlands	X		X		X	X		
New Zealand	X	X	X	X	X		X	
Norway	X	X	X				X	
Poland	X	X	X	X	X	X	X	X
Portugal	X	X	X	X	X	X	X	
Romania	X	X		X	X	X	X	X
Slovak Republic	X	X	X	X	X	X	X	X
Slovenia	X	X	X		X		X	X
Spain	X	X		X	X	X	X	
Sweden	X	X		X	X	X		
Switzerland	X	X	X		X			
Türkiye		X		X			X	
UK	X	X	X	X	X	X	X	

Table A A.2. Q1 Overview of issuing procedures – country notes

	Country notes
Australia	
Austria	Traditionally syndications are used for new government bond issues only. Austrian government bond (RAGB) auctions are multiple-price whereas ATB auctions are single-price. In May 2022, Austria issued its inaugural green bond, the issuance procedure was the same as with a conventional bond. In Q4 2022 Austria plans to issue green short-term debt instruments (bills) as first sovereign issuer, the issuance procedure will be the same as with conventional short-term debt instruments.
Belgium	
Brazil	
Bulgaria	
Canada	Canada issues most of its domestic debt through multiple-price auction format. All nominal bonds and treasury bill auctions are multiple-price, whereas real return bonds (inflation-indexed bonds) and ultra-long (50-year) bonds are issued through a single-price auction format.Canada also does tap issues for its long and short term benchmark bonds to build them to a sizable level without having to conduct a single large auction. Information about target benchmark sizes of the relevant sectors are available in our annual Debt Management Strategy. (Annex 2: Debt Management Strategy | Budget 2022) In March 2022, Canada issued its inaugural green bond through a syndication format. Canada also issues foreign currency global bonds through syndication, Medium Term Notes (MTNs) /Euro Medium Term Notes (EMTNs) on a reverse inquiry basis and operates a Commercial Paper program in USD.
Chile	
Colombia	To finance public debt, Colombia Government sells bonds (long and short term) through public auctions with a specific calendar for every week of the year, considering the debt capacity given by the annual budget approved by the congress. Our Global Bonds are issued through book building.
Costa Rica	Ministry of Finance of Costa Rica conducts multiple-price auctions with allocation under the Dutch methodology. In 2018, the last and only syndication was carried out, known as "contratos de colocación". The benchmark issues of internal debt securities, are issued at reference terms of 3-5-7-10-15 years, the facial rate conditions of the coupon are defined with the current yield curve
Croatia	
Czech Republic	Primary market (auction type) • Treasury bonds: multi-price auction • Treasury bills: single-price auction • Secondary market operations (auction type) • Tap-issues: single-price auction • Exchange operations: single-price auction
Denmark	Foreign EMTN issuance takes place via syndication.
Estonia	Estonia has no regular issuance calendar
Finland	
France	Syndication mainly used for curve extension or new/technical products
Germany	
Greece	
Hungary	After bond auctions there can be a non-competitive top-up tender, which is a single-price (average auction price) issuance. Some types of T-bills and bonds are sold via tap issuance or via subscriptions for retail investors. Syndication is used only for the issuance of foreign exchange bonds in the international markets
Iceland	Single price format used for T-bills and T-bonds. Syndication is used for foreign debt borrowing
Ireland	
Israel	
Italy	The Italian Treasury makes use of two kinds of auction: - a competitive (multi-price) auction on a yield basis, for T-bills; - a marginal price (single-price) auction - where the auction price and the quantity issued are determined discretionally by the Treasury within a preannounced range of amounts in issuance for all medium-long terms bonds (nominal fixed and floating rate bonds, and inflation indexed bonds). The Treasury normally makes use of syndication: - in case of issuance of new types of bonds (for instance, BTP€i in 2003, CCTeu in 2010 and BTP Green in 2021) or benchmarks in new segments of the nominal and European inflation curves (e.g.: 7-year BTP, 5-year BTP€i with a new coupon cycle); - in case of issuance of new nominal bonds with maturities above 10 years and new inflation linkers with maturities of 10 years or more.

	Country notes
	Starting from 2020 the Italian Treasury has started to make use of the syndicated placements even for the launch of new benchmark, both nominal and inflation-linked, with maturity equal or lower than ten years. However, this may occur in exceptional circumstances, when the market conditions require since the beginning an efficient allocation among final investors and the achievement of a size that guarantees a good performance on the secondary market. As for the BTP Italia (linked to the Italian inflation) and starting from 2020 also for the BTP Futura (dedicated to retail investors), the Treasury makes use of a specific method of issuance, which allows for collecting purchase orders through the retail screen-based market for government bonds, the MOT platform of Borsa Italiana. A minimum coupon rate (for BTP Futura a set of annual minimum coupon rates) is announced the day before the starting of the issuance process, while the final coupon rate (for BTP Futura a set of annual coupon rates) is determined at the end of the placement period based on market conditions, whereas the issue price is fixed at par. For the BTP Italia the placement period is divided into a First Phase and a Second Phase. The First Phase is reserved to retail investors, while during the Second Phase all investors (including banks and other institutional investors) are allowed to participate. For the BTP Futura only retail investors are allowed to buy the bond during the placement period. Starting from April 2020 and consistently with what announced in the Update of the Guidelines for Public Debt Management for 2020, the Italian Treasury has introduced a new modality to issue one or more off-the-run securities through a separated and dedicated segment of the electronic trading system where the interdealer secondary market takes place ("TAP ISSUE"). These Tap reopening operations of off-the-run bonds are executed outside the auction calendar and are reserved to Specialists in Government Bonds. Moreover, the opportunity and type of bonds to be issued are evaluated according to specific demand requirements.
Japan	Price-competitive & multiple-price auction methods are used in Japan, except for the auctions for: • 40-year bonds (yield-competitive & single-price auction), • Inflation-indexed bonds (price-competitive & single-price auctions) and • Liquidity Enhancement Auctions (yield-spread-competitive & multiple-price auctions). Also, reopening is conducted for JGBs except for T-Bills and 2-year bonds.
Korea	Korea temporarily introduced the single-price auction type from March 2021.
Republic of Latvia	As for the 2021 and 2022 funding programme, Latvia did not issue any short term government securities and there were no single-price auctions, still all issuing procedure are available
Lithuania	The Government borrows by issuing both short– and long–term securities in the auctions and later tapping them. However, since 2015, due to market conditions (low interest rates) short-term securities were issued just once in April 2020. Since September 2021, syndicated issues are also being re-opened in the auctions. We are able to issue syndicated deals and private placements but those are done only in the international markets
Luxembourg	
Mexico (Local)	Local Market Debt The quarterly issuance calendar remains as one of the most important tools for the announcement of the future issuing plan as it details the issuance scheme for zero coupon bonds, nominal bonds, inflation-linked bonds and floaters. Regarding the bonds auction pricing, the floaters are currently the only type of bonds that use both auction types of pricing: single and multiple. Syndicated auctions, are only used when there is a new instrument to be issued and used in the quarterly calendars. Given the weekly frequency of auctions, tap issues occur quite regularly.
	External Market Debt The process of Mexico's debt issuances in international financial markets is made through syndication. The characteristics of any debt issuance will depend on market conditions and the specific objectives that the Federal Government has at the time. That been said, it is very important to mention that Mexico has large access to the US dollar, the euro and the yen markets, which means that practically all the tenors are available for Mexico in those markets. Also, tap issues is a very common tool the Federal Government uses in both, the US dollar and the euro market.
Netherlands	We don't use Syndicates or Private Placements but we normally use the Dutch Direct Auction (DDA) method for auctions of bonds with initial maturity of about 5 years or longer. Our Tap issues are single price auctions but they can have a multiple price during the auction process. A tap auction can have 3 different prices but on each price every primary dealer has the same ability to buy at that price.
New Zealand	New bond lines are issued via syndication, whilst existing bond lines are generally issued by weekly tenders.
Norway	New bonds are introduced by syndication, while new Treasury bills are issued through uniform price auctions. Both bills and bonds are regularly reopened by auctions. Auctions are conducted via the Bloomberg Auction System. Only primary dealers are authorised to participate in the auctions. They are obliged to participate in every auction of bills and bonds. The issue amount and tenor are published two days prior to the auction.
Poland	The single-price auction is used in the regular sale auctions of Treasury bills and bonds as well as Treasury-bond switching auctions. The multiple-price model is used in buy-back auctions. Syndication has been mainly used for Treasury securities issues on foreign markets.
Portugal	Syndications: T-Bonds only. Auction type: T-Bonds: Single Price T-Bills: Multiple Price

	Country notes
	*Tap issues correspond to reopening the series via auctions for both T-Bonds and T-Bills. T-Bonds can also be tapped via syndication or other formats, such as exchange offers.
Romania	
Slovak Republic	Single price only for T-Bills, currently all other auctions with multiple price.
Slovenia	Auctions apply for Treasury Bills only – Slovenia is not performing bond auctions. However, 18m Treasury Bills are issued via auctions
Spain	The Spanish Treasury usually does the first issuance of longer-term bonds through syndications. Afterwards, these benchmark bonds are tapped through auctions, until they are "filled", with a size of approximately EUR 20 bn. After a benchmark is filled, or it is no longer representative of its point on the curve, a new benchmark is issued. For shorter-term bonds and bills, only auctions are used, both for initial issuance and taps.
Sweden	
Switzerland	Almost all of our debt (bills as well as bonds, both new issues and reopenings) is issued under an auction system with a Dutch tender (the one exception are our "own tranches", see below). The reopening of already issued bonds (implemented by auction) is comparable with the auctioning of new bonds. To support market liquidity, we aim to have only one outstanding bond per year with a volume of around 4 billion CHF at maturity. Because of our limited financial needs and limited market demand, we do not auction the entire volume at once but reopen individual bonds several times over their entire lifetime until they reach our target volume. Between auction dates, the Federal Treasury sells so called "own tranches" from time to time to support market liquidity and cover extraordinary market demand. Own tranches are Government Bonds owned by the Confederation and can be sold on demand at market prices (own tranches are not yet placed/settled, the whole issuance process is completed except the sale to the investor à primary market transaction). We consider the selling of own tranches as tap issues. Own tranches contribute only a small part to the issuance program in total.
Türkiye	In external borrowing operations, syndicated borrowing format is used
UK	We hold single-price auctions for inflation-linked gilts and multiple-price auctions for nominal ("conventional") gilts

Table A A.3. Q2 Have you issued or plan to issue any new types of securities like inflation-linked bonds, variable rate notes, green bonds, and longer dated securities?

	YES, new types of securities were/will be issued	NO new types of securities were/will be issued
Australia		Both
Austria	Both	
Belgium		Both
Brazil		Both
Bulgaria		Both
Canada	Last 12 months	Next 12 months
Chile	Last 12 months	
Colombia	Both	
Costa Rica	Both	
Croatia		Both
Czech Republic		Both
Denmark	Last 12 months	Next 12 months
Estonia		Both
Finland		Both
France	Last 12 months	
Germany		Last 12 months
Greece	Last 12 months	
Hungary	Both	
Iceland	Next 12 months	Last 12 months
Ireland		Last 12 months
Israel	Next 12 months	Last 12 months
Italy	Last 12 months	Next 12 months
Japan		Both
Korea		Both
Republic of Latvia	Last 12 months	

	YES, new types of securities were/will be issued	NO new types of securities were/will be issued
Lithuania		Both
Luxembourg		Both
Mexico (Local)	Both	
Netherlands		Both
New Zealand	Both	
Norway	Last 12 months	
Poland	Last 12 months	Next 12 months
Portugal	Next 12 months	Last 12 months
Romania	Next 12 months	Last 12 months
Slovak Republic		Both
Slovenia	Next 12 months	Last 12 months
Spain		Both
Sweden		Both
Switzerland	Next 12 months	Last 12 months
Türkiye	Both	
UK	Last 12 months	Next 12 months

Table A A.4. Q2 New type of instrument issued over the last 12 months or planned to be issued in the next 12 months

	Inflation-linked bonds	Longer dated securities	Variable rate notes (such as floating rate notes)	Retail bonds	Green bonds	Social bonds	Sustainability bonds	Sustainability-linked bonds	Infrastructure bonds	Sukuk	Other	Last or next 12 months
Australia	Both	Both										
Austria					Last 12 months						Green Austrian Treasury Bills / Commercial Paper	Next 12 months
Belgium		Both		Both	Both							
Brazil												
Bulgaria												
Canada					Last 12 months							
Chile								Last 12 months				
Colombia		Last 12 months			Both	Next 12 months	Next 12 months					
Costa Rica	Both		Both		Next 12 months	Next 12 months	Next 12 months	Next 12 months				
Croatia												
Czech Republic												

	Inflation-linked bonds	Longer dated securities	Variable rate notes (such as floating rate notes)	Retail bonds	Green bonds	Social bonds	Sustainability bonds	Sustainability-linked bonds	Infrastructure bonds	Sukuk	Other	Last or next 12 months
Denmark					Last 12 months							
Estonia												
Finland												
France											Green inflation-linked bonds	Last 12 months
Germany												
Greece			Last 12 months									
Hungary				Both								
Iceland											Green bonds are possible	Next 12 months
Ireland												
Israel					Next 12 months							
Italy					Last 12 months							
Japan												
Korea												
Republic of Latvia							Last 12 months					
Lithuania												
Luxembourg												
Mexico (Local)		Last 12 months	Last 12 months				Next 12 months				SDG-aligned bonds	Both
											SDG-aligned bonds	Both
Netherlands												
New Zealand		Last 12 months			Next 12 months							
Norway		Last 12 months										
Poland				Last 12 months								
Portugal					Next 12 months							
Romania					Next							

	Inflation-linked bonds	Longer dated securities	Variable rate notes (such as floating rate notes)	Retail bonds	Green bonds	Social bonds	Sustainability bonds	Sustainability-linked bonds	Infrastructure bonds	Sukuk	Other	Last or next 12 months
					12 months							
Slovak Republic												
Slovenia		Last 12 months					Both					
Spain												
Sweden												
Switzerland					Next 12 months							
Türkiye			Last 12 months	Last 12 months	Next 12 months					Next 12 months		
UK					Last 12 months							

Table A A.5. Q3 Major challenges experienced over the last 12 months

	Increase in governments funding needs	Understanding investor behavior	Decrease in government's funding needs	Lack of investor demand	Cash flow forecasting	Communication with fiscal authorities	Operational challenges	Communication with monetary authorities	Market volatility	Communication with market participants	Significant rise in yields
Australia		X	X		X				X		
Austria	X				X				X		
Belgium					X						
Brazil	X								X		X
Bulgaria	X			X					X		X
Canada			X		X				X		X
Chile					X				X		X
Colombia					X				X		X
Costa Rica		X			X				X		X
Croatia	X			X	X				X		X
Czech Republic	X				X				X		X
Denmark				X					X		
Estonia	X	X			X				X		X
Finland	X				X				X		
France									X		X
Germany											
Greece		X							X		X
Hungary	X				X				X		X
Iceland					X				X		X
Ireland			X		X				X		

Israel			X		X				X		X
Italy	X				X				X		X
Japan											
Korea									X		X
Lithuania	X	X		X				X	X	X	X
Luxembourg	X				X				X		X
Mexico (Local)	X								X		
Mexico (External)		X		X					X		X
Netherlands			X		X				X		
New Zealand	X		X		X				X		X
Norway				X					X		
Poland	X				X				X		X
Portugal			X		X	X	X		X		X
Republic of Latvia	X	X	X	X	X				X		X
Romania	X			X					X		X
Slovak Republic			X		X				X		X
Slovenia									X		X
Spain					X				X		X
Sweden			X		X						
Switzerland		X			X	X				X	
Türkiye	X			X	X				X		X
UK			X		X		X		X		

Table A A.6. Q3 Specified OTHER major challenges

Australia	
Austria	
Belgium	
Brazil	
Bulgaria	
Canada	
Chile	
Colombia	
Costa Rica	(i) Cyberattack on Government on April 2022.
Croatia	
Czech Republic	
Denmark	
Estonia	
Finland	
France	
Germany	
Greece	
Hungary	
Iceland	
Ireland	
Israel	
Italy	
Japan	
Korea	

Lithuania	
Luxembourg	
Mexico (Local)	(i) Capital outflows (ii) short-term refinancing needs
Mexico (External)	
Netherlands	
New Zealand	
Norway	
Poland	
Portugal	
Republic of Latvia	
Romania	
Slovak Republic	
Slovenia	
Spain	
Sweden	
Switzerland	
Türkiye	(i)Global Risks
UK	

Table A A.7. Q3 Major challenges experienced over the last 12 months – Country notes

Australia	
Austria	In the light of various government relief-packages - that aim to mitigate the effects of the persistent inflation - and thus an increase in the government's funding needs, cash flow forecasting remains a major challenge. Another challenge has been the market volatility, which is primarily caused by alternating market-worries between inflation and a recession and the central banks reaction. We have made the observation that primary market participants tend to be more cautious, thus making careful movements in their positions.
Belgium	So far, despite diverging impacts, overall funding needs appear to be close to initial estimates. Detailed cashflow forecasting remains challenging in the current extremely high inflation environment.
Brazil	
Bulgaria	
Canada	The Government of Canada has decreased its planned gross issuance by CAD 17 billion compared to last fiscal year, from CAD 442 billion (FY2021-22) to CAD 425 billion (FY2022-23). The planned issuance in the bond sector has gone down significantly from CAD 255 billion to CAD 212 billion in FY 2022-23, mainly due to reduced financial requirements, which continue to trend downwards. The planned issuance in bills has been increased to CAD 213 billion compared to CAD 187 billion for FY2021-2022, to support a liquid and well-functioning market for Canadian federal government treasury bills, which helps investors, as a whole, who need access to short-term, interest-bearing securities in lieu of cash.
Chile	
Colombia	
Costa Rica	
Croatia	
Czech Republic	
Denmark	The investor demand has been somewhat impaired by the high volatility and increased duration in the Danish mortgage market.
Estonia	
Finland	
France	
Germany	
Greece	
Hungary	
Iceland	
Ireland	The changing economic backdrop has made it difficult to forecast cash flows and funding requirements
Israel	
Italy	Please refer to the point 4.

Japan	
Korea	
Lithuania	
Luxembourg	
Mexico (Local)	Local Market Debt The greater challenges for the local debt market in the last 12 months have been the foreign capital outflows for MXN 83 billion (Mexican pesos) (~USD 4.15 bn).
Mexico (External)	
Netherlands	
New Zealand	Over the last 12 months, the government funding needs were formally reviewed and updated. In the first review, funding needs decreased. In the subsequent review, funding needs increased.
Norway	Lack of investor demand led to reducing the allocated amount from the announced target amount in a Treasury bill auction in June 2022. High market volatility has led the DMO to allow primary dealers to set a wider price spread than normal in the interdealer market for both government bonds and Treasury bills
Poland	
Portugal	
Republic of Latvia	
Romania	
Slovak Republic	Issuance plans of Slovakia must be in line with prudent Act on Fiscal Responsibility (Debt Brake).
Slovenia	
Spain	On market volatility, it is quite linked with the significant rise in yields. Similarly to other sovereign issuers, we have seen a sudden increase in our financing costs. This increase in rates was widely expected by the market and ourselves, but the suddenness of the increase was not. This sudden increase in yields and the general uncertainty in the current global context have led to significant volatility in the European Government Bond (EGB) space. This volatility has affected the liquidity of the secondary market for Spanish government bonds. This is a challenge for us and many other sovereign issuers. Regarding cash flow forecasting, there are two main factors that pose a challenge for the Spanish Treasury. On the one hand we have more uncertainty in cash flow forecasting due to the implementation of Spain's Recovery Plan under the NextGenerationEU program, because the Recovery Plan's investments may need to be financed before Spain receives its disbursements from NGEU. On the other hand, given the global context, there is uncertainty regarding the Central Government's funding needs. For example, new government spending could be approved to aid households in response to the energy crisis, which makes cash flow forecasting more difficult.
Sweden	
Switzerland	The multiple challenges that arose during the last 12 months (e.g. inflation, energy prices, and war) and the ongoing effects of the pandemic have made cash flow forecasting very difficult. We had to adjust our (internal) scenarios multiple times during this time. As the uncertainty also affected our investors, it was also challenging to understand investor behavior. With the return to positive interest rates, we are also confronted with increasing outflows, in particular from funds temporarily parked with the federal government (mainly delayed withholding tax refunds
Türkiye	
UK	In sharp contrast to the previous financial year, 2021-22 saw two large downward revisions to the UK DMO's gilt financing requirement, by GBP 43.3bn in April 2021 and by GBP 57.8 (to GBP 194.8 billion) in October 2021 as higher than anticipated government revenues reduced its cash needs. The initial forecast of gilt sales for 2022-23 published in March 2022, was lower still at GBP 124.7bn, but this rose slightly to GBP 131.5bn in April 2022. From January 2022, the Bank of England ceased reinvestment of redemption amounts from its holdings of gilts in its Asset Purchase facility, marginally increasing the net supply of gilts to the market. In the context of ongoing challenging conditions in the sterling money markets, the DMO has also worked closely with HM Treasury and the Bank of England to identify ways in which the DMO's cash management responsibilities can be further supported.

Table A A.8. Q4 Major risk factors/events faced in the last 12 months, the next 12 months and both

	Global financial risks (e.g. changes in large central banks' monetary policies)	Local financial risks (e.g. risks stemmed from banking sector)	Macroeconomic uncertainties (e.g. inflation)	Liquidity risk	Changes in the government's borrowing needs	Geopolitical risks	Political risks (e.g. elections, changes in government)	COVID-19 pandemic's risks	Materialization of contingent liabilities including state guarantees	Revisions to the financial regulations	Operational risks (e.g. human failure, lack of staff, IT/system risks and process risk)
Australia	Both		Next 12 months	Next 12 months	Next 12 months	Next 12 months					Next 12 months
Austria	Both		Both		Both						
Belgium	Both		Both		Next 12 months	Next 12 months		Last 12 months			
Brazil	Both	Both	Both		Both	Both	Both	Last 12 months			
Bulgaria	Both		Both		Both		Both				
Canada	Both		Both	Both	Both	Both		Last 12 months			
Chile	Both		Last 12 months			Last 12 months					
Colombia	Both	Both	Both		Both	Last 12 months	Last 12 months	Both			Both
Costa Rica	Both	Next 12 months	Both	Next 12 months	Next 12 months	Both	Last 12 months	Last 12 months			Next 12 months
Croatia	Both		Both	Both	Both	Both		Last 12 months	Last 12 months		
Czech Republic	Both		Both		Both	Both	Last 12 months				Both
Denmark				Next 12 months		Both			Next 12 months		
Estonia	Next 12 months		Both		Both	Both	Next 12 months				
Finland	Both			Both	Both						
France	Both		Both			Both	Last 12 months	Last 12 months			
Germany	Both		Both		Both	Both		Both			
Greece	Both	Both	Both		Both	Both		Last 12 months	Both	Both	
Hungary	Both	Both	Both	Both	Both	Both	Last 12 months	Last 12 months	Next 12 months		
Iceland			Both			Both		Last 12 months			
Ireland	Both		Both		Both	Both					
Israel	Both		Both		Both		Next 12 months	Last 12 months			
Italy	Both		Both		Next 12 months	Both	Both	Both			
Japan					Both						Both
Korea	Next 12 months		Both					Last 12 months			
Lithuania	Both		Both		Last 12 months	Both		Last 12 months			Both

	Global financial risks (e.g. changes in large central banks' monetary policies)	Local financial risks (e.g. risks stemmed from banking sector)	Macroeconomic uncertainties (e.g. inflation)	Liquidity risk	Changes in the government's borrowing needs	Geopolitical risks	Political risks (e.g. elections, changes in government)	COVID-19 pandemic's risks	Materialization of contingent liabilities including state guarantees	Revisions to the financial regulations	Operational risks (e.g. human failure, lack of staff, IT/system risks and process risk)
Luxembourg			Both		Both	Both			Next 12 months		
Mexico (Local)	Both	Both	Both					Last 12 months			
Mexico (External)	Both		Both	Both		Both	Both	Last 12 months			
Netherlands	Next 12 months		Next 12 months		Both	Next 12 months		Last 12 months			Both
New Zealand	Both		Both		Both			Both			
Norway	Both		Both	Both		Both				Next 12 months	
Poland	Both		Both		Both	Both	Next 12 months	Last 12 months			Next 12 months
Portugal	Both		Both	Next 12 months	Both	Both		Last 12 months			Both
Republic of Latvia	Both		Both	Next 12 months	Both	Both		Both			
Romania	Both		Both	Both		Both		Last 12 months	Next 12 months		
Slovak Republic	Both		Both		Both	Both	Both				
Slovenia	Next 12 months		Both		Next 12 months	Both					
Spain	Both		Both		Next 12 months	Both					
Sweden	Both		Both	Both							
Switzerland	Both		Both	Both	Next 12 months	Both		Last 12 months	Both		
Türkiye	Both		Both		Both	Both		Last 12 months		Both	
UK	Both		Both	Next 12 months	Both	Both		Last 12 months			Both

Notes: Mexico mentions additional risk factors/events: Energy prices dynamics (both), Climatological factors associated with droughts or floods that may affect the agriculture and some industrial and services, in addition to the fact that they could generate distortions in the formation of prices in the world economy or Mexico (both) and probability of recession in US and Europe (both).

Table A A.9. Q4 major risk factors/events that your DMO faced last 12 months or might affect your operations in the next 12 months – Country notes

Australia	
Austria	We foresee the biggest factors/events in the next 12 months that might affect our operations to be the uncertainties around the further development of the inflation and the consequential central bank response (changes in monetary policy to counter a recession) as well as possible effects on the funding requirement (potentially necessary additional inflation relief packages à higher government borrowing needs).
Belgium	The main uncertainties are now linked to a broad mix of geopolitical risks, (energy) price inflation, the reaction of central banks and uncertainty with regard to the Government's borrowing needs to the impacts of all of the above on people's purchasing power. Cyber risks remain a point of attention.
Brazil	
Bulgaria	
Canada	While the last 12 months were largely characterized by risks stemming from COVID-19, going forward we expect geo-political and macroeconomic factors to contribute to market risk more
Chile	
Colombia	
Costa Rica	
Croatia	
Czech Republic	
Denmark	
Estonia	
Finland	
France	
Germany	
Greece	
Hungary	
Iceland	
Ireland	
Israel	
Italy	The main macroeconomic factors that may affect our strategy are related to geopolitical issues and the uncertainties regarding the trend of inflation and the attitude of central banks in the coming months (e.g. the end of the Central Banks' bond purchase programs).
Japan	
Korea	
Lithuania	
Luxembourg	
Mexico (Local)	
Mexico (External)	
Netherlands	
New Zealand	
Norway	Norwegian interest rates are highly correlated with foreign interest rates.
Poland	
Portugal	
Republic of Latvia	
Romania	
Slovak Republic	Government too conservative in fiscal projections – higher budgeted deficit compared to reality – higher liquidity buffer
Slovenia	
Spain	The current global context brings uncertainty to the operations of DMOs around the world. In the case of the Spanish DMO, we have seen a rise in our cost at issuance due to the changes in large central banks' monetary policies, largely brought about by rising inflation. This poses a challenge for our debt management strategy, because we must continue striving towards our mandate of minimizing both the cost of debt and the risks associated with our debt portfolio in this new environment. Moving forward, the possibility of gas supply shortages in Europe could also pose challenges for our operations as a DMO.

	Although Spain is not directly exposed to gas cuts from Russia, some of our trading partners are, and we could be indirectly affected by higher energy prices. This could lead to higher funding needs, if government spending were approved to combat a worsening of the energy crisis in Europe.
Sweden	
Switzerland	We expect the challenges in the upcoming 12 months to be similar as in the last 12 months. For the DMO, the main challenge will most likely again be the accurate cash flow forecasting, due to macroeconomic uncertainties and the geopolitical challenges.
Türkiye	
UK	International geopolitical risks have escalated since the start of the Russia-Ukraine conflict. This has prompted a sharp rise in (energy price driven) inflation globally, sharply tightening of monetary policy in the major economies and a corresponding major increase in government bond yields. The yield on the UK 10-year gilt for example has tripled in 2022 to-date (7 September 2022) from approximately 1% to 3%. The financing of the costs associated with mitigating the energy price crisis in the UK and anticipated fiscal measures by the incoming administration are expected to increase the size of the gilt issuance programme over the next year-18 months. A fiscal event to begin to address these costs is expected by the end of September. On 23 September 2022 the UK DMO's financing remit was revised following the publication of the Government's Growth plan. The UK Government's Net Financing requirement rose by GBP 72.4 billion to GBP 234.1 billion. The increase is to be financed by additional gilt sales of GBP 62.4 billion, taking the planned total in 2022-23 to GBP 193.9 billion and additional net sales of Treasury bills for debt management purposes of GBP 10.0 billion, taking the planned increase in 2022-23 to GBP 40.2 billion. From the first week of October 2022 the Bank of England will commence sales of its holdings of gilts in the Asset purchase facility at the rate of GBP 10.0 billion per quarter – further adding to gilt supply to the market.

Table A A.10. Q5 How do you manage these risks (e.g. contingency funding plans, continuity plan etc.)?

Australia	Flexibility in issuance, large liquidity buffer, ability to materially upsize short term borrowing (Treasury Notes) if required
Austria	The Republic of Austria mainly mitigates funding risks with its diversity of funding sources and instruments as well as financial flexibility due to its relative scarcity of issuance. Additionally, we implemented a liquidity buffer in the light of the COVID-19 pandemic and the challenges regarding cash flow forecasting. We also try to spread issuances over the year in order to minimize concentration risk and diversify interest rate risk.
Belgium	In terms of funding there is a close follow-up of fiscal revenue and spending in order to gauge the outcome of overall funding needs. Throughout 2022, as in 2021, because of the funding transactions early in the year we have held larger cash positions than usual.
Brazil	The main measure that the Brazilian National Treasury uses to mitigate risks is to carry a liquidity buffer capable of paying not less than 3(three) months of obligations. We currently have the resources to pay more than 9 months of expenses, which gives us margin to cross periods of volatility and low demand without stressing even further. We have also been very emphatic to communicate that fact to investors. In addition, we are publishing the auction calendar in a quarterly basis, which gives us the needed flexibility to adjust benchmarks and maturity according to expected investors' preferences at that period.
Bulgaria	We communicate with the main market participants.
Canada	The Government of Canada employs an open and collaborative approach for its debt management function. Actions such as publishing market notices, which act as information communiques containing operational details, and/or new program announcements, have been effective. Senior government officials have also effectively communicated changes in funding needs and information on programs and operations during public appearances/speeches. This approach has helped to ensure the well-functioning of the Government of Canada markets and favorable conditions for market liquidity in both the primary and secondary Government of Canada securities markets. In addition, new programs and changes to existing programs that have been announced by the Government to support key financial markets to ensure that they continue to function properly have been well received by market participants and primary dealers (PDs). Being open and transparent in the communication strategy with PDs has also been an effective approach to motivating dealers to provide liquidity to the market and to support primary market issuance. The following are three examples of Canada's transparency in communication with financial market participants: • Publication of the quarterly bond schedule prior to the start of each quarter in advance of auction • Publishing details for each operation in a call for tender a week prior to the auction • Regular consultations with market participants: The Government of Canada and the Bank of Canada seek the views of government securities distributors, institutional investors, and other interested parties on issues related to how the Government of Canada securities market is performing and views for the design and operations of the domestic debt program.
Chile	Typically, it is very important to have a good communication with the investor community, in order to understand investor demand, and a good coordination with the Budget Office, that manages the information of cash flows.
Colombia	Looking to different financial alternatives to attend Government´ borrowing needs.

	Continuity plan.
Costa Rica	The indicated risks are managed by defining an annual financing plan or strategy, with access to external financing (loans and Eurobonds issuance), in addition by prefunding the Government's cash flow and by adopting spending containment measures. and fiscal rule. As a result of the cyberattack suffered by the Government, cybersecurity measures and plans were reinforced in public institutions and business continuity plans are in place.
Croatia	
Czech Republic	Risks arising from domestic or global financial markets are managed operatively by a flexible debt issuance strategy, which is published for the following year and updated in the mid-term (quarterly in extraordinary cases). Additionally, the decisions related to gross issuance are discussed and approved by the Ministry of Finance management every quarter. The Ministry of Finance also keeps a sufficient liquidity buffer within single treasury accounts and forecasts future state debt service expenditure in high percentile.
Denmark	The risk is mainly communicated by the Ministry of Finance. If it materializes in actual funding need we would communicate from the DMO:
Estonia	In order to mitigate the risk of changes in government's borrowing needs, a minimum liquidity requirement was introduced and committed credit facilities with the main local partner banks were established already in 2011. The minimum required level of the liquidity position equals the State's six-month negative net cash flow comprising: • transactional requirements, meaning the excess of budgeted monthly outgoings over budgeted revenue (also taking into account entities such as the Health Insurance Fund and the Unemployment Insurance Fund whose cash management is consolidated with central government), including debt and interest payments during the next one-month period, and • precautionary requirements, representing an estimate of the deterioration in budgeted tax revenues over the following six months in the event of an economic downturn of the severity experienced in 2009 and a provision for liabilities from guarantees given by the State that are expected to crystallise in the following six months. The actual liquidity position is calculated as (a) the Liquidity Reserve (deposits with maximum three months maturity, current accounts and bonds, liquid and high-grade) plus (b) undrawn amounts from facilities committed for at least the following three months (by banks). These facilities also serve to mitigate operational risks and to ensure that unexpected large outgoing payments can be made without having to liquidate investments. Borrowing strategy document was introduced in 2020 and is updated regularly.
Finland	For operational risk process guidelines and checkpoints. There are also contingency and continuity plans.
France	Diversified funding strategy, predictability and transparence towards investors
Germany	Our issuance planning and market entrance allows for adjustments during the year. Short-term changes can, amongst others, be addressed by our bill instruments.
Greece	
Hungary	Flexible issuance plan, contingency plans, communication with market participants, prefinancing, stand-by credit facilities
Iceland	The issuance plan has to be more flexible, more series will be issued and the maximum size of each series has been increased.
Ireland	Large cash balance in place, plan issuance schedule around known events
Israel	Following the change in financing needs and increase in global inflation, we analyzed and performed various simulations covering a wide range of scenarios, including recession and/or increased inflation to see how best to maintain financing flexibility
Italy	The Italian Treasury funding plan is inspired by the principles of transparency and predictability. In order to handle possible risks deriving from a national and international geopolitical scenario, the funding strategy is oriented toward managing interest-rate and refinancing risks, so as to continue to keep exposure to such risks under control. Moreover, the Italian treasury has focused its debt management policy in increasing the average life of the debt to mitigate the risk of refinancing by diluting over time the volumes to place on the market and to decrease the issuer's exposure to sudden increases in interest rates. However, the above-mentioned factors are characterized by a level of uncertainty which makes difficult to predict their evolution over time. Therefore, the Treasury funding strategy keeps a sufficient degree of flexibility to quickly response and adapt its funding plan to the evolution of the market context, as occurred during the COVID-19 crisis. In addition the Treasury has further improved its communication strategy by means of periodical press conferences on debt issuance strategy and a significant change on the quarterly issuance program bulletin that has been enriched with more information on the debt funding progress, the macroeconomic and public finance outlook
Japan	In the case of rapid changes in fiscal demands, we will mitigate additional impacts on the JGB market by adjusting the amount of front-loading Refunding Bonds. Also, we will deal with a decline in market liquidity through Liquidity Enhancement Auction, an additional issuance of off-the-run bonds. In addition, in order to secure stable financing and accurately implement policies to enhance JGB market liquidity, we carry out the dialogue with market participants through meetings of JGB Market Special Participants and other meetings. And, as a measure to tackle the operational risks in Q4, we separate their workplaces to prevent the spread of COVID-19 among the staff in charge of auctions.
Korea	Contingency plan
Lithuania	While international capital markets remain difficult, Latvia is raising funds mainly in domestic market. Demand in auctions

	over the last 12 months has been supporting and Latvia has been able to issue largest ever volumes in domestic market, reaching net issuance volumes in June 2022 already at level we have used to have for the full year. The increased liquidity buffer enables us to be flexible in terms of time for issuance, tenors and currency etc. We regularly review and update the total funding requirement and adjust the borrowing activities if necessary
Luxembourg	When redeeming major (equivalent to EUR 1 billion and above) Eurobond issues, the risks are mitigated by allocating the required funds in advance. Also we can use the reserve (stabilization) fund for the debt redemptions. The taken amount must be returned to the fund within few years. Thus, we have high cash buffers or liquidity cushions, actively seek to reduce operational risk. Also we intensified our communications with investors, explaining mitigating factors to the geopolitical risk.
Mexico (Local)	contingency funding plans
Mexico (External)	While most countries increased their external debt level as a result of the pandemic, our country has managed to keep it stable through its fiscal responsibility policy, sophisticated risk management, and an efficient debt refinancing strategy. Thus, by 2023 it is estimated that 19.2% of the total debt will be denominated in foreign currency and the remaining 80.8% in national currency. With the aforementioned, the Federal Government maintains a low-risk and balanced debt portfolio that will allow it to maintain a solid financial position
Netherlands	
New Zealand	DSTA has recently updated its business continuity plan. In addition a new information security management system is being implemented.
Norway	• Change in Government borrowing needs – we review the borrowing programme forecasts at two scheduled points during the year. • Liquidity risk – NZDM maintain a minimum liquidity buffer (in the form of highly liquid financial assets) of NZD 15 billion, up from our pre-pandemic requirement of NZD 2 billion. We also have a NZD 5 billion overdraft with the Central Bank and the option to increase Treasury Bill and ECP issuance in the short-term. COVID-19 pandemic risk/global financial risk/macroeconomic uncertainties – Rather than trying to respond tactically to short-term market dynamics, we take a long-term structured approach to our funding strategy. Our goal is to provide as much certainty as possible, reducing the uncertainty or illiquidity premiums applied to our bonds. Over time, we believe this will put us in the best possible position in the face of global financial risks beyond our control. These risks are also managed by holding a substantial liquidity buffer and formally reviewing government borrowing needs twice a year.
Poland	We aim to have a transparent and predictable borrowing programme and is updating this quarterly, if necessary.
Portugal	1) By holding a cash buffer, flexible approach in terms of issuance (instruments, markets, issuance techniques), maintaining the relations with investors and developing the investor base. 2) Emergency procedures are updated on a regular basis taking into account new types of security issues. Technical infrastructure allowing for running debt management processes from outside of the Ministry of Finance building is assured.
Republic of Latvia	When preparing the financing plan for the year, potential risk factors are taken into account, therefore we anticipate as much as we can the financial schedule aiming to comfortably raise the funds to cover not only the year funding needs but also prefunding at least 30% of the following year gross funding needs and/or execute liability management exercises with the cost of debt reduction and smooth of redemption profile objectives. We also have contingency funding plans – e.g. we can launch new financial instruments at short notice if need be.
Romania	The state's financing policy maintains a high degree of flexibility regarding the timing and level of the amounts drawn. Additionally, a foreign currency buffer is maintained to cover up to 4 months of the gross financing needs.
Slovak Republic	Sufficient liquidity buffer (currently higher than long-term average) and prudent conservative approach to debt management
Slovenia	Higher liquidity buffer, series of smaller tap issues, liability management transactions (i.e. buybacks and exchanges of the of-the -run lines falling due within next two years, communication with investors and primary dealers
Spain	These factors commented in the previous paragraph, together with other uncertainties have led us to maintain a higher cash buffer at the end of 2022. This will allow us to mitigate any possible risks that may arise in 2023 and have more flexibility in our debt issuance if any of these challenges materialize
Sweden	Yearly review and updates
Switzerland	The Treasury develops its auction calendar and issuance program in close cooperation with the budgetary units of the Ministry of Finance. In addition, the issuance program is revised on a quarterly basis and, if necessary, adapted according to the funding needs of the government. These updates are also approved by the Asset & Liability committee of the Treasury, on which – among others – the budgetary units and the Swiss National Bank are represented. With this rolling planning, potential risk factors can be taken into account for the issuance program and at each quarterly adaption. Thanks to this process and the relatively large liquidity buffer, there is enough time and flexibility to adapt the funding strategy in a timely manner should risks materialize.
Türkiye	Debt and Risk Management Committee closely monitors and evaluates recent changes in global, local markets and budget realizations and government borrowing needs. With respect to these developments, if needed, the Committee determines new strategies for debt management. Regarding operational risks, we manage our operations according to our Operational Risk and Business Continuity Management frameworks. In addition, we have a quite open two-way communication strategy with investors in order to manage those risks
UK	

Table A A.11. Q6 Do you consider potential risk factors when preparing your financing plan (e.g. auction calendar)?

	Answer	Comment
Australia	Yes	
Austria	Yes	In general, potential risk factors (e.g. forthcoming elections, geo-political events, central bank meetings etc.) and competing supply are considered when preparing the financing plan. The RAGB and ATB auction calendar dates are announced in December for the forthcoming year in order to maintain the highest possible degree of predictability. We tend to stick to these calendar dates regardless of potentially arising risk events. However, we have flexibility with regards to the amount and bond(s)/bill(s) issued at each auction (which e.g. for bonds is announced on Thursdays in the week before the auction) depending on demand and market conditions. At bond syndications, where we have no fixed calendar, we have more room to adjust in function of known upcoming events.
Belgium	Yes	Yes, we have opted for a higher number of auctions in our auction calendar in order to be able to cope with possible setbacks
Brazil	Yes	Our strategy aims to lengthen the maturity profile of Brazilian public debt while maintaining cash resources capable of paying at least 3 months of obligations. Our mid-term plan considers favorable and adverse scenarios and forecasts different investors preferences and demands in such scenarios. Our liquidity buffer planning also considers adverse scenarios probability, including possible buybacks and fiscal shocks.
Bulgaria	Yes	
Canada	Yes	Flexibility is built in our financing plan to adjust to lower or higher financial requirements (e.g., contingency planning). The quarterly bond schedule (auction calendar) is designed to ensure that there are no auctions taking place on the same days as the interest rate announcement dates in Canada and in the US. The potential impact of public speaking engagements of members of the Governing Council of the Bank of Canada is also considered and utmost care is utilized to avoid inadvertent impact on Government of Canada primary market auctions. Call for tenders for primary market auctions are released in the morning (instead of the afternoon) in the week before an auction week when the markets are closed for a long weekend (i.e. a national/provincial holiday). The auction calendar also provides information on the specific sector of the to-be auctioned security and total amounts maturing on the auction day (across other securities). Market participants are closely consulted as part of the process of developing the debt management strategy. To support a liquid and well-functioning Government of Canada securities market, the Government strives to promote transparency and regularity.
Chile	Yes	Normally, we try to avoid complicated dates, considering financial news as well as political factors.
Colombia	Yes	
Costa Rica	Yes	Since 2019, the Ministry of Finance has been preparing the calendar of auctions of internal public debt securities. This calendar is published every quarter. You can find it on the website of the Ministry of Finance: HechoRelevanteTN0866_2022CalendariodeSubastasIIITrim2022.pdf (hacienda.go.cr) In addition, the Costa Rican Ministry of Finance has a website with Investor Information. https://www.hacienda.go.cr/InfoInversionistas.html
Croatia	Yes	
Czech Republic	Yes	The financing plan is prepared in accordance with financing needs, state budget deficit development, state treasury development, internal forecast, and last but not least with the situation on the domestic and foreign bond markets and primary dealers' demand. In the internal forecast Ministry of Finance takes into account relevant financial risks arising from the situations on global and local financial markets (i. e. estimate of expenditure on state debt service in particular years), political risk related to state debt management, and expenditure on state debt service (state debt level, expenditure level) etc.
Denmark	No	
Estonia	Yes	For a small country like Estonia it is essential to be prepared for different funding alternatives (multilateral loans, revolving lines, t-bills, bonds).
Finland	No	Annual funding plan is based on a baseline scenario.
France	Yes	We take into account the most likely annual trajectory of our financing programme and try to smooth it by running a buybacks programme and sizing the t-bill programme.
Germany	Yes	We tried and try to consider (avoid) days of foreseeable high volatility / uncertainty while preparing our annual auction calendar.
Greece	Yes	
Hungary	Yes	We do that by making the financing plan rather flexible. The auction calendar used to be fixed until 2019 for the given calendar year, but since then it can be changed within a year as well. The Debt Management Office (DMO) has flexibility in determining the offered amounts and the accepted amounts at the auctions, and it has other tools such as the non-competitive top-up phase after the auctions; all these help to adjust the financing by wholesale instruments. Short-term liquidity management instruments (mainly repos and stand-by credit facilities) are available for handling temporary situations and a sizeable cash buffer is also held on the Treasury Single Account and in Foreign Exchange (FX) deposits.

	Answer	Comment
		The annual amount of Foreign Exchange (FX) bond issuance is also flexible in the financing plan, depending on the government's financing needs and the demand for local government securities. All these measures have been in effect for many years, and were revised and enhanced in the past three years due to the Covid pandemic and the war in Ukraine
Iceland	Yes	The goal is to maintain a high degree of predictability in the auction program. An auction calendar is published in December each year for the following year and a quarterly auction plan is published before the start of each quarter. A degree of flexibility is attained in the financing plan by the amount issued in each auction.
Ireland	Yes	Auctions are announced quarterly. Consideration is given to known market events which may influence auction outcomes
Israel	Yes	
Italy	Yes	
Japan	Yes	We put our focus on predictability of issuance in formulating annual JGB Issuance Plans. One of the tools for this end is front-loading issuance of Refunding Bonds, which allows us to avoid concentration of bond redemption in a specific year and ease volatility in the amount of JGB market issuance across fiscal years. For instance, when it is predictable that bond redemption will be concentrated in a certain fiscal year, which could lead to a sharp rise in the issuance of Refunding Bonds, the amount of JGB issuance across fiscal years can be levelled by issuing front-loading Refunding Bonds in a year before the concentration. In addition, front-loading issuance of Refunding Bonds can serve to address market impacts volatile fiscal needs may have.
Korea	Yes	Issuance amounts are adjusted depending on the market situation on a monthly basis
Republic of Latvia	Yes	Russia invasion in Ukraine and current market volatility has changed a time of deciding on government bond auctions. For example, for auctions we used to do it at least 4 days in advance, but now has decreased to 1-2 days, to decide on particular bonds that would be most relevant for investors under market conditions at that moment.
Lithuania	Yes	Potential risk factors are considered to some extent, however, we publish our auction calendar for three months in advance and auction details 5 working days in advance, so we have little flexibility to react if markets open in a bad shape on the day of the auction. We tend to manage risk by adjusting the borrowing amounts if needed. Since Russia's invasion into Ukraine, we have reviewed our auction calendar by shortening the maturities of the bond offered because there was higher demand.
Luxembourg	Yes	
Mexico (Local)	Yes	The Annual Borrowing Plan and Quarterly Securities Auction Calendars are designed taking into account potential risk factors. The auction calendars are flexible in order to respond to changes in demand from local and foreign investors, as well as cash flow needs in the treasury account
Mexico (External)		
Netherlands	Yes	We are now considering the potential risk of a decrease in the government's funding needs during the year and the uncertainties in the cash forecasting in the financing plan for 2023.
New Zealand	Yes	We take a strategic approach to our bond tender issuance, pre-announcing the full details of the auction calendar a month in advance. We avoid scheduling auctions: • On the day of meetings of the Reserve Bank of New Zealand (RBNZ) • On the day of significant fiscal announcements such as the Budget or release of Crown accounts • During the New Zealand summer holiday period, where there is the risk of low participation By contrast, the precise timing of syndications is based on a tactical assessment of when will provide optimal investor participation, long with a focus on minimising any event risk. Potential risk factors are considered in detail when choosing a date. We also maintain flexibility for the volume of Treasury Bill and Inflation-Indexed Bond tender issuance by announcing the volumes and maturities the day prior to the tender.
Norway	Yes	Issuances in both bills and bonds are spread over the year. An auction calendar for the whole year is published in December the preceding year. The normal auction amount in reopenings is NOK 2-3 billion. Should we experience any challenges in covering the auctions, we might consider increasing the number of auctions and reduce the volume in each auction. Auctions may also be cancelled.
Poland	Yes	In the annual auction calendar, the dates of the auctions are planned on days when there are no decisions of central banks (ECB, Fed, NBP) as well as rating agencies' decisions regarding Poland. In monthly plans, the offer of domestic T-bonds at auctions is adjusted on an ongoing basis to the current and forecast market and budget situation.
Portugal	Yes	Contrary to T-Bills, Portuguese Treasury and Debt Management Agency (IGCP) does not have a defined auction calendar for T-Bonds (Portuguese Government Bonds (PGB)). Instead, there are two issuance windows per month (2nd and 4th Wednesday of each month) and on the Friday of the week preceding the auction date we confirm (or not) the tender and announce the lines to be opened and the target size for the auction. Usually we skip the less liquid windows as August and December.
Romania	Yes	Yes, we take into consideration the market participants feedback, including potential volatility in the demand, regional evolution and future official announcements which might impact de auctions.

	Answer	Comment
Slovak Republic	Yes	Potential risk factors are very important in Syndicate deals with large expected volumes to be sold. In regular auctions, the risks are less important. We prepare the auction calendar (dates of the auctions) for the whole year and try to avoid any changes or cancelations. We announce particular type of the offered bonds in the auctions only few weeks before the auction, following the actual demand/feedback from the PD and investors.
Slovenia	No	It would be too limiting to adjust to potential risks, which are difficult to identify and prioritize in the given volatile and often un-predictable circumstances. Nevertheless, we adjust the auction calendar (please note that we only T-Bills via auctions) to events and situations that evolve in the course of the year.
Spain	Yes	We always make prudent estimates for our funding plan, taking into account all potential risk factors that we are aware of. This allows us to publish a prudent funding estimate, which we can revise downwards later in the year, once the year's funding needs are clearer.
Sweden	No	
Switzerland	Yes	See Q5.
Türkiye	Yes	The Turkish Treasury shares the main framework of the yearly borrowing plan through the Treasury Financing Program announcement. Throughout the year, in the end of each month further details on the auction calendar are shared in the 3-month borrowing strategy. During the preparations of each announcement, Debt Office receives monthly and yearly risk assessments from the Risk Department. These assessments include simulation based analyses are carried out in order to assess the cost - risk profile of the debt stock and to design the main debt management policy of the Turkish Treasury. In addition to those quantitative assessments, other qualitative potential risk factors, like geo-political or operational, are also considered during the final evaluation stage. During the borrowing strategy development process, potential risk factors such as volatility in global economy, regional concerns, geo political risks are considered.
UK	Yes	The key high level risks taken into account from the debt management perspective when preparing the UK's annual financing remit are: interest rate risk, refinancing risk, inflation risk, liquidity risk and execution risk. An assessment of these risks (alongside an assessment of cost and the pattern of demand) will impact the skew of issuance both between nominal and inflation-linked gilts and, within conventional gilt issuance, the split between maturities. The assessment can also impact the number, type, size and scheduling of gilt operations. With respect to some of the larger more global risks cited (e.g. local/global financial risks and changes to monetary conditions), we aim to adapt to any changes in market conditions as appropriate, after consultation with a wide range of market counterparties.

Table A A.12. Q7 Do you have a full business continuity and disaster/incidence recovery plan for the DMO?

	Answer	Comment
Australia	Yes	Annually
Austria	Yes	There is a full disaster recovery plan in effect. This plan is reviewed every year. Every three months there is a test of the fallback system.
Belgium	Yes	An internal workgroup discusses and reviews the plans every 1.5 – 2 months
Brazil	Yes	Once a year or more if needed
Bulgaria	No	
Canada	Yes	Reviewed/revised/tested every 6 months.
Chile	No	
Colombia	Yes	Annually
Costa Rica	Yes	The National Treasury of the Ministry of Finance has a business continuity plan, which involves the activities and functions it performs in terms of debt management. The plan was drawn up in 2019, to date it has not been updated, given the cyberattack situation this year it will be updated at the beginning of 2023. The Ministry of Finance has a contingency protocol in place to ensure business continuity.
Croatia	No	
Czech Republic	No	
Denmark	Yes	As part of the Danish Centralbank we use the disaster recovery plan for the Centralbank.
Estonia	No	
Finland	Yes	Annually
France	Yes	It is revised at least every year.
Germany	Yes	on a continuous basis

	Answer	Comment
Greece	Yes	
Hungary	Yes	Annually
Iceland		
Ireland	Yes	annually
Israel	Yes	Annually.
Italy	Yes	The DMO relies on the Treasury Department ICT infrastructure, based on an Active/Active Data Centers architecture. The Data Centers are physically located in two different sites more than 10 km away. Load balancers are used to split the workload and synchronous replication is adopted to maintain data alignment between the two Data Centers. Further, a local tape backup is performed on a daily basis to provide a recovery point in case of a severe out-of-service affecting both the Data Centers. The plan is reviewed yearly.
Japan	Yes	We formulated the Business Continuity Plan including Operation Guidelines on how to carry out high priority operations in the event of a disaster and revise it every year
Korea	Yes	Review and revision are made when the crisis situation is expected to occur.
Republic of Latvia	Yes	Yes, the plan has been regularly revised and updated according to the most actual situation
Lithuania	Yes	Annually
Luxembourg	Yes	On an annual basis
Mexico (Local)	Yes	We do have a continuity plan, we have alternate offices and we have the possibility of work remotely
Mexico (External)		
Netherlands	Yes	Annually
New Zealand	Yes	The Business Continuity Plan is reviewed and revised on an annual base.
Norway	Yes	Annually
Poland		Ministry of Finance (MoF) implements a business continuity management system. Some business processes carried out by Public Debt Department have been identified as critical for MoF. Business continuity plans have been developed for these processes and will be tested after the comprehensive implementation of business continuity solutions in MoF. The planned date of the tests is the second quarter of 2023. In addition, IT services are provided to the MoF by a specially established unit - IT Center of the Ministry of Finance. Some of its tasks include providing and maintaining IT services at the MoF and managing the availability, continuity and capacity of IT services (including disaster recovery plans for IT systems).
Portugal	No	IGCP has a Disaster Recovery Center where backup of critical system is hosted and daily updated.
Romania	Yes	Annual
Slovak Republic	Yes	Annually.
Slovenia	Yes	There is no prescribed period for the review/update of the plan.
Spain	No	
Sweden	Yes	At least once a year.
Switzerland	Yes	The DMO is part of the Federal Finance Administrations business continuity management. On top of that, we conduct yearly business continuity testing in a second location to test all our processes.
Türkiye	Yes	There is an ongoing for establishing an Emergency Action Plan within the Ministry for the front office operations. Besides, there is an business continuity and disaster/incidence recovery plan for the whole mid (risk) and back office operations and the plan is reviewed at least once in a year.
UK	Yes	The DMO has a detailed Business Continuity Plan together with supporting documentation which are reviewed and updated regularly. DMO staff have received a copy of the Incident Management Team's two-page guide that explains how incidents will be managed. The Incident Management Guidance is reviewed quarterly. The Incident Management Team works through exercises on a quarterly basis to ensure its readiness to manage future incidents when they arise. The Incident Management Team successfully managed three incidents caused by external factors throughout financial year 2021-22. The DMO carried out quarterly communication tests for the whole organisation so we have confidence that we can communicate with all staff during an incident

Table A A.13. Q8 How are your cyber security measures managed/structured?

Country	Comment	Use/share arrangements with your Government	Custom arrangements used specifically by the DMO	Country additional notes (comments might include e.g. purchased security software but managed by DMO staff, or outside security company manages arrangements etc.):
Australia	Large liquidity buffer provides the flexibility to step away from markets for a number of weeks without impeding capacity of Government to meet its obligations. Overdraft facility available through the central bank as well.	X		as AOFM systems are housed within the Commonwealth Treasury's network we rely on their cyber security arrangements and leverage their reporting measures. Additionally, we comply with and report on the Attorney-General's Department's Protective Security Policy Framework, which requires us to monitor the cyber security arrangements of our service providers.
Austria	There is a fallback data center which houses the fallback system. In the case of an emergency this will be utilized to continue the regular business of the DMO.	X		Internal network ranges, applications and clients are managed by DMO staff.
Belgium	All of our payments are made by our national bank, so we mostly rely on their systems and the Target infrastructure. Our internal business continuity group does take into account situations where the normal exchanges and communications with our central bank are hampered.	X		The BDA relies on IT material, network and safety measures (a.o. firewall, parallel servers, …) of the Belgian State
Brazil	The major IT payments systems use a dedicated network environment, preventing from general cyberattacks. Also, there is a strong backup strategy to prevent data loss.	X		
Bulgaria	The Bulgarian National Bank acts as a fiscal and paying agent of the government and organizes the government securities auctions. The Ministry of Finance has established links with the Bulgarian National Bank.	X		
Canada	Cyber threats represent a continued vulnerability given the interconnected nature of the financial system. With the ongoing war in Ukraine, state-sponsored cyber-attacks are occurring with greater frequency and sophistication, increasing the risk of a successful attack on a Canadian financial institution or financial market infrastructure. Such an attack could have far-reaching effects on the broader financial system. The following measures are in place to address these contingencies: • Multiple Data Centres able to be leveraged. • Internal Cyber Response Team provides 24/7 monitoring and response capabilities and fully integrated into the Bank's Incident Management Team. • DMO has contingency plans in place for alternate processing capabilities in the full/partial absence of technology.		X	• Fully functioning internal Cyber Security group. • Internal Cyber Response Team provides 24/7 monitoring and response capabilities and fully integrated into the Bank's Incident Management Team. • We also work hand-in-hand with our federal governments Cyber Security departments and employ various third parties providing additional cyber protection (e.g., DDOS protection, etc.)
Chile	The back office functions are performed by our Treasury Department, which has a business		X	

Country	Comment	Use/share arrangements with your Government	Custom arrangements used specifically by the DMO	Country additional notes (comments might include e.g. purchased security software but managed by DMO staff, or outside security company manages arrangements etc.):
	continuity plan in case of cyberattack			
Colombia	There is an alternate site that has connection with the Central Bank. In the event of a cyberattack, operations will be carried out through the alternate site.			
Costa Rica	The service providers for negotiation, placement, registration and payment of internal debt (and external only payment), which are the Central Bank of Costa Rica, the National Stock Exchange, activated contingency or business continuity mechanisms, so as not to interrupt the service at the country level. The internal processes of affectations and budgetary records, suffered problems, and delays due to the fall of internal systems of the Ministry of Finance. The Technology Department of the Ministry of Finance immediately activates containment and recovery protocols for the systems, which have been implemented in environments with reinforced security measures to guarantee business continuity.		X	
Croatia		X		
Czech Republic		X		
Denmark	It's outside our domain – But sufficient contingencies is in place.	X		The Centralbank handles these risk.
Estonia	Government owned IT systems have a central protection by government agencies. DMO operations depend also on the general internet connectivity (although some contingency procedures are also in place) and cyber security level of commercial banks/national central bank that are used for debt and other payments.	X		
Finland	We have implemented various measures to safeguard funding and payments during possible cyber attack.	X	X	
France	We regularly improve our cyber security lines of defense.	X		Our cyber security is directly managed by the ministry of finance and economy.
Germany	We take several actions to prevent, detect and stop cyberattacks and to restore systems and data in case of incidents following the BSI IT-Grundschutzstandards		X	
Greece	Follow the procedures of the disaster plan	X	X	
Hungary	• Intraday database/file system back-up • Secondary location (geographically different from the DMO's headquarters) • The possibility to hold auctions at the premises of the Budapest Stock Exchange		X	
Iceland				
Ireland	Large cash balances Business continuity site		X	
Israel	The Government Debt Management Unit has	X		

Country	Comment	Use/share arrangements with your Government	Custom arrangements used specifically by the DMO	Country additional notes (comments might include e.g. purchased security software but managed by DMO staff, or outside security company manages arrangements etc.):
	emergency protocols; during cyberattacks there are alternative methods in place to maintain critical functionality			
Italy	Through a structured and collaborative model (with all government Entities in charge), which makes use of suitable professionals, custom software and hardware and software market products, all the activities that affect the infrastructures are analyzed daily and those not recognized as reliable are blocked in advance. Furthermore, to ensure the continuity of services, the infrastructure is distributed over two datacenters, located in two distinct geographic locations, which operate under business continuity. The Department of the Treasury can therefore bear the loss of an entire datacenter plus half of the infrastructure of the second datacenter without interruption of service. Finally, in the unlikely event that both datacenters become unavailable, the Department of Treasury has updated copies of all data, stored in special fireproof safes, available for immediate recovery of systems, services and data.	X		Although the Department of the Treasury makes use of dedicated technologies and services, the cybersecurity strategy, the measures to be adopted and the other aspects relating to cybersecurity are always shared with the relevant government Entities, in a bidirectional collaborative regime.
Japan	Based on the government information security regulations, we implement the security measures. And, we operate systems related to JGBs, including the JGB auction system, in an offline environment. In addition, we are prepared to respond to unforeseen circumstances by applying software security patches and implementing their version upgrades, updating anti-virus software and conducting regular scans, and backing up data	X		
Korea		X		BOK-Wire+ (financial network of the Bank of Korea) is used for the issuance process
Republic of Latvia	We have taken precautions to protect sensitive information against unauthorized access and its processing. Also we have certification to the International Information Security Standard ISO 27001 which provides reassurance	X		
Lithuania		X		
Luxembourg		X		
Mexico (Local)	In Mexico exists the National Digital Strategy 2021-2024, which among other objectives promotes a general information security policy that seeks to preserve the confidentiality, availability and integrity of the information protected by the Institutions, for this, it has been implemented an Approved Protocol for the Management of Cyber Incidents among all the Institutions of the Public Sector, in addition, security evaluations are coordinated in the Institutions for the detection of threats and thus improve the management of information security risks. There is also the National Cyber	X		

Country	Comment	Use/share arrangements with your Government	Custom arrangements used specifically by the DMO	Country additional notes (comments might include e.g. purchased security software but managed by DMO staff, or outside security company manages arrangements etc.):
	Incident Response Center that promotes good prevention and reaction practices.			
Mexico (External)				
Netherlands	Business continuity plan, including back-up and recovery, as well as alternative procedures for doing transactions and settlements.		X	Shared arrangements with the government/ministry, with exceptions on specific areas such as security monitoring
New Zealand	In addition to a range of technology controls, we would look to our transactional banker and other government financial institutions to initiate payments under our instruction.	X	x	Security is actively managed by DMO staff, leveraging cross-government and vendor capability.
Norway	The DMO is organized as a separate unit in Norges Bank and we share cyber security measures with the rest of the central bank.			The DMO is organized as a separate unit in Norges Bank and we share cyber security measures with the rest of the central bank.
Poland	1) Information security management system and solutions regarding rules of information security are developed 2) As far as the debt payments are considered in the case of cyberattack (understood as WAN failure) agreements between MoF and National Depository for Securities and State Treasury Payment Agents (National Bank of Poland and Bank Gospodarstwa Krajowego) make it possible to deliver payment instruction using alternative channels to provide information. It is also possible to deliver the instructions in paper form, duly signed and stamped.	X		Public Debt Department is a part of Ministry of Finance. There are 2 Departments responsible for cyber security: Security and Data Protection Department (sets the rules) and IT and Projects Management Department (coordinates tasks related to cybersecurity). Ministry of Finance cooperates with IT Center of the Ministry of Finance, Computer Security Incident Response Team (CSIRT GOV) and the Government Plenipotentiary for Cybersecurity.
Portugal	Data backup A Disaster Recovery Center where backup of critical system are hosted and daily updated Redundant connections (different routes).	X	x	Among others SIEM, endpoint security, network segregation, security awareness, strong authentication
Romania	The Ministry of Finance owns a secondary data center from which payment operations can be carried out. In addition, the auctions are carried out through the NBR, which has the necessary infrastructure to carry out these operations under the conditions of a cyberattack		X	
Slovak Republic	2 back up sites. Continuity plan	X	X	We are using both or mixed arrangements
Slovenia	The legal basis of information security and regulation of measures to achieve a high level of network and IS security: Information Security Act (ZInfV) - http://www.pisrs.si/Pis.web/pregledPredpisa?id=ZAKO7707 Resolution on the national security strategy of the Republic of Slovenia (ReSNV-2)- http://www.pisrs.si/Pis.web/pregledPredpisa?id=RESO124	X		The Government Information Security Office (GISO) is the competent national authority in the field of information security, which acts as a government office. Its core mission is to increase resilience to cyber threats that can threaten individuals, businesses, government and society at large. GISO connects stakeholders in the national information security system and coordinates the operational capabilities of the system

Country	Comment	Use/share arrangements with your Government	Custom arrangements used specifically by the DMO	Country additional notes (comments might include e.g. purchased security software but managed by DMO staff, or outside security company manages arrangements etc.):
	Adopted cyber security strategy, which establishes a system for ensuring a high level of cyber security- https://www.gov.si/assets/organi-v-sestavi/URSIV/Datoteke/Dokumenti/2022-03-NOKI.pdfhttps://www.gov.si/assets/ministrstva/MJU/DID/Cyber_Security_Strategy_Slovenia.pdf National Cyber Incident Response Plan- https://www.gov.si/assets/organi-v-sestavi/URSIV/Datoteke/Dokumenti/2022-03-NOKI.pdf Cyber risk assessment https://www.gov.si/assets/organi-v-sestavi/URSIV/Datoteke/Dokumenti/Ocena_kibernetskih_tveganj_v1_0_Fina_P.pdf			at a strategic level. It pays particular attention to subjects under the Information Security Act (ZInfV) from the group of essential service providers in the fields of energy, digital infrastructure, drinking water supply and distribution, healthcare, transport, banking, financial market infrastructure, food supply and environmental protection, from a group of digital service providers and from a group of state administration authorities. GISO is also the single point of contact to ensure cross-border cooperation with the relevant authorities of other EU Member States and with the European CSIRT Network and other international cooperation tasks. Through its own inspection service, it oversees the implementation of ZInfV. Due to being tasked with informing the Government and the National Security Council (NSC) in the case of critical incident or cyber attack, GISO is also placed within the national security system. SI-CERT (Slovenian Computer Emergency Response Team) is a designated national computer security incident response team (CSIRT) that operates within the framework of the ARNES (Academic and Research Network of Slovenia) public institute. According to tasks and responsibilities identified by NIS Directive it monitors incidents at a national level, provides early warning, alerts, announcements and dissemination of information to relevant stakeholders about risks and incidents, responds to incidents and provides risk and incident analysis and situational awareness. SI-CERT performs risk and incident handling in accordance with Article 28 of the Information Security Act, which defines following responsibilities: To the subjects for which it is responsible SI-CERT offers methodological support, help and cooperation in case of an incident; Accepts data about risks and vulnerabilities in the area of information security, shares the data with the affected systems administrators, and issues warnings; Cooperates in the network of CSIRT groups and also in other international cooperation networks; Cooperates with CSIRT groups and

Country	Comment	Use/share arrangements with your Government	Custom arrangements used specifically by the DMO	Country additional notes (comments might include e.g. purchased security software but managed by DMO staff, or outside security company manages arrangements etc.):
				security-operations centers in the Republic of Slovenia and CSIRT groups in other EU Member States; Raises awareness of users in the area of information security; Issues warnings about the risks and vulnerabilities in the area of information security; Cooperates with the competent national authority and offers information upon request about performing SI-CERT's competencies on the basis of this Act. SI-CERT also independently operates the Safe on the Internet national awareness programme on information security and participates in the SAFE-SI project. The SI-CERT response centre's services are available to the general public. SI-CERT is financed from the fund provided to the Arnes public institute by the Government Information Security Office, which is the competent national authority in the field of cyber-security. Measurement and monitoring of incidents is published in semi-annual reports
Spain	The Spanish Ministry for Economic Affairs has multiple cyberattack measures put in place, with secure internal networks, 2-factor authentications and secure digital signatures, among others. Additionally, as our financial agent, the Bank of Spain also contributes other cyber-security measures. They have protocols put in place to guarantee the safety of our primary market issuance, with all transactions occurring inside their own safe networks. Similarly, with payments on our outstanding debt, there are multiple measures put in place together with the Bank of Spain as our payments agent, so that we can guarantee the safety of these procedures. Despite the safety of the measures currently in place, there are also contingencies in the case our network were compromised. The fact that we use an internal network would allow us to isolate from any problems. And in the case the private network itself were compromised, there are redundancies in place to continue operations as normal, both for payments and for primary market issuance.	X		The management of our cyber security is something done on the level of the entire Ministry for Economic Affairs and Digital Transformation. The Spanish Treasury has its own IT staff, but they function as a part of the Ministry for Economic Affairs. Aside from our Ministry, the Bank of Spain's cyber security is also key for the DMO. Since they act as our financial agent, their security measures are vital for our operations. Their cyber security management doesn't fall under our control, but since they're a part of the Eurosystem, their security measures are up to the highest standards and we coordinate with them on this topic.
Sweden	Dialogue with Central bank and commercial counterparts	X	X	
Switzerland	The Swiss DMO is part of the Federal Administration and uses the infrastructure of the Federal Government. The DMO is not	X		The Swiss DMO is part of the Federal Administration and uses the infrastructure of the Federal

Country	Comment	Use/share arrangements with your Government	Custom arrangements used specifically by the DMO	Country additional notes (comments might include e.g. purchased security software but managed by DMO staff, or outside security company manages arrangements etc.):
	responsible for cybersecurity on its own. For our funding activities, we mainly use the infrastructure provided by the SIX Swiss Exchange and the Swiss National Bank.			Government. The DMO is not responsible for cybersecurity on its own.
Türkiye	General Directorate of Information Technologies is responsible for ensuring the continuity of operations in case of a cyberattack event.	X		
UK	The DMO has implemented number of security controls and contingency measures to protect the confidentiality, integrity and availability of the DMO IT systems that support the business operations. The DMO has two data centres. Additionally, the DMO has a Cyber Incident Response retainer - an external cyber incident management service provider to help restore and recover from cyber-attack incidents. The DMO has also put in place security tools to identify, detect, protect, respond and recover from cyber incidents		X	The DMO has purchased security software but managed by the DMO internal security team. Security measures are verified by external assessments like SWIFT CAF, penetration testing, third party reviews and Departmental Security Health Checks (DSHC).

Table A A.14. Q9 Has your DMO been involved in experimental projects on blockchain / distributed ledger technology (DLT)?

	Answer	Comment
Australia	No	
Austria	Yes	1) The OeKB - which acts on behalf of OeBFA as the auction agent for government bonds and bills - introduced a Blockchain-based data notarization for the government auction in October 2018. Blockchain-based data notarization involves using an encryption method for documents to derive a unique electronic fingerprint, known as the hash. This hash is unambiguously assignable to the original document, but conversely does not allow conclusions to specific data content. This notarization service provides a trail to verify the authenticity of data, thereby ensuring the greatest possible degree of data security. Notarization is a new additional support element for the auction process. 2) DELPHI In July 2021, the Oesterreichische Nationalbank (OeNB) joined forces with the OeKB CSD, the Austrian Treasury (OeBFA), Raiffeisen Bank International and Erste Group Bank to launch a joint research project (DELPHI / Delivery vs. Payment Hybrid Initiative) to simulate both the issuance and settlement of Austrian government securities as security tokens on a blockchain platform. Besides exploring digital bond issuance and related processes, DELPHI addresses the legal requirements – with a view to assessing compatibility with applicable EU and national law. Moreover, another DELPHI substream evaluates the potential for tailoring the project's solution to evolving market needs.
Belgium	No	
Brazil	No	
Bulgaria	No	
Canada	Yes	The Bank of Canada began experimenting with blockchain in 2016 with a series of experiments under the name Project Jasper. In Phase 1 and 2, in partnership with Payments Canada and the large Canadian banks, we built interbank wholesale payments systems using Ethereum and Corda, respectively. In Phase 3 we built a securities settlement system for DvP settlement of equity transactions in central bank wholesale money. In Phase 4, with the Bank of England and Monetary Authority of Singapore, we investigated frictions in cross-border payments and built a cross-border payment system between Singapore (using a Quorum platform) and Canada (using a Corda platform). We are continuing to investigate blockchain for possible use in securities settlement or possibly in a retail CBDC. All of this work has been to better understand the technology, its benefits, and its limitations. No decision has been made about using blockchain for any use case. Reports summarizing our research and conclusions can be found at https://www.bankofcanada.ca/research/digital-currencies-and-fintech/projects/.
Chile	No	The Central Bank of Chile has made an assessment of the pros and cons of implementing a Central Bank digital

	Answer	Comment
		currency, but it is not related to DMO initatives
Colombia	No	
Costa Rica	No	
Croatia	No	
Czech Republic	No	
Denmark	No	
Estonia	No	
Finland	No	
France	Yes	In June 2021, the Agence France Trésor has participated in the simulation of a permssioned blockchain issuance of bonds, followed by several secondary market operations. The experimentation was conducted in relation with the Banque de France as well as with primary dealers and the French CSD Euroclear.
Germany	No	
Greece	No	
Hungary	No	
Iceland	No	
Ireland	Yes	ECP blockchain project
Israel	Yes	The Government Debt Management Unit, in partnership with the Tel Aviv Stock Exchange (TASE), is formulating a joint project to test the business and technological feasibility (Proof of Concept or "POC") of issuing State of Israel government bonds in a digital format. The digital bonds would be issued on a new platform for trading and clearing digital assets, based on Distributed Ledger Technology ("DLT"), smart contracts, and tokenization. The POC will be carried out by a joint working group that includes representatives from the Accountant General's Office, technology suppliers, as well as a select number of Market Makers. As part of the project, a new process for issuing digital government bonds will be defined. From this process, certain segments will be selected to run the POC feasibility test. The POC may include crediting the accounts of the selected Market Makers with digital bonds, clearance of digital bonds, etc. It is important to note that at this stage any digital bonds issued would be dummy bonds, purely for POC purposes, no actual securities and/or funds will be transferred. The TASE and the Accountant General's Office will, at the project's conclusion, examine the added value and relevance of the innovative processes tested and developed. With the hope that the project will help improve how those processes are carried out today.
Italy	Yes	The Department of the Treasury has participated in various study groups related to distributed ledger technology and blockchain. Although there is no practical implementation yet, these technologies are points of interest for the foreseeable future.
Japan	No	
Korea	No	
Republic of Latvia	No	
Lithuania	No	
Luxembourg	No	
Mexico (Local)	Yes	The Development Bank have explored this type of opportunities. As an example, in november 2021, Nafin successfully placed 10 billion pesos, through 3 stock certificates in the local market, 2 of them sustainable with a digital focus. The financial design of this bond is unique in its kind as it incorporates a digital approach to safeguard the sustainability criteria associated with the issue. With this issue, Nafin contributes to the development of a local market for sustainable instruments by establishing market benchmarks for corporate sustainable financing programs. The resources will be allocated to priority investment projects to promote national and regional economic development, with special emphasis on those that contribute to achieving a balance between social, economic and environmental factors. This issuance is in line with Nafin's accreditation as a Direct Access Entity with the Green Climate Fund.
Mexico (External)		
Netherlands	Yes	The project we are involved in tries to use Blockchain technology to compact the settlement process of Euro Commercial Paper (ECP) issuance from a couple of hours with a lot of manual steps into an automated process that takes only a couple of seconds. This will lead to more possibilities for T+0 settlement of ECP and therefore longer access to daily liquidity. Within the project multiple issuers and investors are involved as well as legislators and other governing bodies. More generally we are monitoring developments around digital (blockchain) bonds and potential benefits and costs but do not have concrete plans to issue (pilot) digital bonds in the near future

	Answer	Comment
New Zealand	No	We engage with peers, and keep across developments in this space, but have no active projects to leverage DLT.
Norway	No	
Poland	No	
Portugal	No	
Romania	No	
Slovak Republic	No	
Slovenia	No	Legislation that would comprehensively regulate blockchain technology has not yet been adopted in Slovenia. Due to the risks that exist in dealing with virtual currencies, this area is partially regulated by the Law on Prevention of Money Laundering and Financing of Terrorism (ZPPDFT-2). Article 3 of the law defines the concept of virtual currency. Research or a comparative review within the framework of the Parliament on the subject of Blockchain technology exists.
Spain	No	The Ministry for Economic Affairs in Spain, to which the Spanish Treasury belongs has recently also incorporated the Digital Transformation under our Ministry's responsibilities. The Spanish Treasury participates in talks regarding the development of a Euro-area Central Bank Digital Currency (CBDC), but the DMO is not directly involved in these discussions.
Sweden	No	
Switzerland	No	The Swiss DMO does not have a mandate in this area; this is part of the mandate of other parts of the Federal Administration and the Swiss National Bank. The Swiss National Bank as well as the Swiss Exchange SIC with their Swiss Digital Exchange SDX – the world's first regulated DLT-based financial market infrastructure – are active in the field of DLT. E.g. BIS, SNB and SIX have successfully tested wholesale CBDC settlement with banks ("Project Helvetia"). Another Example is "Project Jura", where Banque de France (BdF), SNB and BIS have successfully completed an experiment in cross-border wholesale CBDC.
Türkiye	No	
UK	No	Ministers at HM Treasury have announced that the UK government is undertaking a programme of work to understand how Distributed Ledger Technology could be applied to the lifecycle of a sovereign debt instrument. The UK DMO is working with HM Treasury on this project, which will take place over a multi-year programme of work.

Table A A.15. Q10 From a public debt management perspective, what are the potential advantages of the use of a wholesale CBDC?

Country	Facilitate tokenized securities	Safer processing of securities settlement	Quicker processing of securities settlement	Reduce counterparty risk	Improve non-residents' demand at auctions	Improve confidentiality and traceability of transactions	Specify (i):	Specify (i):	Specify (ii):	Specify (ii):
Australia										
Austria			X							
Belgium		x	x			x				
Brazil				X	X	X				
Bulgaria										
Canada	X	X	X	X						
Chile	X									
Colombia										
Costa Rica										
Croatia		x	x							
Czech Republic										
Denmark	X						Not sure there is any specific advantages for a wCBDC compared to the existing system.	X		
Estonia							We have not explored this topic and cannot specify any advantages at the moment	X		
Finland										
France	X		X	X	X					
Germany										
Greece		X	X	X						
Hungary							such instruments are in the very early phase of development and testing, the potential advantages for public debt management cannot be seen clearly at this stage yet	X		
Iceland										

Country	Facilitate tokenized securities	Safer processing of securities settlement	Quicker processing of securities settlement	Reduce counterparty risk	Improve non-residents' demand at auctions	Improve confidentiality and traceability of transactions	Specify (i):	Specify (i):	Specify (ii):	Specify (ii):
Ireland	X	X	X	X						
Israel	X		X	X						
Italy	X		X		X					
Japan										
Korea	X		X							
Republic of Latvia							Currently, this is not a topical issue for Latvia's DMO	X		
Lithuania										
Luxembourg										
Mexico (Local)	X	X	X	X	X	X				
Netherlands	X		X							
New Zealand										
Norway										
Poland	X	X	X	X	X	X				
Portugal	X	X	X	X		X				
Romania		X	X	X		X				
Slovak Republic	X	X	X							
Slovenia	X	X	X		X					
Spain	X	X	X							
Sweden			x							
Switzerland		X		X						
Türkiye		x	x	x	x	x				
UK	X	X	X	X		X				

Table A A.16. Q11 How has the maturity structure of your 2022 issuances changed compared to 2021?

Country	Longer on average	Shorter on average	Around the same	Country additional notes
Australia			X	
Austria			X	Austria has the longest sovereign debt portfolio in the Eurozone with an average tenor of over 11 years. Because of the volatile market conditions and uncertainties regarding the further monetary policy development we decided to not increase the tenor further and continued with our conservative funding strategy. With an average tenor of around 13.70 years the bonds issued in 2022YTD* were slightly shorter than in the previous year (2021: 14.96 years). *As of September 22, 2022
Belgium			X	The average maturity of our debt is already very long (>10 years) and has even increased a little further. This is still in line with our debt management strategy.
Brazil	X			The perception of local risks has been decreasing throughout 2022, especially due to the Brazilian Central Bank signaling the end of the monetary tightening cycle, data showing a disinflationary process and an electoral scenario that brought little volatility to the market.
Bulgaria			X	
Canada		X		The Government of Canada manages its funding plan according to the annual Debt Management Strategy (DMS). The funding plan for fiscal year 2022-23 was released in April 2022 and can be found here: Annex 2: Debt Management Strategy | Budget 2022 Canada will continue, as much as possible, to fund the remaining COVID-19-related debt through long-term issuance. This strategic direction will provide security and stability to the government balance sheet by lowering annual debt refinancing needs and providing more predictability in public debt charges. Over the course of 2021-22, federal government allocation of long bonds was about 45 per cent. The government is now proposing to target about 35 per cent in long bond issuance in 2022-23 to fund the remaining COVID-19-related debt through long-term issuance while also maintaining a well-functioning market in other issuance sectors.
Chile	X			
Colombia	X			The average life of our debt increased from 9.54 years in August 2021 to 9.90 years in August 2022.
Costa Rica	X			
Croatia		x		
Czech Republic		X		The average time to maturity of newly issued medium-term and long-term government bonds was 8.8 years in 2021, while this year (end of September) it is approximately 7.6 years. A lower average time to maturity of newly issued medium-term and long-term government bonds is mainly given by the persistent uncertainty in the financial markets due to the situation in Ukraine and increased issuance activity at the short end of the yield curve in the second quarter of 2022.
Denmark		X		Less demand for duration have shortened the average maturity for issuances in 2022
Estonia			X	Estonia has minor funding needs.
Finland			X	
France		X		Average maturity of bond issuance has shortened by around 1 year on average in 2022 vs. 2021, when it was exceptionally long given the launch of

Country	Longer on average	Shorter on average	Around the same	Country additional notes
				a new 50 year bond.
Germany			X	
Greece		X		
Hungary		X		In the domestic wholesale bond market the ATM of new issuances is roughly the same (only slightly lower, partly due to the fact that the central bank stopped its QE in December 2021). T-bill issuance is higher in 2022. Foreign currency bond issuance is done with shorter maturities than in 2021.
Iceland	X			Two new series were issued in 2022. A 20 year nominal bond and a 15 year inflation-linked bond.
Ireland			X	
Israel			X	
Italy			X	Despite the worsening of market conditions in recent months, the average life of our debt remained stable compared to last year. At the end of September , the average life relative to the stock of government bonds was equal to 7.12 years, slightly above 7.11 years at the end of 2021. This was attributable to various issues on the long end of the yield curve, carried out both through auctions and with the launch - through a placement syndicate – of new benchmark securities (30-year BTP, 15-year BTP, 10-year BTP€I, 12-year BTP green, 8-year CCTeu).
Japan	X			
Korea	X			
Republic of Latvia	X	X		Change in maturities represent change of investor demand and general market situation
Lithuania		X		Average maturity increased from 12.4 years in 2021 to 6.1 years in 2022 YTD.
Luxembourg			X	
Mexico (Local)	X			Local Market Debt Given the maturity requirements of the domestic debt portfolio, the Federal Government had a preference to offer longer duration instruments to the investors. The average time to maturity (ATM) of local debt issuances has slightly increased, in 2021 was of 7.3 years; while for 2022, it was 7.8 years.
Mexico (External)		X		External Market Debt Given the global macroeconomic situation, with rising interest rates and the possibility of a recession, many investors changed their investment strategies leading to a demand for a lower duration in their portfolios. The average term to maturity of external debt issuances in 2021 in US dollars was 35 years and 19 years in euros; while for 2022, it was 18 years in US dollars and 8 years in euros.
Netherlands	X			
New Zealand			X	There are no plans to extend the New Zealand Government Bond curve beyond the 30-year point. With regular issuance into tenors across the curve, the average weighted term to maturity is expected to stabilise around current levels.
Norway	X			For the first time Norway has issued a 20-year bond, in line with the borrowing plan for 2022 released in December 2021
Poland		X		In the period from January 2022 to August 2022 the average maturity of new issuance slightly decreased from 7 years to 6.4 years.
Portugal		X		The average maturity of medium-and-long-term issuance in 2022 dropped from 14.2 year in 2021 to 12.3 years
Romania	X			Due to the market developments and monetary policy stance, the structure of maturities changed from mainly medium to long term

Country	Longer on average	Shorter on average	Around the same	Country additional notes
Slovak Republic			X	Both years the average maturity of new issuance in each year around 15 years.
Slovenia			X	On the long end of the curve a 60 year bond was issued in Q1 of 2021, while in 2022 the longest maturity issued has been a 40 year bond and the likelihood of a new ultra long new line is uncertain in the coming months /years.
Spain			X	We have made significant efforts over the past years to lengthen the average life of our debt portfolio. We finished 2021 with an average life of 8 years and we plan to finish 2022 with a similar number. This is achieved by a similar maturity structure in our issuance. One of the ways we will achieve this is with a negative net issuance of short-term issuance of 5 billion euros for 2022.
Sweden	x			Limited supply of bonds has meant we have to focus more on 10y part of the curve in order to build up the outstanding stock.
Switzerland	X			The average time to maturity of the bonds tapped in 2022 is longer than in 2021. This is mainly due to the changes in interest rates (higher yields, longer end of yield curve in positive territory whereas this part offered negative yields in most of 2021) and corresponding higher demand for long-term bonds.
Türkiye	x	x		Türkiye's one of the main pillars of borrowing strategies for 2022 is to increase maturity of domestic borrowing. In domestic market, we have chosen to go with longer maturities in 2022. As of August 2022, cumulative domestic borrowing maturity is 65.6 months which was 53.5 months at the end of the 2021. However, due to the increased volatility in global markets, we have chosen to go with shorter maturities in international capital markets in 2022.
UK			X	The skew of issuance, which shows the amount of issuance of short (1-7 years), medium (7-15 years) and long nominal gilts (15+ years) as well as that of inflation-linked gilts is decided on a financial year basis. The planned maturity structure of conventional issuance in 2022-23 at the start of the financial year was very similar to that planned in 2021-22. The initial share of shorts rose by 0.4 percentages points (pp) compared to the start of 2021-22, that of mediums fell by 1.0pp, and the share of longs rose by 0.5pp). The proportion of planned index-linked issuance rose by a slightly larger amount by 3.8pp (to 14.9%). In the past year the UK DMO has lengthened both its real and nominal yield curves, with the launch of 0?% Index-linked Treasury Gilt 2073 in November 2021 (which lengthened the real curve by five years) and of 1?% Treasury Gilt 2073 in February 2022 (which lengthened the nominal curve by two years). In 2021-22 the weighted average maturity of issuance was 17.4 years, whereas for 2022-23, as at 7 September 2022, the weighted average maturity of issuance stands at 16.1 years.

Table A A.17. Q12 Have you changed your funding strategies during 2022 compared to any original 2022 funding plan?

(Table 1/2)

Country	Please cross:	Number of issuance of securities across the yield curve	Volume of issuance of securities across the yield curve	Issuance of money market instruments (i.e. T-Bills and repos) compared to issuance of long-term bonds	Introducing new maturity lines	Issuing new types of securities (e.g. FRNs, Green bonds, Linkers)	Auction calendar
Australia	Yes	No change	Lower	Lower	Yes	No	Yes

Country	Please cross:	Number of issuance of securities across the yield curve	Volume of issuance of securities across the yield curve	Issuance of money market instruments (i.e. T-Bills and repos) compared to issuance of long-term bonds	Introducing new maturity lines	Issuing new types of securities (e.g. FRNs, Green bonds, Linkers)	Auction calendar
Austria	Yes	No change	No change	Higher	No	Yes	No
Belgium	No						
Brazil	Yes	No change	No change	No change	Yes	No	Yes
Bulgaria	Yes	Higher	Higher	No applicable	Yes	No	Yes
Brazil	Yes	No change	No change	No change	Yes	No	Yes
Canada	Yes	Lower	Lower	Higher	No	No	No applicable
Chile	Yes	No change	Lower	Lower	No	Yes	No
Colombia	Yes	No change	Lower	No change	No	No	No
Costa Rica	Yes	No change	Higher	No applicable	Yes	No	No
Croatia	Yes	No change	No change	Lower	Yes	No	Yes
Czech Republic	Yes	Higher	Higher	Higher	Yes	No	Yes
Denmark	No						
Estonia	No	Higher	Higher	No change	No applicable	No applicable	No applicable
Finland	No	No change	No change	No change	No	No applicable	No
France	No	No change	No change	No change	No	No	No
Germany	No						
Greece	No	Lower	Lower	No change	Yes	Yes	No
Hungary	Yes	Higher	Higher	Higher	Yes	Yes	Yes
Iceland	No						
Ireland	Yes		Lower				
Israel	Yes	Lower	Lower	No applicable	No	No	No
Italy	No	No change	No change	No change	No	Yes	No
Japan	Yes	No change	No change	No change	No	No	No
Korea	Yes	No change	Higher	No applicable	No	No	No
Republic of Latvia	Yes	Lower	Higher	No change	No	No	Yes
Lithuania	Yes	No change	Higher	No change	No	No	Yes
Luxembourg	No	No change	No change	No change	Yes	No	No

Country	Please cross:	Number of issuance of securities across the yield curve	Volume of issuance of securities across the yield curve	Issuance of money market instruments (i.e. T-Bills and repos) compared to issuance of long-term bonds	Introducing new maturity lines	Issuing new types of securities (e.g. FRNs, Green bonds, Linkers)	Auction calendar
							applicable
Mexico (Local)	No	Higher	Higher	No change	Yes	Yes	Yes
Mexico (External)	No	No applicable	No applicable	No applicable	No applicable	No applicable	No applicable
Netherlands	Yes	Lower	Lower	Higher	No applicable	No applicable	No
New Zealand	Yes	No change	No change	No change	No	Yes	No
Norway	No	No change	No change	No change	No	No	No
Poland	No						
Portugal	Yes	No change	Lower	No change	No	No	No
Romania	Yes	No change	Higher	No change	No	No	Yes
Slovak Republic	No						
Slovenia	Yes	Higher	No change	No change	No	No	
Spain	No						
Sweden	No						
Switzerland	Yes	No change	No change	Lower	No	No	No
Türkiye	Yes	Higher	Higher	Lower	Yes	Yes	No
UK	No	No change	Higher	Higher	Yes	No	Yes

Table A A.18. Q12 Have you changed your funding strategies during 2022 compared to any original 2022 funding plan?

(Table 2/2)

Country	Frequency of auctions	Post-auction option facility (non-competitive bids)	Buybacks	Switches (including conversion)	Use of syndications	Use of private placements	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SPECIFY	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SELECT	Country additional notes
Australia	No change	No applicable	No applicable	No applicable	No change	No applicable			
Austria	No change	No change	No change	No change	No change	Higher			Issuance of green bills was a new feature in 2022.
Belgium									
Brazil	No change	No change	No change	No applicable	No applicable	No applicable	No applicable	No applicable	The only changes we made comparing to the original 2022 plan were in the floating rate bonds (LFT) benchmarks. We started 2022 issuing 2 LFT maturities (3-years and 6-years). From the second quarter on we changed to only 1 (6-year). We also altered the original planned maturity of the 6-year LFT from Sep/28 to Mar/29 in the last quarter.
Bulgaria	Higher	No applicable	No applicable	No applicable	No applicable	No applicable			
Brazil	No change	No change	No change	No applicable	No applicable	No applicable		No applicable	
Canada	No change	No change	No change	No change	No change	No applicable			Due to lower than projected financial requirements, Canada has cut planned issuance across tenors for fiscal year 2022-2023. This has included suspending issuance in the 50Y sector, along with lower volume of issuance across the yield curve.
Chile	Lower	No applicable	No change	No change	No change	No applicable			Due to lower fiscal needs, the original debt issuance plan, which contemplated USD 21bn, was adjusted to USD 15 bn
Colombia	No change	No change	No applicable	No change	No applicable	Lower		No change	

Country	Frequency of auctions	Post-auction option facility (non-competitive bids)	Buybacks	Switches (including conversion)	Use of syndications	Use of private placements	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SPECIFY	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SELECT	Country additional notes
Costa Rica	No change	No applicable	No change	Higher	No applicable	No applicable		No applicable	
Croatia	No change	No applicable	No applicable	No applicable	No change	No applicable		No change	
Czech Republic	Higher	No change	No applicable	No applicable	No applicable	No applicable		No applicable	In 2022, the planned financing needs increased mainly due to higher planned state budget deficit compared to the one originally approved. Original plan of state budget deficit amounted to CZK 280 billion, actual state budget deficit, which has been approved by the government in July, is planned at the level of CZK 320 billion with a certain possibility that the final deficit approved by the Chamber of Deputies will be even higher
Denmark									
Estonia	No change	No applicable	No applicable	No applicable	Higher	No applicable		No change	
Finland	No change	No applicable	No applicable	No applicable	No change	No applicable		No applicable	
France	No change	No change	No change	No change	No change	No applicable		No change	
Germany									Our annual issuance planning published in advance is very precise, including exact sizes planned for each upcoming auction. In this respect, it is proven practice to slightly adjust the planning before a quarter if needed. However, this is not to be described as a change of funding strategy.
Greece	No change	No change	No change	No change	Lower	No change			
Hungary	Higher	No change	Higher	Lower	Higher	No applicable		No change	
Iceland									

Country	Frequency of auctions	Post-auction option facility (non-competitive bids)	Buybacks	Switches (including conversion)	Use of syndications	Use of private placements	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SPECIFY	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SELECT	Country additional notes
Ireland	Lower								
Israel	No change	No change	Higher	Lower	No change	No change		No change	
Italy	No change	No change	Higher	No change	No change	No change	Repo facility	Higher	In 2021, cash management was characterized by the introduction of the repurchase agreement (Repo) activity, which generated positive effects both in terms of efficiency in raising and investing cash and in the management of distortions in the market. The constant positive spread between BOT rates and Repo rates with the same maturity allowed, compatibly with the Treasury's cash requirements, greater flexibility and more efficient funding compared to conventional instruments. On the other hand, the targeted offer of the securities most in demand on the secondary market has allowed the reduction of specialness and limited the discrepancies between the yields of securities belonging to the same segment.
Japan	No change	No change	No change	No applicable	No applicable	No applicable		No applicable	The number of issuances of JGB and the calendar-base JGB Market Issuance of the revised FY2022 JGB Issuance Plan have not changed from those of the initial FY2022 JGB Issuance Plan. This is because the increase in the amount of newly issued bonds was offset by the reduction in the amount of front-loading issuance of Refunding Bonds.
Korea	No change	No change	No applicable	No applicable	No change	No change			
Republic of Latvia	Higher	No change	No change	No change	Lower	No change		No change	Changes are related to : 1) More exploring domestic market 2) Shorter maturities, because these reflect investor demand 3) Issuance of larger volumes to maintain increased cash buffer

Country	Frequency of auctions	Post-auction option facility (non-competitive bids)	Buybacks	Switches (including conversion)	Use of syndications	Use of private placements	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SPECIFY	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SELECT	Country additional notes
									4) Flexibility in structuring the offer in auctions 5) More regular auctions when markets are supportive and investors are active
Lithuania	No change	No change	No change	No change	Lower	No change		No applicable	
Luxembourg	No applicable	No applicable	No applicable	No applicable	No change	No applicable		No applicable	
Mexico (Local)	No change	No change	No applicable	Higher	Higher	No applicable		No applicable	
Mexico (External)	No applicable	No applicable	No applicable	No applicable	No applicable	No applicable		No applicable	Since the external debt issuances seek to cover the Federal Government needs, by taking advantage of market conditions in an opportunistic manner, they are designed to provide the most flexibility to prevailing market conditions. Therefore, the Federal Government does not have a fixed strategy throughout the year.
Netherlands	Lower	No change	No change	No applicable	No applicable	No applicable			
New Zealand	No change	No applicable	Higher	No change	Higher	No applicable			Explanation of the changes relative to original 2022 funding plans: • Issuing new types of securities: New Zealand will issue its first Sovereign Green Bond in late 2022. • Use of syndications: NZD 2.5 billion of 20 September 2035 inflation-indexed New Zealand Government Bonds have been issued via syndicated tap. • Buybacks: NZD 1.5 billion of 20 September 2025 Inflation-Indexed Bonds have been repurchased, concurrent with the syndicated tap.

Country	Frequency of auctions	Post-auction option facility (non-competitive bids)	Buybacks	Switches (including conversion)	Use of syndications	Use of private placements	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SPECIFY	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SELECT	Country additional notes
Norway	No change	No applicable	No change	No applicable	No change	No applicable			
Poland									
Portugal	Lower	No change	No applicable	No applicable	No change	No change			In 2022 the number of syndications and auctions was according with the initial plan until June (despite a lower issuance volume). In July the T-Bill auctions was canceled and an expected T-Bond auction window in that month was not used, mostly due to a better budget execution and an increase of net issuance of the retail products.
Romania	No change	No change	Higher	Higher	No change	Higher		No change	
Slovak Republic									Syndicated deal was planned for first half of the year but is postponed to second half. However, the total issuance for the year should be fulfilled as originally planned.
Slovenia			No change	No change	No change	Higher			
Spain									We have not made changes in our funding strategy with respect to our original 2022 funding plan. This is largely because of the prudent estimates that we make in our initial funding plans. Despite the outbreak of the war in Ukraine and the energy crisis across Europe, our initial funding plan has proven large enough to accommodate the increase in government spending. It is also worth mentioning that despite the increase in government spending, there has also been an increase in tax revenues which have helped finance this additional government spending.
Sweden									
Switzerland	No change	No applicable	No	No applicable	No	No		No applicable	Our original issuance program for 2022 foresaw a

Country	Frequency of auctions	Post-auction option facility (non-competitive bids)	Buybacks	Switches (including conversion)	Use of syndications	Use of private placements	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SPECIFY	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SELECT	Country additional notes
			applicable		applicable	applicable			relatively large amount of T-bills. At the same time, we knew that uncertainty over cash flows was still very elevated. Because of this we again used target ranges for our bills instead of a target volume. As the changes to our issuing program were much lower than in the previous year and we were able to hold our bill program within the target range or very close to it, we did not have to communicate the changes to the market participants.
Türkiye	No change	No change	No applicable	No applicable	No change	No change			The table given above is filled according to the domestic borrowing market data. The total domestic roll over ratio was planned to be 103% in 2022 Treasury Financing Program which was published in October 2021. Although this ratio is main target for our domestic borrowing program, investors' demand for long-term fixed-income TL-denominated securities has increased as a result of the reserve requirement, collateral and loan regulations made by the CBRT in recently. In this context, it is considered that domestic borrowing and share of long-term fixed-income TL denominated securities could be increased to meet the needs of the market, therefore the domestic debt rollover ratio may increase slightly by the end of 2022. Due to the higher amount of FX denominated borrowing operations in domestic markets, it has been revised the total amount to be raised via international capital markets operations.
UK	No change	No change	No change	No change	No change	No change		No change	A modest increase in planned gilt sales in 2022-23 was announced on 26 April 2022, when planned gilt

Country	Frequency of auctions	Post-auction option facility (non-competitive bids)	Buybacks	Switches (including conversion)	Use of syndications	Use of private placements	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SPECIFY	Others (e.g. use of repo markets for funding, changes in currency composition etc.) SELECT	Country additional notes
									sales rose by GBP 6.8 billion (to GBP 131.5 billion). The planned contribution to debt financing by Treasury bills rose by GBP 7.0 billion to GBP 30.2 billion on 26 April 2022. On 31 August 2022 the DMO announced plans to launch a new conventional gilt maturing on 29 January 2027 on 12 October 2022.

Table A A.19. Q13 Have you observed any changes in investors behaviour in participating in auctions or/ Syndications (e.g. oversized orders)?

Australia	Oversized orders from Hedge Funds in syndications remain a feature. Behavior of markets participants (investors/intermediaries) broadly unchanged from recent experience.
Austria	In 2021 the bid/cover ratio normalized with an average value of 2.29x, close to its long-term average of 2.33x (2009-2022YTD). In 2022YTD the average bid/cover ratio at government bond auctions was 2.12x. The syndicated bond issuances oversubscription was 8.18 in 2021 (='highest' value ever recorded) and 6.65 in 2022YTD
Belgium	We haven't observed any changes in auctions. The oversubscription in the syndicated transactions was a little less than in previous years, but still high compared to pre-QE years.
Brazil	Yes. The end of the monetary tightening cycle brought strong local demand for fixed rate bonds. In addition, data showing a disinflationary process in recent months led to a decrease in demand for inflation-linked bonds.
Bulgaria	The investor demand has decreased due to higher global debt market volatility.
Canada	None
Chile	During the last years, we have observed new accounts coming with an ESG mandates, which are less price sensitive than vanilla accounts.
Colombia	There have not been any changes in investor behavior in the participation in the auctions.
Costa Rica	Preference for Inflation-linked bonds, significant pressures on interest rates, as a result of increases in the Central Bank monetary policy rate. Uncertainty about the local and international macroeconomic situation, and significant dispersions in the bids received in auctions.
Croatia	Lower investor demand
Czech Republic	There was a temporary shift in demand to the shorter end of the yield curve in the first half of 2022.
Denmark	The increased volatility have led to more volatile demand at the auctions. At some auctions the event risk is very high as it might coincide with other market moves (e.g. extraordinary ECB meeting at the same time as one of our auctions.)
Estonia	Estonia is a very infrequent issuer. There was less competition in the latest T-bills auction in June 2022.
Finland	
France	No significant change
Germany	No
Greece	No
Hungary	Number of PDs interested in FRNs has slightly increased; syndications for the foreign currency denominated government bonds have been harder (more flexibility, transparent communication is needed, proper timing and volume is crucial).
Iceland	Due to steep increases in policy rates investors have been reluctant to buy longer dated T-bills (6-12 months)
Ireland	No significant changes
Israel	No significant changes
Italy	During the past syndicated transactions, in some circumstances we have noted an inflated amount of orders coming from fast money accounts that misrepresented the underlying value of the book. However, in the recent transactions, we observed a significant reduction of this phenomenon
Japan	Auction participants' behavior such as "successful Bids Share for JGBs by Investor type" and "bid-to-cover ratio" at the time of auctions has not changed in particular.
Korea	
Republic of Latvia	Yes, the demand of longer tenors mostly is limited due to the market volatility, increasing yields and geopolitical risks
Lithuania	Significantly smaller demand both in auctions and in syndicated deal, very limited oversubscription.
Luxembourg	No specific observations
Mexico (Local)	Local Market Debt Due to current market conditions, we have observed participants have shown higher demand for floating rates instruments. Foreign investors are focusing on instruments on the long-end side of the curve, revealing preferences for 10 and 30 years bonds on the run, but also on inflation-linked bonds. Additionally, some local participants have shown a preference for liquidity, demanding instruments on the short-end of the curve.
Mexico (External)	External Market Debt Due to current market conditions, we have observed that investors are currently showing more appetite for short and medium term debt than long term debt; also, they require higher liquidity premiums.
Netherlands	We don't have information on this for tap auctions as we only see the end orders from primary dealers. On the DDA side we do have more information and there seems to be no change in behavior as compared to previous years
New Zealand	No
Norway	We experience some challenges in investor demand in bill auctions. In general, high market volatility and lower liquidity will affect

Australia	Oversized orders from Hedge Funds in syndications remain a feature. Behavior of markets participants (investors/intermediaries) broadly unchanged from recent experience.
	investor behavior to some extent.
Poland	Due to monetary policy tightening cycle and geopolitical risks, market sentiment has worsened and investors demand in auctions has decreased compared to the same period of 2021. We have not observed any changes in Syndications on foreign market.
Portugal	During 2022, the order size of the books has decreased (approx. half of 2021' book size). IGCP has witnessed a drop in large orders in syndications, mostly from real money accounts and Hedge Funds (the HF accounts have dropped the relative participation more in April syndication than in January syndication). This past behavior led to a certain difficulty in assessing the quality of the demand and consequently to set the final price for new issuance.
Romania	A very high volatility of the submitted orders was observed, influenced especially by the news in the market. In addition, there were significant differences between the amounts attracted in the same month, similar auctions registering different interest. There is also a concentration of investors' interest in bonds issued in the medium and long term, especially maturities longer than 5 years and bonds included in the regional indices
Slovak Republic	Investors more cautious in placing bids in auctions because of the environment with increasing yields.
Slovenia	Less interest for taps of longer dated lines recently
Spain	Similarly to what we reported last year, we have noticed larger orders from certain investors in our syndications. Also, we have noticed a slight general upward trend in New Issue Premiums in syndications across the European Government Bond space, when compared with 2020 and 2021 funding conditions.
Sweden	
Switzerland	Participation in our auctions was more or less on the same level as in the previous year. It was surprising to see that demand for long-term bonds was higher than for medium-term bonds even though volatility was high, the yield curve was inverse in that part of the curve and monetary policy got more and more restrictive over the last 12 months.
Türkiye	Due to the higher amount of FX denominated borrowing operations in domestic markets, we have revised the total amount to be raised via international capital markets operations.
UK	Market participation at gilt auctions, as measured by the average cover ratio, has continued to remain relatively robust. The average cover ratio at gilt auctions in 2022-23 to-date is 2.49x (compared to 2.41x in 2021-22). It had been reported to us anecdotally, and we had observed, oversized orders placed at syndicated offerings (i.e. where bidders submit bids that are larger than the amount they want/expect to be allocated in the transaction). We also understand that this experience was not unique to the UK. We communicated to our primary dealers that we did not find this approach to submitted orders to be helpful, in that it may make allocations more difficult for the dealers themselves, whose responsibility it is to decide the allocations based on the DMO's high level steer. Following this communication, we have noted that the practice of overbidding has diminished.

Table A A.20. Q14 In your view, which aspects of your primary market operations might be impacted by monetary policy quantitative tightening (QT)?

Country	Issuance techniques	Instruments choice	Management of refinancing risk	Borrowing costs	Investor base	Investor demand	Markets absorption capacity of funding needs	Market volatility	Communication with fiscal authorities	Communication with market participants	Communication with monetary authorities	Other (i)	Other (i)	Other (i)	Other (ii)
Australia		X		X		X		X							
Austria				X	X		X	X							
Belgium				X		X		X							
Brazil		X	X	X	X	X	X	X	X						
Bulgaria		X	X	X		X	X	X							
Canada				X			X	X							
Chile		X	X	X				X							
Colombia			X	X				X							
Costa Rica			X	X			X	X							
Croatia		x	x	x		x	x	X							
Czech Republic				X		X		X							
Denmark							X	X							
Estonia				X		X		X							
Finland				X	X	X									
France		X		X	X	X		X							
Germany				X	X										
Greece		X		X	X			X							
Hungary		X		X	X	X	X	X							
Iceland												X	QE has been very limited in scope in Iceland.		

Country	Issuance techniques	Instruments choice	Management of refinancing risk	Borrowing costs	Investor base	Investor demand	Markets absorption capacity of funding needs	Market volatility	Communication with fiscal authorities	Communication with market participants	Communication with monetary authorities	Other (i)	Other (i)	Other (i)	Other (ii)
													Thus, QT will not have much impact.		
Ireland		X		X	X			X							
Israel		X	X	X		X	X	X							
Italy		X	X	X			X	X							
Japan			X	X	X	X				X					
Korea						X		X							
Republic of Latvia		X	X	X		X	X	X							
Lithuania				X		X	X	X		X					
Luxembourg				X	X	X	X								
Mexico (Local)		X	X	X				X							
Mexico (External)	X	X	X	X		X	X	X							
Netherlands				X	X	X	X	X							
New Zealand				X			X	X			X				
Norway	X			X		X		X							
Poland				X	X	X	X	X							
Portugal				X		X	X	X							
Romania				X	X	X	X	X							
Slovak Republic	X			X	X	X	X	X							
Slovenia		X		X		X	X	X							
Spain				X				X							
Sweden				X	X	X	X	X							

Country	Issuance techniques	Instruments choice	Management of refinancing risk	Borrowing costs	Investor base	Investor demand	Markets absorption capacity of funding needs	Market volatility	Communication with fiscal authorities	Communication with market participants	Communication with monetary authorities	Other (i)	Other (i)	Other (i)	Other (ii)
Switzerland			X	X		X	X	X		X					
Türkiye		x		x		x		x							
UK				X		X		X	X		X			X	

Table A A.21. Q15 Do you have a liquidity buffer?

	Answer	Comments
Australia	Yes	Broadly similar
Austria	Yes	There have been no changes to the liquidity buffer practice since its implementation in the light of the uncertainties around the exact cash flows surrounding the Austrian government corona package in mid-March 2020. The liquidity buffer is the financial buffer used for the daily cash flow management to deal with normal mismatches of cash inflows and outflows within a month. In 2022 it was also used to cover uncertainties surrounding the funding of anti-inflation/energy support packages by the Austrian government
Belgium	No	We typically do not hold a formal liquidity buffer. However, in 2021 the liquidity we held was higher than usual (cf 5)
Brazil	Yes	The Brazilian National Treasury built, throughout 2021, a liquidity buffer capable of paying more than 10 months of obligations, to be prepared for a period that seemed to be increasing in uncertainties (global inflation, Ukraine-Russia, domestic elections). Throughout 2022, it was possible to maintain the liquidity buffer at the same level.
Bulgaria	Yes	The country keeps a high level fiscal reserve in the central bank
Canada	Yes	There have been no changes to the liquidity buffer practice. The liquidity plan is composed of government deposits held with financial institutions and the Bank of Canada, as well as the liquid foreign exchange reserves and are managed to provide one month's worth of coverage
Chile	Yes	We don't have a formal buffer, but the Treasury normally maintains transitory cash, which in practice work as a liquidity buffer, but with no formal rules.
Colombia	Yes	
Costa Rica	No	
Croatia	No	No
Czech Republic	Yes	Liquidity buffer within single treasury accounts has been quite stable last years. There have been no changes in cash management.
Denmark	Yes	We maintain a large cash buffer, and it has been somewhat higher than anticipated due to better than forecast public finances. No questions has been asked for the desire to maintain a cash buffer.
Estonia	Yes	There have been no changes in our liquidity buffer practice. The liquidity buffer is the financial buffer used for the State's daily cash flow management to deal with normal mismatches of cash inflows and outflows within a month.
Finland	Yes	No changes to size of the liquidity buffer
France	Yes	No significant change
Germany	Yes	At the beginning of the pandemic, we significantly expanded our buffer. Since then, we have been smoothing it back.
Greece	Yes	No.
Hungary	Yes	No change in the methodology of setting the optimal liquidity buffer levels, but it resulted in higher liquidity buffer target for the year 2022 than for 2021. The volume of cash placement by the DMO has decreased in 2022, due to the abundant liquidity of banks and monetary policy measures and developments. ÁKK introduced stand-by credit lines to increase liquidity buffer in 2022. There have been no problems in managing or communicating the use of the liquidity buffer.
Iceland	Yes	No
Ireland	Yes	No
Israel	Yes	The state increased its liquidity buffer. There have been no problems managing or communicating the use of the liquidity buffer.
Italy	Yes	Any change in our liquidity buffer practice has not been introduced in the last 12 months.
Japan	Yes	Although the fund balance on the Government Debt Consolidation Fund (GDCF) had decreased by reducing the amount of front-loading Refunding Bonds according to the 3rd revision of the issuance plan for FY2020, it has recovered because of the subsequent increases in the amount of front-loading Refunding Bonds and other factors.
Korea	No	
Republic of Latvia	Yes	Increased liquidity buffer is maintained not only due to geopolitical risk and high market volatility, but to manage changing funding needs. Liquidity buffer was maintained to mitigate fiscal impact of Covid-19 pandemic, and is being kept in increased volumes at this moment No difficulties in managing or communicating the use of the liquidity buffer have been observed.
Lithuania	Yes	No changes
Luxembourg	Yes	Liquidity buffer has been increased, no problems encountered
Mexico (Local)	Yes	There has not been any changes in our liquidity buffer. The Treasury has a minimum liquidity threshold that functions as a contingency buffer. Also, Mexico has access to the IMF' Flexible Credit Line and other International Financial Institutions resources. Regarding the short-term zero coupon bonds, there is always a buffer in order to capture more

	Answer	Comments
		resources; furthermore, zero coupon bonds are on a range and they are communicated to participants on a weekly basis.
Mexico (External)	Yes	
Netherlands	No	
New Zealand	Yes	NZDM has reviewed the level of the liquidity buffer to hold on an ongoing basis to meet core objectives. The minimum liquidity buffer has been set at NZD 15 billion, which is complemented by the NZD 5 billion overdraft facility with the Central Bank. This is up from the pre-pandemic minimum liquidity buffer of NZD 2 billion, although we had recently been holding an elevated buffer due to the pandemic risks. The buffer comprises of cash and liquid highly rated financial assets denominated in New Zealand Dollars (NZD). We have had no challenges in managing or communicating the use of the new liquidity buffer.
Norway	Yes	The central government has the liquidity buffer as deposits at the central bank. There are no changes in practice over the last 12 months.
Poland	Yes	Due to elevated budget and market uncertainty the level of cash buffer remained at relatively high level.
Portugal	Yes	No changes to the liquidity buffer practice. This year's increased uncertainty of government revenues and expenditures has put additional pressure on cash forecasting. Excess cash has been surpassing the target significantly. As a result, the 2022 funding program needed to be adjusted by reducing net issuance
Romania	Yes	The policy of the Ministry of Finance is to maintain a buffer in foreign currency to cover up to 4 months the gross financing needs. The volume of this buffer may fluctuate during the year a s a result of various repayments and new Eurobond issuances. The currency buffer is hold at NBR and is not used for other purposes than budget deficit financing and repayment of the government debt.
Slovak Republic	Yes	Higher liquidity buffer due to conservative budgetary process
Slovenia	Yes	In the last period, there were no changes regarding the liquidity buffer practice. The Republic maintains a sizeable liquidity buffer which is well communicated to the market as well as mentioned by rating agencies
Spain	Yes	As mentioned in the answer of question #5, we have increased our liquidity buffer over the last 12 months. This has been done in response to an increase in uncertainty given the global context. The increase of geopolitical tensions, the risk of gas and energy shortages for certain European countries, the changes in the monetary policy of large central banks, all of these factors could have an impact on our funding needs and financial markets in general. To mitigate risks and maintain flexibility in this new context, we have decided to increase our liquidity buffer. Additionally, the suspension of the 0% cap on sovereign deposit remuneration at the ECB has reduced the opportunity costs of maintaining this liquidity buffer.
Sweden	No	
Switzerland	Yes	No, there was no change. As we have had a liquidity buffer for multiple years, there were also no problems in managing or communicating our liquidity buffer.
Türkiye	Yes	Keeping a strong level of cash reserve in order to reduce the liquidity risk associated with cash and debt management is one the main pillars of our borrowing strategy.
UK	No	

Table A A.22. Q16 Among the following indicators of market-risk exposure, please indicate the ones you calculate (1), publish (2), or use as a benchmark in your medium-term funding strategies (3)?

(Table 1/3)

	Average Time to Maturity (ATM)			Debt maturing in X months			Share of FX debt to total debt			Average time to re-fixing (ATR)		
Country	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)
Australia	X	X		X	X							
Austria	X	X	X	X	X	X	X	X		X	X	X
Belgium	X	X	X	X	X	X	X	X		X	X	X
Brazil	X	X	X	X	X	X	X	X	X			
Bulgaria	X	X		X			X	X		X	X	
Canada	X	X		X	X		X	X		X		
Chile	X	X		X	X		X					
Colombia	X	X					X	X		X		
Costa Rica												
Croatia	x			x	x		x	x	x			
Czech Republic	X	X	X	X	X	X	X	X	X	X	X	X
Denmark	X	X		X	X		X			X	X	
Estonia	X	X		X			X	X		X	X	X
Finland	X	X		X	X		X	X		X	X	X
France	X	X		X	X		X	X		X		
Germany	X			X			X			X		
Greece	X	X	X	X	X	X	X	X	X	X	X	X
Hungary	X	X	X	X			X	X	X	X	X	X
Iceland	X	X	X									
Ireland	X			X			X					
Israel	X	X	X	X	X	X	X	X		X	X	X
Italy	X	X	X	X	X	X	X	X		X	X	

	Average Time to Maturity (ATM)			Debt maturing in X months			Share of FX debt to total debt			Average time to re-fixing (ATR)		
Country	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)
Japan	X	X		X	X							
Korea	X			X								
Republic of Latvia				X	X	X	X	X		X	X	
Lithuania	X	X		X	X		X	X		X	X	
Luxembourg	X	X		X	X							
Mexico (Local)	X	X	X	X		X						
Mexico (External)	X		X	X		X	X		X			
Netherlands	X	X	X	X	X	X				X	X	X
New Zealand	X	X										
Norway	X	X		X	X	X				X	X	X
Poland	X	X	X	X	X		X	X	X	X	X	X
Portugal	X	X		X	X		X	X		X		
Romania	X	X	X	X	X	X	X	X		X	X	X
Slovak Republic	X	X		X	X	X	X	X	X	X		
Slovenia	X	X	X	X	X	X	X	X		X		
Spain	X	X	X	X		X	X	X		X		X
Sweden	x	X					x	x				
Switzerland	X		X	X		X						
Türkiye	x	x		x	x	x	x	x	x			
UK	X	X		X	X							

Table A A.23. Q16 Among the following indicators of market-risk exposure, please indicate the ones you calculate (1), publish (2), or use as a benchmark in your medium-term funding strategies (3)?

(Table 2/3)

	Macaulay duration			Modified duration			Share of fixed rate debt to total debt			Debt re-fixing of rate within X months		
Country	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)
Australia				X	X							
Austria				X			X	X		X	X	X
Belgium							X		X	X		
Brazil	X			X			X	X	X			
Bulgaria	X	X		X			X	X		X	X	
Canada							X	X		X	X	
Chile												
Colombia	X	X		X			X	X				
Costa Rica												
Croatia	x						X	X	X			
Czech Republic				X	X		X			X	X	X
Denmark	X			X	X	X				X		
Estonia				X	X	X				X		
Finland				X	X		X			X		
France	X			X			X	X				
Germany	X			X			X			X		
Greece	X		X	X	X	X	X	X	X	X		X
Hungary	X			X			X	X	X	X		
Iceland	X	X										
Ireland				X			X			X		
Israel				X	X	X	X	X		X	X	X
Italy				X			X	X				

	Macaulay duration			Modified duration			Share of fixed rate debt to total debt			Debt re-fixing of rate within X months		
Country	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)	Calculated (1)	Published (2)	Used as a benchmark (3)
Japan												
Korea	X			X								
Republic of Latvia	X	X	X	X	X		X	X	X	X	X	
Lithuania							X	X				
Luxembourg												
Mexico (Local)				X		X	X		X	X	X	
Mexico (External)				X		X	X		X	X	X	
Netherlands				X								
New Zealand	X											
Norway				X	X							
Poland	X	X					X	X				
Portugal				X	X		X			X	X	
Romania							X	X		X	X	X
Slovak Republic	X	X		X			X	X		X	X	X
Slovenia	X			X			X	X		X		
Spain							X	X	X	X		X
Sweden	x	x										
Switzerland												
Türkiye	x	x					x	x	x			
UK				X	X							

Table A A.24. Q16 Among the following indicators of market-risk exposure, please indicate the ones you calculate (1), publish (2), or use as a benchmark in your medium-term funding strategies (3)?

(Table 3/3)

Country	Other (i)	Calculated (1)	Published (2)	Used as a benchmark (3)	Other (ii)	Calculated (1)	Published (2)	Used as a benchmark (3)
Australia								
Austria								
Belgium								
Brazil	Share of floating rate debt to total debt:	X	X	X	Share of inflation linked debt to total debt:	X	X	X
Bulgaria								
Canada								
Chile								
Colombia								
Costa Rica								
Croatia								
Czech Republic								
Denmark								
Estonia								
Finland								
France	Shared of index-linked debt to total debt	X	X	X				
Germany								
Greece								
Hungary								
Iceland								
Ireland								
Israel								
Italy								
Japan								

Country	Other (i)	Calculated (1)	Published (2)	Used as a benchmark (3)	Other (ii)	Calculated (1)	Published (2)	Used as a benchmark (3)
Korea								
Republic of Latvia	Average life:	X	X					
Lithuania								
Luxembourg								
Mexico (Local)								
Mexico (External)								
Netherlands								
New Zealand								
Norway								
Poland								
Portugal	Cost at Risk	X	X					
Romania								
Slovak Republic								
Slovenia								
Spain								
Sweden	Share of Index linked debt	x	x					
Switzerland								
Türkiye								
UK								

Table A A.25. Q17 Do you plan to review the long-term funding strategy as a consequence of increased debt levels and rising uncertainty in funding conditions?

	Answer	Comments
Australia	Yes	The long-term funding (and liquidity management) strategy evolves as circumstances change. It is reviewed at least annually. It would be reviewed irrespective of whether debt levels had increased or decreased
Austria	No	We do not plan to review/change our long-term funding strategy as we are confident that we are well equipped well for future challenges. The cornerstones of the Austrian funding strategy are:

	Answer	Comments
		• Diversity of funding sources (geographically and by instruments) • Financial flexibility (e.g. to address specific investor demand) • Monthly auctions for bonds and bills • No foreign currency risk • Well-balanced maturity profile • Reliability, Transparency, stability-oriented approach • Conservative debt management strategy with a high share of fixed-rate debt
Belgium	No	It is however possible that our strategy will be adapted as a result of the ongoing high inflation and the rising rates.
Brazil	No	That scenario has been incorporated in our strategy already
Bulgaria	No	
Canada	Yes	Treasury bills, medium term (2Y, 3Y, 5Y) and long term (10Y and 30Y) nominal bonds issuances are expected to be reviewed in light of projected debt levels and market conditions. Issuance of inflation linked bonds and Green bonds are not considered in consequence of these factors.
Chile	Yes	One of the risk factors is the Pension Reform, which could later the way in which the Pension managers work in this moment. Thus, in case of a regulatory change that affects demand coming from pension managers investors, it could mean a change in the maturities (likely: shorter maturities) and even the procedures of issuing.
Colombia	No	The long-term funding strategy (published every 4-5 years) will be reviewed and updated according to an annual revision of Financial Plan and the Medium Term Fiscal Framework.
Costa Rica		
Croatia	No	
Czech Republic	No	
Denmark	No	At the moment we have lower public debt than before Covid.
Estonia	No	
Finland	No	
France	Yes	Our base strategy to be transparent, predictable and to respond to investor's demand all along our rate curve has remained unchanged for decades and has been resilient to many different market situations. The modalities of its implementation are reviewed twice per year by our Strategic Committee.
Germany	No	reviewing strategy is an ongoing process
Greece	Yes	
Hungary	Yes	We use a stochastic optimal debt portfolio model to set the financing structure; the results will be available in November and they will be the basis for the strategy review.
Iceland		
Ireland	No	
Israel	Yes	Revising the debt maturity structure
Italy	No	The Italian Treasury funding plan is already inspired by the principles of transparency and predictability. In order to handle possible risks deriving from a national and international geopolitical scenario, the funding strategy is oriented toward managing interest rate and refinancing risks, so as to continue to keep exposure to such risks under control. Moreover, the Italian treasury has focused its debt management policy in increasing the average life of the debt to mitigate the risk of refinancing by diluting over time the volumes to place on

	Answer	Comments
		the market and to decrease the issuer's exposure to sudden increases in interest rates. However, the above-mentioned factors are characterized by a level of uncertainty which makes difficult to predict their evolution over time. Therefore, the Treasury funding strategy keeps a sufficient degree of flexibility in order to quickly response and adapt its funding plan to the evolution of the market context
Japan	No	
Korea	Yes	
Republic of Latvia	Yes	Annual funding strategy envisages that aside the core capital market instruments, the loans from international financial institutions or targeted EU loan facilities for member countries (like SURE) is good alternatives. In additions there are markets in other currencies that remain available. Latvia's general government debt level is forecasted to be slightly above 40% in medium term. Current debt levels ensure sufficient fiscal space to implement the scenarios that would require additional borrowing needs
Lithuania	No	
Luxembourg	No	
Mexico (Local)	No	
Mexico (External)	No	
Netherlands	Yes	We extensively review our funding strategy and interest rate risk framework every six years. Every two years we conduct a smaller assessment. In these assessments we take debt levels and market conditions into account. The next smaller assessment will take place in 2023.
New Zealand	Yes	We continue to review our funding strategy.
Norway	No	
Poland	No	
Portugal	No	We are not planning to revise our long term funding strategy in terms of maturities or debt instruments due to the current funding conditions.
Romania	No	
Slovak Republic	No	We believe in our current funding strategy thus no need for reviewing
Slovenia	No	
Spain	No	We will maintain the same overarching long-term funding strategy that we have had until now, among which we can highlight the following: We will continue to maintain a benchmark program, which allows us to provide liquid reference points across our yield curve. We will continue to diversify our investor base, through investor outreach and the issuance of instruments such as green bonds or inflation-linked bonds. We will continue to maintain a long average life of our debt portfolio, to reduce our refinancing risk and improve our portfolio's resilience. We will continue to listen to the feedback from investors and our Primary Dealers, and make sure to issue into demand, to improve the stability and efficiency of the Spanish Public Debt market.
Sweden	No	
Switzerland	No	Debt levels of the Swiss Confederation have not increased by a large amount; therefore, there is no need to change our long-term funding strategy. The changes in monetary policy might have a more prominent effect on our funding strategy
Türkiye	No	

	Answer	Comments
UK	Yes	We keep our future funding strategy in terms of the mix and maturity of issuance and the mix between types of operation under review on an ongoing basis. The major occasions at which such a review may be implemented are (i) when designing the financing remit for the forthcoming financial year (usually each March) and (ii) at an Autumn fiscal event when new forecasts of the public finances are published

Table A A.26. Q18 Do you consider ESG (Environmental, Social and Governance) factors in your debt management operations?

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
Australia	X								We consider Australian environmental and climate responses in our provision of data to our investors, in order to provide them with the Australia's official view on these issues. Investors having		X	

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
									been requesting this information from Australia consistently for the last three years.			
Austria	X		X	X	X						X	X
Belgium	X		X	X	X	X					X	X
Brazil	X		X		X	X	X	X		The Brazilian National Treasury is building up a sustainable framework for external issuances, but this process is not finished yet.	X	X
Bulgaria		X										
Canada	X		X	X	X	X				Canada issues only green bonds as ESG debt.	X	
Chile	X		X	X	X	X		X			X	X
Colombia	X		X	X	X			X			X	

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
Costa Rica	X		X	X	X			X		There could be a financial benefit at the interest rate level. Due to the international image of our country (migrating towards carbon neutrality), there could be a benefit in terms of yield	X	X
Croatia		X										
Czech Republic		X										
Denmark	X		X		X						X	X
Estonia	X			X			X			Estonia has a holistic approach to ESG factors and focuses on government level targets and performance of budget spending. Thematic bonds are currently not	X	

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
										part of the strategy.		
Finland	X		X			X					X	
France	X		X	X	X			X			X	X
Germany	X			X	X			X			X	X
Greece	X		X	X		X	X	X				X
Hungary	X		X	X	X	X	X			In line with international efforts, Hungary is strongly committed to fighting climate change and biodiversity loss. The Hungarian government is implementing wide and overreaching climate, energy and environmental policies to transition the country to a low-carbon and environment-friendly economy. The Green Bond Framework of	X	X

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
										Hungary, created in 2020, contributes to support the government's commitment and to raise a part of the necessary funding from the capital markets. The Green Bond Framework contributes to further diversify Hungary's investor base.		
Iceland	X		X	X	X	X	X	X		Iceland has issued a sustainable financing framework but has not yet issued a labelled bond. That is though on Treasury´s agenda when it is deemed feasible.	X	X
Ireland	X		X	X	X	X					X	X

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
Israel	X		X	X	X	X	X				X	X
Italy	X		X	X	X			X		ESG factors, and in particular green bond issuances, are taken into consideration when defining the issuance strategy to diversify both the investor base and the central debt securities. The issuance of green bond is aimed at financing green expenditures with positive environmental impact.		X
Japan		X										
Korea		X										
Republic of Latvia	X		X	X	X	X	X	X			X	
Lithuania		X										
Luxembourg	X		X	X	X	X						X

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
Mexico (Local)	X		X	X	X			X		The issuance of SDG Bonds follows several motivations. On the one hand, the Government of Mexico is committed to work towards attaining the SDG. This effort comes in hand with the commitment of closing social gaps and transit to a more sustainable society and economy. On the other hand, by issuing these instruments, as a sovereign, Mexico develops a sustainable yield curves that serves as a reference to both external and local markets, and promote the development of	X	

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
										capital markets in sustainability. Finally, parallel to engaging with a new investors' base, Mexico is promoting transparency in public spending and a better monitoring for the fulfillment of the commitment of the 2030 Agenda.		
Netherlands	X			X	X						X	X
New Zealand	X		X	X	X			X			X	X
Norway		X										
Poland	X		X		X							X
Portugal	X		X	X	X	X	X				X	X
Romania	X		X	X	X		X	X		Romania is in the process of creating its Green Bond Sovereign	X	X

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
										Framework and the Ministry of Finance has requested technical assistance from the World Bank regarding this project.		
Slovak Republic		X										
Slovenia	X		X	X	X	X	X	X			X	X
Spain	X		X	X	X	X				Spain issued its inaugural green bond in 2021. In 2022 we have tapped the green bond via auction. We will soon publish the impact and allocation reports for our 2021 green bond issuance. We carry out roadshows and meetings related to our green bond program.	X	X

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
										Additionally, when we talk with investors we also highlight Spain's ESG efforts, especially regarding the green transition, which is a key element of our Recovery Plan, financed with the NextGenerationEU program.		
Sweden		X										
Switzerland	X			X	X	X		X		We will issue the Confederation's first green bond in the 4th quarter. By issuing a green bond, the Federal Council mainly aims to strengthen the position of the Swiss financial markets, set a benchmark for other		X

Country	Yes	No	18.1 If yes, what is your motivation?								18.2 If yes, what are the areas of activities that you consider ESG factors?	
			Diversification of investor base	Aligning with government's ESG policy	Supporting the market for sustainable finance instruments (e.g. by signaling and benchmarking roles)	Positive market story	Impact on sovereign creditworthiness	Accountability and transparency (e.g. quality of internal control and risk management functions, timely and adequate dissemination of data)	Other (i) SPECIFY	Country additional notes:	Communication and investor relations strategy (e.g. presenting information on country's initiatives related to ESG in annual reports, newsletters, PD meetings and roadshows)	Instrument choice (e.g. green bonds, certificates etc.)
										issuers and increase transparency over green federal expenditures		
Türkiye	X		x	x	x	x	x	x			X	X
UK	X		X	X	X	X					X	X

Table A A.27. Q19 Do you observe an interest in government's ESG related activities from market participants (e.g. institutional investors and rating agencies)?

	Yes	No	Comments
Australia	X		There has been considerable interest from investors in sovereign ESG and particularly Australia's environmental policies over the last few years. There has been interest, but to a much lesser extent in Australia's S & G credentials
Austria	X		To a certain extent
Belgium	X		
Brazil	X		Foreign investors have shown a meaningful interest in ESG aspects during roadshows and investors meetings.
Bulgaria		X	
Canada		X	While there was much interest and outreach around the time of Canada's inaugural 2022 green bond issuance, such outreach and interest has declined since.
Chile	X		We have observed during the last years the development of special departments related to ESG form the side of investors, as well as an increased interest of rating agencies to include ESG factors.
Colombia	X		There is interest from market participants regarding ESG activities. In fact, we have participated in many panels, forums, events, and bilateral meetings regarding ESG with local and international investors. Additionally, on August 5th of 2022 Colombia published the Green Bonds, Social and Sustainable Framework.
Costa Rica	X		For the local public debt market, there is little demand for ESG issues. In the last 24 months, ESG issues have boomed in the domestic market in Costa Rica.
Croatia	X		
Czech Republic		X	
Denmark	X		Most investors is moving towards a higher focus on ESG related factors. With the launch of our green bond we have started a much more direct conversation with our investors on ESG issues.
Estonia	X		
Finland	X		
France	X		Investors tend to show an increased interest in our environmental activities, notably when they investigate our green bonds. We observe that ESG is now a pillar as such in the country rating methodology of most agencies.
Germany	X		
Greece	X		
Hungary	X		There are frequent meetings with investors to discuss potential opportunities and risks in the ESG field.
Iceland	X		We´ve seen increased interest from investors and rating agencies.
Ireland	X		
Israel	X		
Italy	X		Market participants takes positively into account that the Republic of Italy has been at the forefront of international developments in the field of sustainable finance, committing itself to making finance flows commensurate with a pathway towards low greenhouse gas emissions and climate-resilient development
Japan	X		
Korea		X	
Republic of Latvia	X		After the issuance of the first Sustainability Bond in December 2021 (the 1st in Baltics and Scandinavia), we have been receiving increased interest from investors for re-openings or new lines.
Lithuania	X		There is interest from both investors and rating agencies
Luxembourg	X		Strong interest during issuance preparation/process
Mexico (Local)	X		The interest comes from different investors (asset managers, pension funds, among others), rating agencies, institutions and other governments that want to integrate the ESG on their investment decision making.
Mexico (External)			
Netherlands	X		The Netherlands has issued its first green bond 4 years ago, and has seen a healthy appetite from investors since. Our green bond, including our EU taxonomy aligned framework, is part of the dialogue we have with our investors.
New Zealand	X		In the investor engagement activities, most investors ask questions about New Zealand's climate risks, and they are increasingly wanting to see that issuers are aware of, and are appropriately managing, ESG related challenges.
Norway	X		We receive questions from investors whether Norway will issue ESG-bonds, and in particular green bonds. Rating agencies are incorporating ESG considerations in their reports on Norwegian government debt.
Poland	X		Interest from rating agencies

	Yes	No	Comments
Portugal	X		IGCP has observed an increased interest in a Green bond by investors. That is mainly perceived in roadshows and in one to one meetings
Romania	X		From discussions with investors, this type of instrument would generate a high interest, better cost conditions compared to classic instruments
Slovak Republic	X		Mostly primary dealers who would like to arrange such issuance
Slovenia	X		
Spain	X		We notice that both investors and rating agencies show an interest on the Spanish public sector's efforts in the ESG-space. Because of this, we have made additional efforts to compile this information for investor outreach efforts, especially green projects, which are related to our green bond program.
Sweden	X		
Switzerland	X		Strong demand for sustainable financial instruments from investors and increased interest from rating agencies on ESG issues and risks.
Türkiye	X		We have witnessed a strong appetite from investors during various meeting towards a potential ESG bond issuance from Türkiye
UK	X		Investors get greater visibility on government's climate spend through the green financing framework and our annual allocation reports which details the projects the proceeds of the green gilt financing programme have been allocated to

Table A A.28. Q20 In your view, do you think investors consider your country's ESG performance when pricing your sovereign risk/creditworthiness?

	Yes	No	Comments
Australia	X		Yes but only by a small number of investors at this stage. Most investors are beginning to apply an ESG lens across their sovereign portfolios or strategies but for many this remains at a relatively early stage particularly when grappling with sovereign debt. For a smaller and more sophisticated group (usually private sector fund managers) they have developed or are developing more rigorous
Austria		X	There has been no clear indication yet that investors consider ESG ratings and performance when pricing our sovereign risk/creditworthiness. However, we recognize increasing interest from investors/rating agencies on this topic
Belgium		X	
Brazil	X		Some "G" (Governance) aspects related to the rating agencies assessments with a considerable weight in the final score.
Bulgaria		X	
Canada		X	Not to our knowledge
Chile		X	
Colombia	X		
Costa Rica	X		
Croatia	X		
Czech Republic		X	
Denmark	X		Some investors consider it more than others.
Estonia	X		
Finland		X	
France		X	Sovereign credit worthiness remains mostly at this stage a matter of debt sustainability.
Germany	X		
Greece		X	
Hungary	X		
Iceland	X		Investors do most likely consider ESG factors but whether it affects the pricing is not clear.
Ireland	X		Important for our green bond
Israel	X		
Italy		X	Fort the time being existing green bonds tend to trade with some small premium versus conventional bonds but this has not been factored in the pricing of green bonds at issuance
Japan			
Korea		X	

Republic of Latvia	X		That is proved by: 1) the statistics of investor`s portfolios (dedicated to ESG assets), when investing in Latvia's Sustainability Bonds. 2) detailed questions in the Road show and during bilateral discussions with investors
Lithuania	X		
Luxembourg		X	
Mexico (Local)		X	As these criteria are still quite innovative, we have not yet rely on them for creditworthiness. As long as these performance evaluations develop, we expect that in the future, Mexico's ESG performance will be taken into consideration
Mexico (External)			
Netherlands		X	Not yet, might become relevant in the (near) future
New Zealand	X		
Norway		X	
Poland		X	
Portugal		X	This has not been evident yet for Portugal but we believe it will be in the future.
Romania	X		While ESG performance is not yet a factor when pricing Romania's government bonds, potentially investors may consider it in the future
Slovak Republic		X	
Slovenia	X		
Spain		X	For the case of Spain, we don't believe that ESG-performance is linked to investors' perception of sovereign creditworthiness. The main reason is that we do not have significant ESG-related risks that could affect our creditworthiness. For other countries, which are subject to significant ESG-risks, there could be a correlation between ESG-performance and sovereign risk indicators.
Sweden	X		
Switzerland	X		
Türkiye	X		We expect the ESG performance of country would be an instrumental indicator especially for pricing of ESG related debt instruments.
UK		X	

Table A.29. Q21.Do you observe a correlation between your country's ESG performance with your sovereign risk indicators (e.g. spreads, CDS)?

	Yes	No	
Australia		X	
Austria		X	Again, there has been no clear indication that our ESG ratings and performance correlate with our sovereign risk indicators
Belgium		X	
Brazil		X	Although we understand some investors consider ESG aspects in assessing sovereign risk, we don´t see a meaningful correlation in the day-to-day operations.
Bulgaria		X	
Canada		X	Not to our knowledge
Chile		X	
Colombia			
Costa Rica			
Croatia		X	
Czech Republic		X	
Denmark		X	
Estonia		X	
Finland		X	
France		X	
Germany		X	
Greece		X	

Hungary		X	
Iceland		X	
Ireland		X	
Israel		X	
Italy			Being the sovereign risk indicators influenced by several factors (macro dynamics, national and international geo-political events), It is difficult to detect a specific relationship with the ESG performance.
Japan			
Korea		X	
Republic of Latvia		X	It is very hard to prove by certain numbers or b.p.
Lithuania		X	
Luxembourg		X	
Mexico (Local)		X	
Mexico (External)			
Netherlands		X	We haven't investigated this, but we do not think there will be such a correlation
New Zealand		X	
Norway		X	
Poland		X	
Portugal		X	This has not been evident yet for Portugal but we believe it will be in the future
Romania		X	
Slovak Republic		X	
Slovenia	X		
Spain		X	For the case of Spain, we don't believe that ESG-performance is linked to our sovereign risk indicators. The main reason is that we do not have significant ESG-related risks that could affect our creditworthiness. For other countries, which are subject to significant ESG-risks, there could be a correlation between ESG-performance and sovereign risk indicators
Sweden		X	
Switzerland		X	So far, we did not observe any correlation. This might also be because there have been very few changes in Switzerland's ESG ratings to date and the methodology of different rating providers is hard to compare for investors.
Türkiye	X		We expect the ESG performance of country would be an instrumental indicator especially for pricing (i.e. spreads) of ESG related debt instruments.
UK		X	

Table A A.30. Q22 In your opinion, how are the ESG labelled bond demand and supply dynamics evolving?

(Table 1/2)

Country	Investor demand for ESG-labelled bonds			Pricing and liquidity conditions			Borrowing needs		
	Increase/Improve	Remain stable	Decline	Increase/Improve	Remain stable	Decline	Increase	Remain stable	Decline
Australia	X			X					
Austria	X				X		X		
Belgium	X				X		X		
Brazil	X			X			X		
Bulgaria									
Canada	X				X			X	
Chile		X		X					X
Colombia	X			X			X		
Costa Rica	X						X		
Croatia									

Country	Investor demand for ESG-labelled bonds			Pricing and liquidity conditions			Borrowing needs		
	Increase/Improve	Remain stable	Decline	Increase/Improve	Remain stable	Decline	Increase	Remain stable	Decline
Czech Republic									
Denmark	X					X	X		
Estonia									
Finland		X			X			X	
France	X				X			X	
Germany		X		X			X		
Greece		X			X			X	
Hungary	X				X		X		
Iceland	X				X			X	
Ireland	X				X			X	
Israel	X				X			X	
Italy	X			X				X	
Japan									
Korea		X			X			X	
Republic of Latvia	X			X			X		
Lithuania	X				X			X	
Luxembourg	X			X			X		
Mexico (Local)	X			X				X	
Netherlands		X				X			
New Zealand	X				X		X		
Norway									
Poland		X			X			X	
Portugal	X				X			X	
Romania		X		X				X	
Slovak Republic									
Slovenia	X				X		X		
Spain	X			X			X		
Sweden		X			X				
Switzerland	X			X			X		
Türkiye	x			x			x		
UK			X			X		X	

Table A A.31. Q22 In your opinion, how are the ESG labelled bond demand and supply dynamics evolving?

(Table 2/2)

Country	Size of eligible expenditures			Government's willingness to issue ESG bonds			Country additional notes:
	Increase	Remain stable	Decline	Increase	Remain stable	Decline	
Australia							
Austria	X			X			We expect both, demand and supply to increase steadily over the coming years.
Belgium		X			X		
Brazil				X			

Country	Size of eligible expenditures			Government's willingness to issue ESG bonds			Country additional notes:
	Increase	Remain stable	Decline	Increase	Remain stable	Decline	
Bulgaria							
Canada					X		Canada has committed to a permanent green bond program with regular issuances. Difficult to opine on future eligible expenditures at the given time.
Chile			X	X			
Colombia	X			X			
Costa Rica	X			X			
Croatia							
Czech Republic							
Denmark		X			X		
Estonia							Estonia has not issued any ESG labelled bonds
Finland		X			X		
France		X			X		
Germany	X			X			
Greece		X					
Hungary	X			X			
Iceland	X				X		
Ireland	X				X		
Israel	X			X			
Italy	X			X			
Japan							
Korea		X			X		
Republic of Latvia	X			X			As Latvia has issued only one Sustainability bond, it is hard to comment the dynamics for Latvia. Therefore, answer for this question is more of general nature and our observation.
Lithuania		X			X		
Luxembourg	X			X			
Mexico (Local)		X		X			Mexico intends to keep developing the sustainable yield curve in the local and external market due to the Government's priority on addressing the most vulnerable population and promoting sustainable development
Netherlands	X	X		X	X		We see investors caring more about liquidity in the current market, thus pricing green bonds more in line with regular bonds (i.e. the greenium decreases, but this is more liquidity driven). We are willing to issue more green bonds, but only if this is in line with our framework and high standard of issuing green bonds, which will depend on the government budget (i.e. how many new expenditures we can label as dark green, also considering the DNSH-criteria, for our bond)
New Zealand	X			X			In the short term while there is much greater demand than supply for ESG bonds we expect ESG bonds may have a cost advantage. In the long term, as supply grows this advantage may erode to the point where the pricing benefit doesn't materially offset ongoing programme costs
Norway							
Poland		X			X		On the one hand, the emphasis is on ecological and social projects, on the other hand, as a result of the energy crisis, the regulations on fossil fuels have been loosened. These two factors balance each other.

Country	Size of eligible expenditures			Government's willingness to issue ESG bonds			Country additional notes:
	Increase	Remain stable	Decline	Increase	Remain stable	Decline	
Portugal	X			X			
Romania	X						
Slovak Republic							We have not issued any ESG instruments and do not intend to issue. Government has many ways how to achieve the ESG goals without the complexity of these instruments. We expect the ESG instruments at sovereign level to be a dead end.
Slovenia		X		X			
Spain	X			X			In the past years there has generally been a scarcity of sovereign green bond supply in financial markets, which led to "greeniums" appearing both in primary and secondary markets. However, as more sovereign issuers have started and developed their green bond programs, this scarcity has decreased. This is evidenced by the general downward trend in "greeniums", especially in primary market issuance. We believe that there is still a "greenium" linked to sovereign green bond programs, which means that they provide a cost advantage over nominal issuance. Additionally, even if this "greenium" were to disappear as sovereign green bond supply increases to meet market demand, there would still be advantages to these programs, especially due to their contribution in diversifying debt managers' investor base.
Sweden							Limited overall funding need, focus on keeping existing lines liquid.
Switzerland	X			X			Green bond issuance results indicate that demand remains high and is trending upward. At the same time, there are more and more issuers issuing sustainable bonds
Türkiye	X			X			
UK		X			X		

Table A A.32. Q23 In your view, what are the main drawbacks or challenges associated to ESG-labelled bond issuance for debt managers?

(Table 1/2)

Country	Lack of eligible expenditures	Allocation reporting (ex-ante)	Impact reporting (ex-post)	Complexity of issuance process	Timing consideration (e.g., issuance)	Changes in regulation	Changes in taxonomy	Interaction with other governmental entities	Additional operational costs	Potential impact on existing instruments
Australia										
Austria		X	X			X	X	X	X	
Belgium	X		X	X			X			
Brazil		X	X	X				X		
Bulgaria										
Canada	X	X	X		X	X	X	X	X	X
Chile	X		X					X		
Colombia		x	x					x	x	
Costa Rica	X								X	X
Croatia	x	x	x	x		x	x	x	x	
Czech Republic						X	X			
Denmark										X
Estonia	X	X	X	X		X	X		X	
Finland	X			X		X	X			
France	X		X				X			
Germany			X			X	X			
Greece	X				X	X				
Hungary	X	X	X			X	X	X		
Iceland				X						
Ireland					X		X	X		
Israel	X		X			X	X			
Italy		X	X			X	X	X		
Japan		X	X	X				X	X	
Korea	X								X	

Country	Lack of eligible expenditures	Allocation reporting (ex-ante)	Impact reporting (ex-post)	Complexity of issuance process	Timing consideration (e.g., issuance)	Changes in regulation	Changes in taxonomy	Interaction with other governmental entities	Additional operational costs	Potential impact on existing instruments
Republic of Latvia	X	X	X		X	X	X			
Lithuania	X	X	X	X	X			X	X	X
Luxembourg	x	x	x	x	x		x	x	x	x
Mexico (Local)		X	X	X	X			X		
Mexico (External)										
Netherlands	X					X	X			
New Zealand		X	X					X	X	X
Norway	X	X	X							
Poland			X			X	X			
Portugal			X	X			X	X	X	
Romania	X	X	X				X	X		
Slovak Republic	X	X	X	X	X	X	X	X	X	X
Slovenia	X		X	X	X			X		
Spain	X						X			
Sweden										X
Switzerland			X			X	X	X	X	X
Türkiye	x	x	x			x	x	x	x	
UK	X	X	X						X	

Table A A.33. Q23 In your view, what are the main drawbacks or challenges associated to ESG-labelled bond issuance for debt managers?

(Table 2/2)

Country	Other (i)	Other (i)	Other (ii)	Country additional notes:
Australia				
Austria				Possible changes to the EU taxonomy and regulations do pose a challenge regarding the adaptation of our framework.

Country	Other (i)	Other (i)	Other (ii)	Country additional notes:
				Resources and additional costs with respects to allocation and impact reporting that are necessary to guarantee full transparency are also worthwhile mentioning.
Belgium				
Brazil				The greatest challenge in ESG-labeled issuances is to build the policy framework and the interaction with other governmental entities such as the line ministries.
Bulgaria				We cannot comment this topic as we don't have direct observation of this process
Canada				
Chile				
Colombia	it requires a full time team dedicated to ESG instruments	X		
Costa Rica				
Croatia				
Czech Republic				
Denmark	A green bond could be detrimental to the liquidity of other issues.	X		
Estonia				
Finland				
France				
Germany				
Greece				
Hungary				In our view, the main obstacle to the spreading of ESG solutions in the EU is the lack of clear, predictable set of rules, of which evolution is not hampered by a tangled web of interests.
Iceland	It can be challenging to consider sustainable financing without compromising debt management objectives concerning a deep, active market, and regular issuance.	X		
Ireland				
Israel				
Italy				Allocation and impact reporting represent a challenge inasmuch collecting the suitable information is extremely complex and articulated.
Japan				
Korea				

Country	Other (i)	Other (i)	Other (ii)	Country additional notes:
Republic of Latvia				
Lithuania				
Luxembourg				
Mexico (Local)				Timing consideration and complexity of issuance process might be a bottleneck for issuances at early year. As a sovereign issuer, in order to issue SDG Bonds, the selection process of eligible expenditures is subject to the federal budget cycle, and prior Congress approval; thereafter, the selection criteria can be applied to the pool of eligible expenditures and undergo the verification process by the SPO provider, according to the SDG Sovereign Bond Framework. On the other hand, the elaboration of the allocation and impact report depends on the data availability provided by the different ministries who manage the eligible expenditures, so a good coordination, communication and time consideration is needed to get the best information available for the report.
Mexico (External)				
Netherlands				The green bond market is developing, thus regulation/taxonomy is also still developing.
New Zealand	demonstrable additionality of ESG spend	X		
Norway				
Poland				
Portugal				
Romania				
Slovak Republic				
Slovenia				
Spain				One of the most important challenges the Spanish Treasury faces in its green bond program is that it doesn't have as much eligible expenditure as it would like, despite substantial public spending in Spain on ESG issues. This is because our public sector is very decentralized, which means that much of the ESG-related spending is done on a regional level, not by the central government. This means that the regions have more eligible expenditure than the Central Government, and some of them carry out their own green bond programs. Additionally, NextGenerationEU has also absorbed a significant part of the Central Government's possible eligible expenditure. The ESG-related spending in the Spanish Recovery Plan is financed by NextGenerationEU. This means that the European Commission will issue green bonds which use eligible green expenditure from investments being carried out in Spain. Therefore, this eligible expenditure is also not available for the Central Government's green bond program. Lastly, to touch on the changes in taxonomy, this is also a challenge for debt managers who wish to issue green bonds. The taxonomy being approved by the EU will set the standard to which European debt managers must adapt their green bond programs. The problem here is that when public sector green expenditure is planned and executed, its design doesn't take

Country	Other (i)	Other (i)	Other (ii)	Country additional notes:
				into account the reporting needs for a green bond program or a specific taxonomy. This means that even if public sector green spending did follow the principles guiding a specific green taxonomy, there could still be difficulties in proving this with the correct reporting, because these reporting needs were not taken into account when designing the green expenditure.
Sweden				
Switzerland				The issuance and especially the reporting on green bonds leads to a considerable administrative effort. This is further increased when taxonomies or market standards are adapted and the framework consequently has to be changed. Moreover, Switzerland's relatively small debt volume means that additional financing instruments have a negative impact on existing instruments (cannibalization, lower liquidity).
Türkiye				
UK				

Annex B. OECD 2022 Survey on Liquidity in Government Bond Secondary Markets

This annex belongs to the OECD Sovereign Borrowing Outlook 2022. Thirty-seven of the 38 OECD countries responded to this survey. Countries which responded to the survey but did not provide comments to a question may not appear in the table of answers. The requested date for a response to the survey was 10 October 2022.
Source: 2022 Survey on Liquidity in Secondary Government Bond Markets by the OECD Working Party on Debt Management.

Table A B.1. Q2 Do you believe it is necessary/important to maintain certain volumes in specific maturity segments in your country?

	Answer	Comments
Australia	Yes	The focus is on the free-float i.e. gross outstanding in any given line less what the RBA owns (by virtue of QE operations). While far from an exact science, our experience suggests that circa 20bn is generally consistent with good depth and liquidity (less in longer maturities >12years
Austria	Yes	We are of the opinion that a certain minimum size in the main benchmark bonds is important in order to support secondary market liquidity.
Belgium	Yes	In order to create and maintain a sufficiently liquid full curve, volumes issued in all lines should reach sufficient levels.
Brazil	Yes	We do not have an exact figure on the minimum volume, but our strategies seek to ensure that each line have a considerable amount so that the securities have relevant liquidity in the market.
Bulgaria	Yes	It is important to maintain a highly standardized benchmark yield curve across all maturity segments.
Canada	Yes	In order to maintain well-functioning markets, the Government maintains certain minimum levels of issuance across maturities. Benchmark size ranges for each sector are announced in the annual Debt Management Strategy. For fiscal year 2022-23, benchmarks will be lower in most sectors relative to fiscal year 2021-22, reflecting the decreased overall issuance in bonds. Due to much higher issuance levels in core sectors as well as the strategy to term out COVID related debt by locking in longer maturity bonds at historically low rates, the benchmark bond target ranges were increased in fiscal year 2021-22. For fiscal year 2022-2023, these benchmark size ranges are (as per Table A2.5): Annex 2: Debt Management Strategy | Budget 2022 2Y: CAD 16 Billion to CAD 20 Billion for February, May, August, and November maturity dates 3Y: CAD 10 Billion to CAD 14 Billion for April and October maturity dates 5Y: CAD 16 Billion to CAD 20 Billion for March and September maturity dates 10Y: CAD 18 Billion to CAD 32 Billion for June and December maturity dates 30Y: CAD 25 Billion to CAD 40 Billion for December maturity dates RRB: CAD 8 Billion to CAD 12 Billion for December maturity dates (including inflation adjustments)
Chile	Yes	Our debt management strategy relies strongly on the existence of high liquid benchmarks, for which it is necessary to have important volumes in each specific benchmark
Colombia	Yes	It is important to maintain high volumes in the middle and long part of the curve to reduce the risk of refinancing.
Costa Rica	Yes	Benchmark: 3, 5 7 and 10 years. United States dollars (USD) 160 million for CRC zero coupon bonds, United States dollars (USD) 1.100 million for CRC fixed rate, United States dollars (USD) 800 floating and United States dollars (USD) 1.300 for indexed rate bonds. The Ministry of Finance of Costa Rica maintains volumes in certain segments or focal dates allows better price formation, which impacts the liquidity of the issues, allowing the placement of debt in better conditions.
Croatia	Yes	
Czech Republic	Yes	The Ministry of Finance tries to keep the sufficient outstanding amounts of treasury bonds along the whole yield curve so market participants may benefit from the market liquidity.
Denmark	Yes	
Estonia	No	
Finland	Yes	
France	Yes	It is important for us to maintain large volumes on all segments of our market. Nonetheless, we are demand-driven and would lower volumes issued if demand was weak on a particular segment. Our auction system (bill auction every week, long term nominal bonds, medium term nominal bond and inflation-linked bond every month) makes it easy to issue on every segment
Germany	Yes	
Greece	Yes	
Hungary	Yes	We have regular and frequent benchmark auctions with maturities from 3 months up to 20 years. In 2021 we have introduced a new 30-year Green Bond, which is also auctioned regularly (quarterly). Issuing at several maturities ensures us a balanced maturity profile. Bond series are reopened several times, which helps to build up sufficiently large volumes. The targeted sizes are usually around USD 3 billion equivalent, the largest bond series are close to USD 4 billion equivalent. Issuing the appropriate volume creates the opportunity for the given series to be included in, for example, the GBI index, which - in line with the issuer's goal - can further increase the liquidity of the bond
Iceland	Yes	It's very important to maintain liquidity in most segments on both our nominal and inflation-indexed curves, especially in 2, 5 and 10 years lines with regular issuance. A certain pre-announced minimum size in benchmark series is important to support secondary market liquidity.
Ireland	Yes	It is important to maintain liquidity throughout the curve. In general, the 5yr and 10yr and increasingly the 15 and 30 year

	Answer	Comments
		points are viewed as key maturity segments and are usually the most active.
Israel	Yes	One of our primary focuses is on maintaining certain liquidity levels that support tradability, and vice versa. While this is also a key goal for the primary dealership model, due to market conditions and structure, some segments are known to be less liquid. Primary dealers are obligated to quote bonds in both New Israeli Shekel (NIS) denominated Consumer Price Index linked bonds and nominal bonds, including On-the-run bonds. Most bonds are quoted with a maximum spread of 3-4 bps, except for the 10 years On-the-run bond, which is quoted with a maximum spread of 2 bps.
Italy	Yes	This is a key pillar that we have in mind in defining our issuance strategy. For each instrument and maturity we set a minimum outstanding volume to be issued before launching a new bond. Having an outstanding large enough for each bond is extremely important in order to guarantee a sufficient liquidity of the bond on the secondary market.
Japan	No	A breakdown of the JGB market issuance by maturity is determined with market needs and trends taken into account, covering a wide range of maturities from the short term to the super long term, based on government debt management policy requirements.
Korea	Yes	10 year maturity (benchmark)
Republic of Latvia	Yes	Liquidity is important element regardless of maturity segment and is beneficiary for both primary and secondary market.
Lithuania	Yes	It is important to issue regularly at the longer end – 7-12 years, to ensure liquidity of the bonds. Volumes are not particularly important as longs as the issuance is regular.
Luxembourg	Yes	
Mexico (Local)	Yes	On the run bonds, are fundamental for portfolio duration management and for market makers to provide enough liquidity to the secondary market. This allows the correct development for local and foreign investors. - Duration management is important to give flexibility to investors due to perspectives on market conditions or to specific investment objectives. - For on the run bonds new issuances, we attempt to have an outstanding value of at least 5 billion dollars. The time to reach the 5 billion dollars outstanding in the short-term bonds is a year, for middle and long term is between 2 - 3 years.
Mexico (External)	Yes	This is an aspect to which the Federal Government gives a lot of attention regarding its foreign denominated bonds. It's absolutely very important for bonds at specific tenors to comply with all the necessary characteristics in order to be consider as real benchmarks and size is one critical characteristic as it relates directly to liquidity (size it also a very important criteria for bonds to be included in global indexes which also enhance the instrument's liquidity). Here I's important to mention that bonds are consider as liquid benchmarks depending on the market where they are issued; for example, in the US dollar market Mexico's typical benchmarks are 10 and 30 years for notional amounts of at least 2 billion while in the euro market most typical benchmarks are 7 years (a notional amount of 750 million its more than enough) and 10, 12 and even 20 years (for these tenors in euros Mexico considers at least 1 billion as the proper benchmark size). As a sovereign issuer Mexico has the responsibility to establish true benchmarks in international financial markets as this will both enhance and facilitate the price discovery process of other Mexican issuers (either from the private or public sector).
Netherlands	Yes	All bonds up to and including 10 years have a target of around 12 billion when issued. The commitment for bonds <10 years when issued is usually to get to the target within 12 to 18 months from first issuance. Our 10 year benchmark bond has the same target volume but a commitment to get it to the target volume within the calendar year. Longer than 10 year have a target volume of at least 10 billion but no commitment as to when have to get to that number.
New Zealand	Yes	We target quickly building volume in newly syndicated 'benchmark' 5-year, 10-year and 30-year lines to a minimum of circa NZD 4b, in order to promote liquidity in these lines that we see as important points on the curve for offshore investors. We have a 'cap' on individual nominal and inflation-indexed bond lines of NZ$18b and NZ$10b respectively. These caps are designed to balance the need for liquidity in each line against building out a full New Zealand Government Bond (NZGB) curve and mitigating refinancing risk.
Norway	Yes	Norway has a policy of limiting the number of bond lines in order to build up the volume in existing lines to ensure liquidity. We issue a new 10- year bond every year in order to maintain the yield curve up to 10 years. The policy is to build the new 10-year bond up to a volume that constitutes nearly half of the borrowing requirement in each year. There is however large uncertainty about which volumes are necessary to reach satisfying liquidity in the specific segments.
Poland	Yes	In order to enhance market liquidity it is important to build large issues of benchmark bonds. In case of medium- and long-term domestic fixed rate bonds the desired amount outstanding is at least PLN 25bn (about USD 5.5bn).
Portugal	Yes	We believe it is important to maintain good levels of liquidity in all segments of our curve, in particular in 5y and 10y buckets. In those segments (5y and 10y), it is important to have at least an outstanding amount of USD 5 bln per bond. In steady state, we believe that the outstanding volume per bond should hover USD 10 bln.
Romania	Yes	In the current conditions our strategy favors medium to long maturities (4 years to 10 years), while related to volume we target an equivalent in local currency of EUR 2.5 billion per line.
Slovak Republic	Yes	We have goals stemming from the Debt Management Strategy that require us to meet refinancing and refixing risk criteria. It is up to DMO what mix of maturities will lead to fulfilling this criteria. We have to issue what market wants and what is risk and cost efficient within the Strategy boundaries.
Slovenia	No	In the past Slovenia tended to issue "smaller" sizes of bonds in comparison to other Eurozone countries (around EUR 1bn). For the past couple of years or so the policy has been to tap existing EUR bonds and thus increasing their original issue size up to EUR 3bn. For the Republic of Slovenia, as a smaller issuer, is therefore liquidity wise not so

	Answer	Comments
		necessary/important to maintain certain volumes in specific maturity segments than it is to ensure bigger issue size per bond.
Spain	Yes	We try to maintain liquidity throughout all of the main points of our yield curve. To achieve this, we use benchmark programs, trying to keep liquid benchmarks that represent each of the main points of our yield curve, such as the 5, 10, 15, 20, 30 and 50 year points. To achieve this, we maintain try to reach a volume of approximately 20 billion outstanding for each of these reference points, so that they have sufficient liquidity. As time goes by and these benchmarks no longer correctly represent the intended maturity segment, or they reach the goal of approximately 20 billion outstanding, they are replaced with a new benchmark
Sweden		
Switzerland	Yes	In our view, it is important to cover maturities of 1 to 13 years with liquid T-bonds. Additionally in the case of longer maturities, intermittent anchor points with individual bonds may complete the government yield curve. The yields on T-bonds constitute a key benchmark and therefore help to ensure an attractive and efficient Swiss capital market that functions well. As the Federal treasury finances itself exclusively via the domestic market, an efficient market is important to ensure beneficial financing conditions for the government. We are aiming for a maximum volume at maturity of around CHF 4 billion. This helps us to ensure that our relatively small capital market debt volume (around USD 70 billion; less than 10% of Swiss GDP) is somewhat evenly distributed among the individual bonds.
Türkiye	Yes	It is important to maintain a certain amount of liquidity for 2, 5 and 10 years benchmark bonds in order to meet the different duration needs of the investors as well as to form a solid long-term yield curve that will be treated as a reference rate in bond and money markets.
UK	Yes	Even though there are no specific volume targets in place, we believe that regular issuance at key benchmark maturities supports more efficient price discovery/price adjustment and, therefore, contributes to smooth functioning of the gilt market. To this end, we focus issuance of conventional (i.e. nominal) gilts particularly at the 5-, 10-, 20- and 30-year benchmark maturities with successive re-openings of relevant bonds until they reach benchmark size. The range of benchmark maturities to be supported and the volumes that are appropriate to target will vary over time according to the overall size of the debt programme and of the debt stock. For nominal gilts at present this is typically up to around £30bn; some lines during the COVID crises we built up to around £40bn. In the case of inflation-linked gilts, issuance takes place particularly at 10-, 20- and 30-year maturities with sizes typically built to around £15 to £20bn. Currently, the longest dated gilts are 1?% Treasury Gilt 2073 (nominal gilt) with approximately £9.7bn nominal in market hands and 0?% Index-linked Treasury Gilt 2073 (inflation-linked gilt), with approximately £3.1bn uplifted nominal in market hands.

Table A B.2. Q3 What has been the overall trend in the liquidity conditions of your domestic sovereign bonds -in terms of bid-ask spread, trading volumes etc.- over the last 12 months?

	Improvement	Decline	No Change	Don't know	Additional comments (e.g. in particular where liquidity conditions vary from the main trend):
Australia		X			A decline compared to 12 months ago, however, liquidity conditions have remained consistent and have improved a little this calendar year. Elevated volatility continues to be a headwind to a broader recovery in liquidity.
Austria		X			In the first eight months of 2022 (Jan-Aug), we have seen an increase in secondary market turnover in RAGBs (Republic of Austria Government Bonds) vs. the same period in 2021 of around 22%. However, in 2022YTD*, bid-ask spreads have widened significantly compared to the last year. E.g., for the 10-year benchmark bonds the average bid-ask spread (on price basis) is as follows: 2017 16 ct 2018 18 ct 2019 14 ct 2020 26 ct 2021 17 ct 2022* 33 ct *until September 09, 2022
Belgium	X	X			Liquidity conditions have been impacted by the extreme market volatility in 2022. This has in particular and logically led to an increase in bid asks spreads. At the same time, we do see that traded volumes, especially by customers, are on the rise, supported by the scaling down of QE and continued high amounts of issuance.
Brazil	X				Liquidity has increased in the secondary market, and we have seen tighter spreads due to increased primary issuance and greater transparency in

	Improvement	Decline	No Change	Don't know	Additional comments (e.g. in particular where liquidity conditions vary from the main trend):
					trading.
Bulgaria	X				In 2022 were approved new Criteria for the selection of Primary Dealers of Government Securities, which introduced a market-making obligation.
Canada		X			Liquidity has been quite stable across sectors with a slight decline over the last 12 months where bid ask spreads have slightly increased.
Chile			X		During 2021, there were Congress initiatives that allowed people to withdraw resources from the pension accounts, which are fully private. This had an effect on the market, mainly because the pension funds had less money to invest, with its impact on treasury securities' demand. During the last months, this situation has changed and now pension managers receive positive net flows, which allow them to participate actively in the local market. But the depth of the market is worse compared to previous years.
Colombia		X			The liquidity conditions have declined due to the high volatility of the local and external markets and the impact of global inflation and hikes of interest rates in most of the countries.
Costa Rica					The traded volume of government bonds in the secondary market is decreased in more than 50%. The lower volume traded in the secondary market is the result of the volatility in the international financial markets due to the increase in interest rates, inflation and movements in the exchange rate.
Croatia		X			
Czech Republic	X				In the last 12 months, the Ministry of Finance recorded on the secondary market higher demand for domestic government bonds, as well as higher market volatility in the form of higher bid-ask spreads (mainly at the beginning of March).
Denmark		X			Slight decline in liquidity conditions with a widening in bid/ask spreads. The main reason is spill-over from the domestic covered bond market and global volatility.
Estonia			X		Securities issuance was set up only in 2019 when Treasury Bills were first introduced. In 2020, Estonia issued a Eurobond (EUR 1.5 billion), which has been rather illiquid in the secondary market. There is no regular issuance calendar in place.
Finland		X			
France			X		The war in Ukraine has initiated the rise of inflation. The central banks have increased their rates since june 2022. The impact was tension on credit supply. But on the last 12 months, the turnover on the secondary cash market is stable as the bid-ask spread on average
Germany		X			Liquidity conditions in German Federal securities remain good. Bid offer spreads have widened, clip sizes seem reduced. Overall turnover remains strong.
Greece			X		
Hungary		X			In order to decrease the market yield's volatility the DMO decided to increase the maximum bid-ask spread of PDs' mandatory price quotation obligation. Based on the experience of the past months, this was an effective step, the quality of the price quotation improved.
Iceland			X		Bid–ask spread and average ticket size have remained on average stable in recent years. Secondary market turnover is similar over the last two 12 month periods.
Ireland		X			Volumes have been marginally lower, bid-ask spreads are stable
Israel		X			Higher bid-ask spreads and lower trading volumes since January 2022.
Italy		X			While in the first half of 2021 the liquidity conditions have remained quite stable, starting from June 2021 the liquidity levels have started worsening, also due to the uncertainty triggered by the inflation forecasts and the consequent actions taken by the European Central Bank to handle inflation. After the announcement in the ECB meeting held on December 2021 of the end of the PEPP Program in March 2022 and the progressive slowdown of the path of APP Program, the market has experienced an increase in volatility and a concurrent worsening of liquidity conditions. This trend has continued over the first half of 2022 and has exacerbated in the last months.

	Improvement	Decline	No Change	Don't know	Additional comments (e.g. in particular where liquidity conditions vary from the main trend):
					During 2021 the stability of liquidity conditions has been followed by an increase in the trading volumes compared to 2020. While in the first quarter, despite the increase in market volatility the volumes traded on the main interdealer platform (MTS Italy) has remained quite stable, starting from the second quarter, the deterioration in liquidity levels has been confirmed by a slight decrease of the volumes traded
Japan			X		
Korea			X		
Republic of Latvia	X	X			We have mentioned both answered – improved in turnover and declined in liquidity through wider bid-ask-spreads. Because of Russia invasion of Ukraine changed the overall environment. But in the same time an active reopening of outstanding Eurobonds via Primary Dealer system in auctions in the domestic market has positively affected the trading volumes (increased turnover) in the secondary market in spite of volatile markets and big uncertainty in the markets. Due to geopolitical aspects bid-ask spread has increased for several bonds.
Lithuania		X			Because of the geopolitical risks and the end of the PSPP, the bid-ask spread increased significantly, trading volumes fell.
Luxembourg				X	
Mexico (Local)	X				The Federal Government has witnessed a reduction in the bid/ask spread and an increase in volume, in addition to an increase of sensibility (DV01) in long tenors.
Netherlands		X			Bid-ask spreads have trended higher. Quotation scores for primary dealers have decreased significantly. Overall trading volumes are more stable according to data from the secondary market reporting by our primary dealers
New Zealand		X			The bid-ask spread generally increased since mid of 2022.
Norway		X			We use a liquidity index to monitor liquidity in the secondary market for government bond. The index is a composite of four indicators that are primarily price-based measures. The index shows signs that liquidity has declined through 2022.
Poland		X			Average bid-ask spread of the total secondary bond market increased by around 20% in the first quarter of 2022 compared to the fourth quarter of 2021 and since then the spread has been remaining at the stable level. Trading volumes reached its peak in January 2022 and decreased drastically in the consecutive months due to market volatility mainly resulted from Russia's war of aggression against Ukraine. Data from electronic market for secondary trading.
Portugal		X			The increase in inflation and economic weakening due to the energy crises that started by the end of 2021 and the Ukrainian war led to an increase in bid-ask spreads in the last 12 months. The spreads were particularly acute at the start of the war and in the last 3 months due to Central Banks action to fight inflation. Volumes have been decreasing over the past 12 months due to the same reasons, particularly in dealer-to-dealer platforms
Romania		X			
Slovak Republic			X		Slightly higher volume on MTS but overall no significant changes in trends
Slovenia		X			In the second half of the year 2021 the bid-ask spread remained low and stable in comparison to Covid-19 crisis period. In the last 6 months (Jan-Jun 2022) the bid-ask spread started to widen due to war in Ukraine and resulting economic and geopolitical risks. Correspondingly trading volumes started to decrease.
Spain		X			We have seen a worsening of liquidity in the Spanish Public Debt market, which has been in line with the trend experiences by other European Government Bond sovereign issuers. There are multiple reasons for this decline in liquidity, among which we can highlight three: One of the main reasons is the increase in volatility, which makes Primary Dealers less willing to provide the same level of liquidity that they did in 2020 and 2021. Another reason is the change in monetary policy by large central banks. As

	Improvement	Decline	No Change	Don't know	Additional comments (e.g. in particular where liquidity conditions vary from the main trend):
					interest rates rise and the net asset purchase programs of the large central banks are ended, this affects financial markets, changing the market context that has been in place for over 10 years. We don't believe that this change will have lasting effects on liquidity, but as market agents transition from one market context to the next, liquidity conditions could worsen as market participants adapt to the new context. Yet another reason is the uncertainty in the global macroeconomic and geopolitical context. The war in Ukraine, the possible gas supply shortages and many other risks in the global economy bring more uncertainty, and therefore less liquidity.
Sweden		X			
Switzerland			X		Over the last 12 months, liquidity conditions of our bonds did not change significantly. As issuance activity was still elevated compared to pre-pandemic times, our sovereign bonds were traded slightly more often than in the years before the pandemic (as measured by turnover). The higher issuance volume of the Swiss Confederation still was mainly caused by the elevated financing needs of the Confederation's Covid-19 measures. Over the last few months, bid-ask spreads widened slightly, most of all in longer-dated bonds. This might be explained by a tighter (more negative) spread to swap at auctions in this timeframe and a large percentage of buy-and-hold investors in this market segment.
Türkiye	X				Domestic bond trading volumes in the last 12 month-period (September 2021-August 2022) in Borsa Istanbul's organized Outright Purchases and Sales Market showed an increasing trend compared with the previous period. Monthly average trading volume reached to 3.6 billion USD (3.1 billion USD in the previous period) with a daily average trading volume of 177 million USD (150 million USD in the previous 12 month-period). In terms of TRY, monthly average trading volume doubled compared with the previous period and reached to 50 billion TRY in the September 2021-August 2022 period.
UK		X			Data available to us suggest that bid offer spreads of both 10-year and 30-year gilts have widened over the last 12 months; moreover, the trading range in 2022 has been more volatile compared to that in 2021. Secondary market trading volumes (13-week average) in conventional gilts (as reported by primary dealers) have ranged between around £150bn and £180bn a week for the bulk of the past two years. However, over the past three months, volumes have fallen to circa £130bn (, which is slightly higher than the turnover observed in the summer months of 2019, in which there was no expansion of quantitative easing (QE) from the Bank of England (in contrast with the summers of 2020 and 2021). Index-linked gilt turnover (13 weeks average) spiked in the December 2021 to July 2022 period to between £27bn and £33bn a week from between £22bn and £26bn in the first 11 months of 2021. However, in August and September 2022, turnover has retracted to around £24bn.

Table A B.3. Q4 What factor affected liquidity in the prior twelve months (backward looking) and what the impact of those factors is expected to be over the next twelve months (forward looking)?

Table 1/4

Country	COVID-19 pandemic				Monetary policy developments				Macroeconomic uncertainties (e.g., inflation)			
	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction
Australia	X	Mixed	X	Mixed	X	Mixed	X	Mixed	X	Negative	X	Negative
Austria					X	Mixed	X	Negative	X	Negative	X	Negative
Belgium					X	Mixed	X	Mixed	X	Negative	X	Mixed
Brazil	X	Positive			X	Positive	X	Positive			X	Mixed
Bulgaria	X	Mixed	X	Positive					X	Negative	X	Mixed
Canada	X	Negative	X	Negative			X	Negative	X	Mixed	X	Mixed
Chile					X	Negative	X	Mixed	X	Mixed		
Colombia	X	Negative			X	Negative	X	Negative	X	Negative	X	Negative
Costa Rica	X	Negative			X	Negative	X	Negative	X	Negative	X	Negative
Croatia	X	Negative	X	Negative	X	Negative	X	Negative	X	Negative	X	Negative
Czech Republic					X	Mixed	X	Mixed	X	Negative	X	Negative
Denmark									X	Negative		
Estonia												
Finland												
France					X	Mixed	X	Mixed	X	Negative	X	Negative
Germany					X	Mixed	X	Negative	X	Negative	X	Negative
Greece	X				X		X		X		X	
Hungary	X	Negative			X	Negative	X	Mixed	X	Negative	X	Negative
Iceland												
Ireland	X				X		X		X		X	
Israel	X	Negative			X	Negative	X	Negative	X	Negative	X	Negative
Italy	X		X		X		X		X		X	

Country	COVID-19 pandemic				Monetary policy developments				Macroeconomic uncertainties (e.g., inflation)			
	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction
Japan												
Korea							X	Mixed			X	Mixed
Republic of Latvia	X	Mixed	X	Mixed	X	Mixed	X	Mixed	X	Negative	X	Negative
Lithuania					X	Mixed	X	Mixed	X	Negative	X	Negative
Luxembourg												
Mexico (Local)	X	Negative			X	Positive	X	Negative	X	Negative	X	Negative
Netherlands					X	Mixed	X	Mixed	X	Negative	X	Negative
New Zealand					X	Mixed	X	Mixed	X	Negative	X	Negative
Norway	X	Negative			X	Negative	X	Negative	X	Negative	X	Negative
Poland	X	Negative			X	Mixed	X	Mixed	X	Negative	X	Negative
Portugal	X	Negative			X	Negative	X	Negative	X	Negative	X	Negative
Romania	X	Negative			X	Negative	X	Mixed	X	Negative	X	Negative
Slovak Republic					X	Negative	X	Negative	X	Negative	X	Negative
Slovenia					X	Negative	X		X	Negative	X	
Spain					X	Negative	X	Negative	X	Negative	X	Negative
Sweden	X				X		X		X		X	
Switzerland	X	Positive			X	Positive	X	Positive	X	Mixed	X	Mixed
Türkiye	X	Negative			X	Mixed	X	Mixed	X	Negative	X	Negative
UK	X	Negative			X	Mixed	X	Negative	X	Mixed	X	Negative

Table A B.4. Q4 What factor affected liquidity in the prior twelve months (backward looking) and what the impact of those factors is expected to be over the next twelve months (forward looking)?

Table 2/4

	Geopolitical risks				Political risks (e.g. elections, government change)				Issuance strategies				Design of borrowing instruments			
Country	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction
Australia	X	Negative	X	Negative					X	Mixed	X	Mixed				
Austria																
Belgium	X	Mixed	X	Mixed					X	Positive	X	Positive				
Brazil			X	Mixed			X	Mixed	X	Negative	X	Mixed	X	Positive	X	Positive
Bulgaria	X	Mixed	X	Negative	X	Negative	X	Negative	X	Positive	X	Positive	X	Mixed	X	Mixed
Canada	X	Negative	X	Negative												
Chile																
Colombia																
Costa Rica	X	Negative	X	Negative					X	Positive	X	Positive	X	Positive	X	Positive
Croatia	X	Negative	X	Negative							X	Negative				
Czech Republic	X	Negative	X	Negative												
Denmark	X	Negative														
Estonia																
Finland	X	Negative	X	Negative												
France	X	Negative	X	Negative												
Germany	X	Negative	X	Negative	X	Negative			X	Positive			X	Positive	X	Positive
Greece	X		X													
Hungary	X	Negative	X	Negative	X	Mixed	X	Mixed			X	Mixed				
Iceland																
Ireland	X		X													
Israel	X	Mixed			X	Negative	X	Negative	X	Mixed	X	Mixed				
Italy	X		X		X		X									
Japan																
Korea																

	Geopolitical risks				Political risks (e.g. elections, government change)				Issuance strategies				Design of borrowing instruments			
Country	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction
Republic of Latvia	X	Negative	X	Negative			X	Mixed	X	Positive	X	Positive	X	Mixed	X	Mixed
Lithuania	X	Negative	X	Negative												
Luxembourg																
Mexico (Local)	X	Negative	X	Negative			X	Negative	X	Positive	X	Positive				
Netherlands	X	Negative	X	Mixed					X	Mixed	X	Mixed				
New Zealand	X	Negative							X	Positive						
Norway	X	Negative	X	Negative					X	Mixed	X	Mixed				
Poland	X	Negative	X	Negative			X	Mixed								
Portugal	X	Negative	X	Negative					X	Negative	X	Positive				
Romania	X	Mixed	X	Negative												
Slovak Republic	X	Negative	X	Negative			X	Mixed	X	Positive	X	Positive				
Slovenia	X	Negative	X													
Spain	X	Negative	X	Negative			X	Negative								
Sweden	X															
Switzerland	X	Mixed	X	Mixed												
Türkiye	X	Negative	X	Negative			X	Mixed	X	Mixed	X	Mixed			X	Positive
UK									X		X					

Table A B.5. Q4 What factor affected liquidity in the prior twelve months (backward looking) and what the impact of those factors is expected to be over the next twelve months (forward looking)?

Table 3/4

	Market microstructure (e.g. electronic trading)				New regulations				Changes in investor base				Changes in investor sentiment			
Country	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction
Australia	X	Positive	X	Positive					X	Mixed	X	Mixed	X	Mixed	X	Mixed
Austria									X	Mixed	X	Positive	X	Mixed	X	Mixed
Belgium																
Brazil	X	Positive	X	Positive							X	Positive			X	Positive
Bulgaria	X	Positive	X	Positive	X	Positive	X	Positive	X	Mixed	X	Mixed	X	Mixed	X	Mixed
Canada																
Chile																
Colombia															X	Mixed
Costa Rica											X	Positive	X	Positive	X	Mixed
Croatia																
Czech Republic																
Denmark																
Estonia																
Finland																
France									X	Mixed	X	Mixed	X	Mixed	X	Mixed
Germany									X	Mixed	X	Mixed	X	Mixed	X	Mixed
Greece							X				X				X	
Hungary									X	Mixed	X	Mixed	X	Mixed		
Iceland																
Ireland																
Israel													X	Negative	X	Negative
Italy	X		X										X		X	
Japan																
Korea																

	Market microstructure (e.g. electronic trading)				New regulations				Changes in investor base				Changes in investor sentiment			
Country	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction	Last 12 months	Impact direction	Next 12 months	Impact direction
Republic of Latvia							X	Mixed			X		X	Negative	X	Mixed
Lithuania													X	Negative		
Luxembourg																
Mexico (Local)									X	Positive	X	Positive	X	Positive	X	Negative
Netherlands	X	Negative	X	Mixed									X	Mixed	X	Mixed
New Zealand													X	Negative	X	Mixed
Norway							X	Negative								
Poland									X	Mixed	X	Mixed	X	Negative	X	Negative
Portugal											X	Negative	X	Negative	X	Negative
Romania									X	Mixed	X	Mixed	X	Mixed	X	Mixed
Slovak Republic																
Slovenia																
Spain													X	Mixed	X	Mixed
Sweden	X		X		X		X		X		X					
Switzerland													X	Positive	X	Positive
Türkiye													X	Mixed	X	Mixed
UK	X	Positive	X	Positive	X		X		X		X		X		X	

Table A B.6. Q4 What factor affected liquidity in the prior twelve months (backward looking) and what the impact of those factors is expected to be over the next twelve months (forward looking)?

Table 4/4

	Other Factors:														
Country	Especify (i)	Last 12 months	Impact direction	Next 12 months	Impact direction	Especify (ii)	Last 12 months	Impact direction	Next 12 months	Impact direction	Especify (iii)	Last 12 months	Impact direction	Next 12 months	Impact direction
Australia															
Austria															
Belgium															
Brazil															
Bulgaria															
Canada															
Chile															
Colombia															
Costa Rica	Increase interest rates	X	Negative	X	Negative	Exchange volatility	X	Negative	X	Negative					
Croatia															
Czech Republic															
Denmark															
Estonia															
Finland															
France															
Germany															
Greece															
Hungary															
Iceland															
Ireland															
Israel															
Italy															

	Other Factors:														
Country	Especify (i)	Last 12 months	Impact direction	Next 12 months	Impact direction	Especify (ii)	Last 12 months	Impact direction	Next 12 months	Impact direction	Especify (iii)	Last 12 months	Impact direction	Next 12 months	Impact direction
Japan															
Korea															
Republic of Latvia															
Lithuania															
Luxembourg															
Mexico (Local)															
Netherlands															
New Zealand															
Norway															
Poland															
Portugal															
Romania															
Slovak Republic															
Slovenia															
Spain															
Sweden															
Switzerland															
Türkiye															
UK															

Table A B.7. Q5 In your view, which aspects of market liquidity might be impacted by monetary policy quantitative tightening (QT)?

Country	PDs' market-making capacity	Investor base	Risk appetite	Fire-sale risk in securities markets	Breakdown of demand along bond lines	Investor behavior	Other (i)	(i) please specify:
Australia	X	X	X		X	X		
Austria	X	X						
Belgium				X		X		
Brazil		X	X			X		
Bulgaria	X		X		X		X	ECB's monetary policy transmission mechanism has indirect impact due to the fact that the Republic of Bulgaria is in a Currency board regime.
Canada	X		X					
Chile					X	X		
Colombia			X					
Costa Rica			X					
Croatia		X	X		X	X		
Czech Republic								
Denmark		X	X					
Estonia			X			X		
Finland		X						
France		X	X			X		
Germany			X					
Greece	X	X	X		X	X		
Hungary		X	X		X			
Iceland							X	QE has been very limited in scope in Iceland. Thus, QT will not have much impact.
Ireland	X	X		X				
Israel	X		X			X		

Country	PDs' market-making capacity	Investor base	Risk appetite	Fire-sale risk in securities markets	Breakdown of demand along bond lines	Investor behavior	Other (i)	(i) please specify:
Italy	X	X	X		X			
Japan						X		
Korea	X					X		
Republic of Latvia	X	X	X		X	X		
Lithuania	X		X	X	X	X		
Luxembourg		X				X		
Mexico (Local)			X					
Mexico (External)								
Netherlands	X	X	X			X		
New Zealand	X		X			X		
Norway	X		X			X		
Poland	X	X	X			X		
Portugal	X	X	X		X	X		
Romania		X	X			X		
Slovak Republic		X	X	X				
Slovenia	X		X		X			
Spain		X	X			X		
Sweden	X				X	X		
Switzerland		X	X			X		
Türkiye			X			X		
UK	X	X	X			X		

Table A B.8. Q6 What is your observation in terms of the practice of the following advances in FinTech in your government bond markets?

Country	Electronic trading platforms				High-frequency trading				Algorithm trading				Robo-advisors				Blockchain/distributed ledger				Other (i)				(i) please specify:
	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	
Australia		X				X				X						X				X					
Austria		X				X				X					X			X							
Belgium	X						X			X						X				X					
Brazil		X					X				X				X					X					
Bulgaria	X							X				X				X				X					
Canada	X					X				X						X				X					
Chile		X					X				X				X				X						
Colombia																									
Costa Rica				X				X				X				X				X					
Croatia		X				X																			
Czech Republic				X				X				X				X				X					
Denmark	X						X				X					X				X					
Estonia		X						X				X				X				X					
Finland																									
France		X				X			X							X				X					
Germany	X							X		X						X				X					
Greece		X				X					X				X				X						
Hungary		X						X				X				X				X					
Iceland			X					X				X				X				X					
Ireland		X																							
Israel		X					X				X				X				X						
Italy	X					X				X					X					X					

Country	Electronic trading platforms				High-frequency trading				Algorithm trading				Robo-advisors				Blockchain/distributed ledger				Other (i)				(i) please specify:
	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	
Japan																									
Korea				X				X				X				X				X					
Republic of Latvia																									domestic market is quite limited in scope, and we have not observed particular advance in FinTech so far
Lithuania		X					X				X					X			X						
Luxembourg																									
Mexico (Local)			X				X					X				X				X					
Netherlands	X							X	X							X				X					
New Zealand	X							X				X				X				X					
Norway																									
Poland	X				X																				
Portugal	X							X		X						X				X					
Romania	X						X	X			X				X				X						
Slovak Republic		X						X				X				X				X					
Slovenia		X						X				X				X				X					
Spain	X					X				X										X					
Sweden				X				X				X				X				X					

Country	Electronic trading platforms				High-frequency trading				Algorithm trading				Robo-advisors				Blockchain/distributed ledger				Other (i)				(i) please specify:
	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	To a great extent	To some extent	To a small extent	Not at all	
Switzerland	X																								
Türkiye	X						X				X					X				X					
UK		X				X				X										X					

Table A B.9. Q7 Have you observed changes in liquidity conditions of your foreign bonds (if any) over the last 12 months?

Country	Improvement	Decline	No change	Don't know	Not applicable (e.g. no foreign bonds)	Additional comments (e.g. where liquidity conditions vary from the main trend):
Australia					X	
Austria			X			Liquidity in our foreign currency issues under the Euro Medium Term Note (EMTN) programme has always been relatively limited. We have not received any indications that this has changed.
Belgium			X			We do not impose quoting obligations on our foreign currency bonds and do not track liquidity conditions.
Brazil		X				Liquidity has declined, especially in the long end of the curve, in line with the more risk averse global environment.
Bulgaria	X					On 15 September the Ministry of Finance placed on the international capital markets EUR-denominated bonds in two tranches totaling EUR 2.25 billion. The first tranche is a 7-year tranche with an amount of EUR 1.5 billion and a coupon of 4.125%. The second tranche has a tenor of 12 years, its amount is EUR 0.75 billion and its coupon is 4.625%.
Canada		X				Because of overarching market volatility and uncertainties, liquidity in foreign bond markets has also seen a slight decline.
Chile			X			
Colombia		X				
Costa Rica	X					The volume of foreign bonds traded in the domestic market increased up to three times.
Croatia		X				
Czech Republic			X			

Country	Improvement	Decline	No change	Don't know	Not applicable (e.g. no foreign bonds)	Additional comments (e.g. where liquidity conditions vary from the main trend):
Denmark			X			Only one short dated foreign bond outstanding so not really possible to infer any changes.
Estonia					X	
Finland			X			
France					X	
Germany					X	
Greece					X	
Hungary			X			These bonds are rather illiquid.
Iceland						
Ireland					X	
Israel			X			
Italy		X				Due to the raising rate environment in the US, we noticed a decline of secondary transactions regarding our Global bonds in USD. However, the Italian Treasury is committed to support liquidity in the secondary market also suppling the market with new bond emissions or reopening current bonds with tap syndications
Japan					X	
Korea				X		
Republic of Latvia	X	X				We have mentioned both answers – improved and declined, because of Russia invasion of Ukraine changed the overall environment from February 2022. Regular reopenings of outstanding Eurobonds (under English law) via Primary Dealer system in auctions in the domestic market has positively affected the trading in the secondary market. As well as larger borrowing needs enabled us to issue larger volumes in syndication in 2021, thus helping liquidity in secondary market. But after February 2022 situation changed in terms of ticket size volumes and bid-ask spread widening.
Lithuania		X				
Luxembourg					X	
Mexico (Local)		X				From September 14th, 2021 to September 14th, 2022 Mexico's foreign denominated bonds have shown a worsening in liquidity (measured through the difference in their bid/ask prices). During that period, US dollar denominated benchmarks (5, 10, and 30-year bonds) worsened their average liquidity from 0.52 to 0.67 while euro denominated benchmarks (5, 10, and 30-year bond) worsened their average liquidity from 0.66 to 0.82.
Netherlands					X	
New Zealand					X	
Norway					X	
Poland			X			

Country	Improvement	Decline	No change	Don't know	Not applicable (e.g. no foreign bonds)	Additional comments (e.g. where liquidity conditions vary from the main trend):
Portugal			X			
Romania		X				Due to high level of the financing needs, the primary market we attracted significant volumes with the impact in the reduced liquidity on the secondary market.
Slovak Republic		X				Very limited foreign bonds outstanding. No foreign bond are being traded on MTS. These issues are smaller mostly in hands of buy and hold investors. We have very limited information about liquidity of these bonds.
Slovenia			X			
Spain			X			Our bonds with a foreign currency denomination are a marginal element of our outstanding debt portfolio, and do not play a significant role in the Spanish Treasury's current DMO strategy.
Sweden				X		
Switzerland					X	All our bonds are denominated in Swiss franc, we do not have any foreign bonds.
Türkiye	X					Trading volume of USD or EUR denominated Eurobonds (issued by Ministry of Treasury and Finance of Türkiye) that are traded in Borsa Istanbul increased in the last 12 month-period (September 2021-August 2022). Monthly average volume reached to 24 million USD (from 21 million USD in the previous period).
UK					X	The UK DMO issues only sterling denominated bonds

Table A B.10. Q8 Have you observed changes in liquidity conditions of bond related derivate and repo markets over the last 12 months?

Country	Improvement	Decline	No change	Don't know	Not applicable (e.g. no foreign bonds)	Additional comments (e.g. where liquidity conditions vary from the main trend):
Australia		X				Low free float in some front-end Treasury Bonds has contributed to a general decline in the liquidity of the 3 year Treasury Bond futures contract (physical bonds trading expensive to the futures contract has sidelined some participants reducing turnover/liquidity/depth). This has begun to recover but remains below normal.
Austria			X			We have not observed any larger changes regarding the liquidity conditions over the past 12 months.
Belgium		X				Repo's became extremely expensive in August-September when there was fear of a shortage of supply of short dated government securities in EUR. The situation has improved since.
Brazil	X					We have seen an improvement in terms of liquidity in the IPCA Coupon Futures Contract (DAP), a derivative traded at B3, that works as a hedge instrument for NTN-Bs.

Country	Improvement	Decline	No change	Don't know	Not applicable (e.g. no foreign bonds)	Additional comments (e.g. where liquidity conditions vary from the main trend):
Bulgaria	X					The government securities repo market is a natural complement to the interbank bond market. The Bulgarian National Bank is very limited in its actions as it is a lender of last resort. The repo market has a major role in the domestic market, as Republic of Bulgaria is in currency board regime.
Canada		X				Same as above.
Chile					X	
Colombia		X				In Colombia, derivate and repo markets have declined over the past 12 months due to accelerated hikes in lending rates from the central bank which have been increasing from 1.75% to 9.00%, so this behavior has impacted the repo and bond lending markets.
Costa Rica			X			The traded volume of government bonds in the related repo markets increased in 10%.
Croatia					X	
Czech Republic			X			
Denmark		X				The main derivative market used for Danish government bonds is the german bund futures where some detoriation in liquidity have been observed.
Estonia					X	
Finland			X			
France		X				The normalization of the credit market combining to an excess liquidity have induced tension on the repo market. The need of collateral had an impact on the liquidity of the short term bond market.
Germany		X				Swap and repo liquidity have been reduced in general. Collateral scarcity is a prominent topic. Squeezes seem to have become somewhat more likely. The future market maintained its pivotal role for the liquidity conditions in the EGB market.
Greece			X			
Hungary		X				Repo transaction volumes between the DMO and banks decreased, mainly because both sides' liquidity position is similar, but the DMO also made some decisions to decrease (or temporarily halt) the repo activity with the market.
Iceland					X	
Ireland			X			
Israel			X			
Italy	X					In the last 12 months repo market has performed efficiently and tensions on GC rates have occurred in combination with the end of the quarter and at the turn of the year. However, the market has experienced a reduction of the collateral – also

Country	Improvement	Decline	No change	Don't know	Not applicable (e.g. no foreign bonds)	Additional comments (e.g. where liquidity conditions vary from the main trend):
						due to the Purchase Programmes of the ECB (APP and PEPP) – causing a drop of Special repo rates at more negative levels. This trend has been partially offset by the MEF, which with its new repo operation has provided more collateral in the market. During the months, the volume traded in Special repo increased consistently, widely offsetting the slight decrease of those traded in GC.
Japan			X			
Korea				X		
Republic of Latvia				X		
Lithuania				X		
Luxembourg					X	
Mexico (Local)	X					Comparing the most recent traded volume data with that of a year ago, both the real and nominal government bond curves show an increase in traded volume of 27%. Likewise, the moving averages of the volumes traded on both curves also show an increase over the last year.
Netherlands		X				Repo market for Dutch securities got more expensive after the change in deposit rate in July. Liquidity in the repo market has also gone down as more repo requests come to us as a DMO as compared to previous years.
New Zealand	X					Liquidity in repo market has improved since LSAP purchases ended in July 2021.
Norway				X		
Poland	X					Over the last 12 months value of buy-sell-back bond transactions have nearly doubled, while repo transactions remained stable with a slight upward trend. The average monthly value of transaction in this period amounted to ca. PLN 810mn. In August 2021 the value of those transactions was ca. PLN 602mn, while in July 2022 it was almost PLN 1 006mn.
Portugal		X				Some primary dealers have raised concerns on repo market liquidity, mentioning that some bonds and bills have been harder to find (and costlier). Reduced funding needs and lower issuance volumes are the main reasons that primary dealers attribute to the perceived lower liquidity in the repo market.
Romania					X	
Slovak Republic				X		We use only CCIRS for foreign currency bonds. We haven't issued any new foreign currency bonds since 2014 and didn't have to initiate any new derivatives.
Slovenia			X			
Spain		X				We aren't directly involved in bond derivative or repo markets as the Spanish DMO. However, we are aware that there have been some liquidity problems in the Euro-area repo market, due to collateral scarcity.
Sweden		X				

Country	Improvement	Decline	No change	Don't know	Not applicable (e.g. no foreign bonds)	Additional comments (e.g. where liquidity conditions vary from the main trend):
Switzerland				X		There is a sovereign bond futures market (CONF Futures), however due to the lack of involvement in this market we are not aware of any changes in liquidity conditions. We are also not aware of any changes in the share of repo transactions which were collateralized with bonds of the Swiss Confederation.
Türkiye		X				Trading volumes in repo markets has shown a declining trend in the last 12 month-period (September 2021-August 2022). Monthly average trading volume decreased to 83.8 billion USD (from 166.2 billion USD in the previous period).
UK	X					According to Bank of England data (as at end June 2022), liquidity in the sterling repo markets has improved slightly in overnight repo (i.e. where a financial institution sells securities and agrees to buy them back the following day), and remained the same in tomorrow/next day maturities (a transaction that spans two consecutive business days – tomorrow and the following day – that enables traders to roll over their positions).

Table A B.11. Q9 How has the market-making capacity of primary dealers evolved in your market over the last few years?

Country	Increased	Decreased	Stable	Please discuss
Australia		X		The collective market making capacity of intermediaries has probably not matched the growth in the stock of debt securities on issue over recent years. Higher costs of market making may also have triggered some erosion in capacity as well. Intermediaries are generally more vulnerable now to events that trigger bond accumulation on trading balance sheets than in the past. Despite some erosion in capacity, the Australian Government Securities market remains well 'brokered'.
Austria			X	
Belgium			X	The situation seems stable, but market makers have lost an important part of their role in smoothening auction supply to hedge funds. Cf. next question.
Brazil	X			More banks and brokers have shown interest in being a primary dealer. The highlight is the consolidation of the largest groups in the brokers business.
Bulgaria	X			With the introduction of new Criteria for the selection of Primary Dealers of Government Securities in 2022 we practically introduced the market making system in Bulgaria. As of July 1, the primary dealers of government securities must comply with the obligation to maintain firm quotations.
Canada	X			Increase in overall issuance, improved international demand, relative value trading, and overall bigger size of the market has led to the increase in market

Country	Increased	Decreased	Stable	Please discuss
				making capacity of dealers.
Chile				We do not have PD
Colombia			X	Over the last few years the Primary Dealer (PD) program in Colombia has played a vital role in contributing to the successful development of the domestic debt market and has been a helping hand to attract foreign investors.
Costa Rica			X	I´ve been working to development this market in Costa Rica.
Croatia				
Czech Republic	X			
Denmark		X		Regulation and the cost of capital have led to an increased focus from the primary dealers on where they use the balance sheet. In general this has led to a decline in the balance sheet used from the primary dealers.
Estonia				Estonia has not established a primary dealer system.
Finland		X		
France		X		Regulatory reforms have induced balance sheet constraints for some primary dealers.
Germany			X	
Greece			X	
Hungary			X	These years have been characterized by crises; in difficult times the DMO allowed the PDs to make market on a best efforts basis, with no penalties, and the DMO also widened the obligatory minimum bid-ask spread. These measures have resulted in a rather stable market making performance of PDs.
Iceland			X	
Ireland			X	
Israel	X			Over the last few years, measures were taken to improve market-making capacity, including benefits to Primary Dealers that provide additional liquidity in the secondary market and more obligations in the Primary Market.
Italy		X		The European regulatory framework introduced after the financial crisis seems to have changed quite significantly the economics of market making activity, with strong repercussions on the underlying liquidity of bonds. Due to capital requirements, for instance, the cost related to bond risk warehousing has risen under different perspectives, reducing de facto their capacity to quote and then trade at tight levels. This trend has brought in some cases dealers to modify their business model or, in some other cases, to put in place strategies aimed at increasing the profitability of market making that in most of the cases have resulted in some reduction of the liquidity of bonds on the secondary market.
Japan			X	Although the bid-ask spread widened temporarily in the beginning of the COVID-19 pandemic, it has remained within a certain range. We recognize that there has been no change in the market-making capacity.
Korea			X	

Country	Increased	Decreased	Stable	Please discuss
Republic of Latvia	X			As of January 2021 we have a new Primary dealer – Erste – in our PD group. Regular auctions and re-openings of Eurobonds in auctions in domestic market makes it more attractive for investors and for dealers. Increased borrowing levels in domestic market via auctions have positively impacted overall liquidity levels as well (increased turnover in the secondary market).
Lithuania		X		With diminishing liquidity PDs no longer want to keep higher amount of bonds on their books and accept losses
Luxembourg				No Aplicable
Mexico (Local)	X			In 2000, SHCP successfully implemented the market makers program. Since then, the market making capacity of primary dealers has been increasing due to the good structure of the program. In addition, in 2021, some changes were made allowing more institutions to join this program.
Netherlands		X		It is not so much about the last few years but mostly since the start of 2022 that market-making capacity has gone down. Geopolitical risks and monetary policy changes have led to increased volatility which has put b/a-spreads higher. On top of higher b/a-spreads the increased volatility has led to PD's not being able to quote within the required spread for the required amount of time and as such quotation scores have gone down significantly since the start of 2022.
New Zealand	X			The market making capacity for dealers has either remained the same or slightly improved in the last 12 months. There has been an improvement in the linker market, with Inflation-Indexed Bonds moving to single price auctions.
Norway		X		Higher volatility has increased risks and costs of being a primary dealer.
Poland	X			The market-making capacity of primary dealers has been strengthened by introduction of modern electronic trading platform, software supporting high-frequency quoting and trading and large issues of benchmark bonds enhancing market liquidity. The system of constant evaluation of primary dealers performance, improved communication and quarterly assessments stimulates dealers to better results (see point 11).
Portugal	X			Over the past few years, the market making capacity of primary dealers have been improving. In 2022, there has been a decrease in their capacity due to an increase in bid-ask spreads and a decrease in liquidity, however with higher capacity then in 2018 and 2017
Romania			X	We recorded steady trading volumes on our secondary market electronic trading platform (EBOND) in the last few years.
Slovak Republic			X	
Slovenia			X	
Spain			X	We have seen some Primary Dealers increase their investment in our market, increasing their market-making capacity in the last few years, but at the same time we have seen others decrease their investment. We believe that this shows that our market remains dynamic and competitive, leading to the success of certain Primary Dealers who are more efficient than others or willing to take on more risk in the current market context.
Sweden		X		
Switzerland			X	The Swiss Confederation does not use a PD system for any of its financing activities. We have a stable group of counterparties (banks) which participate in our auctions and trade actively in the secondary market. But we do not have any obligations to them and they receive no compensation from us in

Country	Increased	Decreased	Stable	Please discuss
				return. We did not perceive any fundamental changes in primary or secondary market activity over the last few years.
Türkiye	X			Primary dealer trading in Outright Purchases and Sales Market has increased over the last 12 month-period (September 2021-August 2022). There is an increasing trend in the secondary market trade volume since the beginning of the 2022.
UK			X	During the COVID pandemic, the relaxation of bank capital and liquidity requirements, along with the extra liquidity provided by the Bank of England, enhanced primary dealers' market making capacity. However, over the last 12 months, the commencement of quantitative tightening (QT) from the Bank of England, the fall in secondary market turnover in conventional gilts and also the increase in market volatility is likely to have increased strain on the market making capacity of primary dealers.

Table A B.12. Q 10, 11

Country	10. Are other market participants playing a bigger role, behaving as "shadow dealers" (e.g., hedge funds, or other type of investors)?	Please discuss	11. Do you have measures in place to motivate/oblige dealers to provide liquidity?	If yes, please explain which measures are the most effective according to your experience.
Australia		No		
Austria	Yes		The trend of very large orders by hedge funds at syndications continues, which also has effects on the secondary market.	Yes
Belgium	Yes		Yes, we see that the "warehousing" role, classically played by market making banks in absorbing auction supply by selling around the auction dates and purchasing in the auctions has been taken over to a large extent by hedge funds.	Yes
Brazil		No	Hedge funds in Brazil often trade curve distortions or make speculative bets. It's important to highlight, however, that their participation has increased, improving liquidity in Brazil.	Yes
Bulgaria	Yes		Investment intermediaries, trading for their clients are a major market participant in the secondary market of government securities.	Yes
Canada	Yes		Increased participation of hedge funds, particularly on the international side, has been observed over the past few months.	Yes
Chile		No		
Colombia	Yes		Foreign investors have played an important role over the last few years, and they have demanded a big part of the auctioned debt.	Yes

Country	10. Are other market participants playing a bigger role, behaving as "shadow dealers" (e.g., hedge funds, or other type of investors)?	Please discuss	11. Do you have measures in place to motivate/oblige dealers to provide liquidity?	If yes, please explain which measures are the most effective according to your experience.
Costa Rica		No		
Croatia		No		
Czech Republic	Yes			Yes
Denmark		No	So far we haven't seen any new market participants playing a significant role in the market	Yes
Estonia			Not applicable.	
Finland		No		Yes
France	Yes		Other market participants like hedge funds contribute to providing liquidity on the French curve.	Yes
Germany	Yes		Hedge funds have been a significant liquidity provider for German government bonds.	
Greece		No		Yes
Hungary		No		Yes
Iceland		No		Yes
Ireland		No		Yes
Israel	Yes		Yes, historically a there were a few large market participants who work through the primary dealers.	Yes
Italy		No	Our secondary market is characterized by a high degree of liquidity provided by a great variety of market participants. These factors contribute to minimize the impact that each dealer may have on the market. However, hedge funds have increased their presence on the primary and secondary market but they tend not to behave as liquidity providers as for most of them their presence is purely tactical	Yes

Country	10. Are other market participants playing a bigger role, behaving as "shadow dealers" (e.g., hedge funds, or other type of investors)?	Please discuss	11. Do you have measures in place to motivate/oblige dealers to provide liquidity?	If yes, please explain which measures are the most effective according to your experience.
Japan		No		Yes
Korea		No		Yes
Republic of Latvia		No		Yes
Lithuania		No		
Luxembourg		No		
Mexico (Local)	Yes		The Mexican Government debt market has among its largest participants the AFORES, brokerage houses and foreign hedge funds, each of which has a very active participation in the market.	Yes
Mexico (External)				
Netherlands			Not applicable/don't have enough information to answer this question	Yes
New Zealand		No		Yes
Norway		No		Yes
Poland		No		Yes
Portugal	Yes		There have been unconfirmed reports of hedge funds behaving as shadow dealers.	Yes
Romania	Yes		Some of our PDs are managing orders from offshore investors.	Yes
Slovak Republic		No		Yes
Slovenia		No		Yes
Spain	Yes		The increase in regulation on the banking sector has affected many of our Primary Dealers. This means that they are not able to carry out the same operations that they did 10 years ago for example. Other market	Yes

Country	10. Are other market participants playing a bigger role, behaving as "shadow dealers" (e.g., hedge funds, or other type of investors)?	Please discuss	11. Do you have measures in place to motivate/oblige dealers to provide liquidity?	If yes, please explain which measures are the most effective according to your experience.
			participants have stepped in to fill the gaps left by the baking sector, especially hedgefunds. This means that some of the roles previously carried out by banks are now carried out by hedgefunds, among which we can highlight the provision of liquidity for certain segments of the European Government Bond market. However, these changes have evolved naturally in the market, without a specific direction provided by market regulators and supervisors.	
Sweden		No		Yes
Switzerland		No	There are large institutional investors who hold a significant proportion of our bonds. However, these types of investors trade relatively little in our bonds. Apart from those investors and our main counterparties (see Q10), we are not aware of any market participants playing a significant role in our bond market. Please note: We are only rarely in direct contact with the end investors of our bonds. Therefore, we may not have all the information necessary to assess this topic.	
Türkiye		No		Yes
UK		No	Entities other than GEMMs (e.g. hedge funds) have acted in effect as intermediaries in the secondary market between the DMO as issuer and end investors; this activity is likely to have been material in recent years. Moreover, according to anecdotal evidence, some end-investors also transact with non-GEMM banks and/or brokers. However, any non-GEMM entity acting in this way has no formal agreement with the DMO and, therefore, no commitment to participate in our operations or make two-way prices in the secondary market.	Yes

Table A B.13. Q12 Specify the measures already in place / under consideration to support secondary market liquidity

Table 1/2

	Improving market capacity of primary dealers			Repos / Reverse Repos / Securities Lending			Enhancing the integrity/transparency of electronic trading			Adapting regulations that may impact intermediation capacity			Buyback/switch operations			Regularly scheduled taps of existing securities		
	AP	UC	NC	AP	UC	NC	AP	UC	NC	AP	UC	NC	AP	UC	NC	AP	UC	NC
Australia			X	X					X			X	X			X		
Austria	X			X					X			X				X		
Belgium			X	X					X			X	X			X		
Brazil	X				X			X			X				X	X		
Bulgaria	X			X			X				X				X	X		
Canada	X			X					X			X	X	X				X
Chile		X			X				X			X	X			X		
Colombia	X			X					X			X	X			X		
Costa Rica	X			X			X				X				X			
Croatia					X			X			X						X	
Czech Republic			X	X			X				X		X					X
Denmark		X		X					X			X	X			X		
Estonia			X			X			X			X			X			X
Finland			X	X					X			X			X	X		
France			X	X				X				X	X			X		
Germany				X												X		
Greece		X			X		X				X		X				X	
Hungary	X			X					X			X	X			X		
Iceland				X									X					
Ireland				X									X			X		
Israel					X				X			X	X			X		
Italy	X			X			X			X			X			X		
Japan			X	X					X			X	X					X
Korea	X					X			X			X	X			X		

	Improving market capacity of primary dealers			Repos / Reverse Repos / Securities Lending			Enhancing the integrity/transparency of electronic trading			Adapting regulations that may impact intermediation capacity			Buyback/switch operations			Regularly scheduled taps of existing securities		
	AP	UC	NC	AP	UC	NC	AP	UC	NC	AP	UC	NC	AP	UC	NC	AP	UC	NC
Republic of Latvia					X									X		X		
Lithuania			X		X				X			X			X	X		
Luxembourg																		
Mexico (Local)	X			X				X		X			X			X		
Netherlands	X			X				X				X		X		X		
New Zealand			X	X					X			X	X			X		
Norway				X									X			X		
Poland	X			X			X			X			X			X		
Portugal	X				X		X					X	X			X		
Romania	X				X			X			X		X			X		
Slovak Republic			X		X		X	X				X	X			X		
Slovenia					X								X					
Spain	X			X			X					X		X		X		
Sweden				X									X			X		
Switzerland			X		X				X			X		X				X
Türkiye	X			X			X			X			X			X		
UK				X					X			X			X	X		

Note: AP: Already in place; UC: Under consideration; NC: Not considered

Table A B.14. Q12 Specify the measures already in place / under consideration to support secondary market liquidity

Table 2/2

	Ad hoc taps of existing securities			Improved communication with market participants			Others:									Notes
	AP	UC	NC	AP	UC	NC	Specify	AP	UC	Specify	AP	UC	Specify	AP	UC	
Australia	X				X											Buybacks have been used in the past but a switching facility is not in place. Existing securities are tapped according to decisions on a weekly basis, in this sense they are 'ad-hoc', however, there are sections of the curve that we regularly tap.
Austria	X			X												We aim to improve the market capacity of primary dealers e.g. by selling bonds (from our own retention) to them via the secondary market.
Belgium	X			X												
Brazil			X	X												The current focus is on improving the transparency and participation on electronic trading, in addition to creating securities lending options and repos that assist primary dealers in providing liquidity.
Bulgaria	X			X												Efforts are aimed at integrating foreign investors, to the local sovereign debt market, through regulatory and infrastructural changes. In addition, the future accession to the T2S of the Depository of GS will contribute to enlarge the investors base.
Canada			X	X												
Chile	X															We are analyzing the implementation of market makers for treasury bonds. A bill was sent to the Congress, in order to allow the lending of securities to the market makers, in order to do it more attractive. At the same time, we are analyzing measures to strengthen the repo market.
Colombia			X	X												
Costa Rica	X			X												
Croatia		X			X											
Czech Republic	X			X												

	Ad hoc taps of existing securities			Improved communication with market participants			Others:									Notes
	AP	UC	NC	AP	UC	NC	Specify	AP	UC	Specify	AP	UC	Specify	AP	UC	
Denmark	X				X		Securing a better alignment between our and PD's interest		X							
Estonia			X			X										
Finland			X	X												
France			X	X												
Germany	X			X												
Greece	X			X												
Hungary	X			X												
Iceland	X						Number of PDs go from 4 to 5		X							
Ireland				X												
Israel			X	X												
Italy	X			X												In 2021, liquidity management was characterized by the introduction of the repurchase agreement (Repo) activity, which generated positive effects both in terms of efficiency in raising and investing of cash and in the management of distortions in the market. For the purposes of executing Repos with the aim of raising cash, the Treasury has set up its own portfolio, composed of tranches of Government securities already in circulation in the nominal BTP segment. This portfolio is periodically updated to adjust its composition and quantities in line with cash management needs and consider the full implementation of Repo operations. Given the levels of market rates, while in 2021 the Treasury operated on the Repo market only in raising cash, starting from 2022 the Treasury could have recourse to the Repo market also for investing its cash balances.
Japan			X	X			Liquidity Enhancement Auctions	X								

	Ad hoc taps of existing securities			Improved communication with market participants			Others:									Notes
	AP	UC	NC	AP	UC	NC	Specify	AP	UC	Specify	AP	UC	Specify	AP	UC	
Korea			X	X												
Republic of Latvia	X			X												
Lithuania	X			X												
Luxembourg																
Mexico (Local)	X			X												
Netherlands	X					X										
New Zealand	X			X												
Norway																
Poland	X			X												We consistently hold dealers accountable for their obligations supporting secondary market liquidity and cooperate with them on any problematic matter.
Portugal	X			X												
Romania	X			X												
Slovak Republic	X			X												The biggest accomplishment in small market like Slovak market was MTS introduction
Slovenia	X															
Spain			X	X												One of the main changes we have done in our issuance to support secondary market liquidity is increase the issuance of OffTheRun bonds in our primary market issuance. This helps to increase the available supply of many references that are “street-shorts”, helping Primary Dealers obtain these bonds via auction and be able to more easily provide liquidity for these references.
Sweden			X	X												
Switzerland	X			X												The main instruments to support secondary market liquidity are regular taps of existing bonds (no pre-scheduled rhythm for individual bonds) to achieve our target volume of around CHF 4 billion at maturity. Between auction dates, the Federal Treasury sells so called “own tranches” from time to time to

	Ad hoc taps of existing securities			Improved communication with market participants			Others:									Notes
	AP	UC	NC	AP	UC	NC	Specify	AP	UC	Specify	AP	UC	Specify	AP	UC	
																support market liquidity and cover extraordinary market demand. Own tranches are Government Bonds owned by the Confederation and can be sold on demand at market prices (own tranches are not yet placed/settled, the whole issuance process is completed except the sale to the investor à primary market transaction). We consider the selling of own tranches as tap issues. One possible instrument to counter decreasing secondary market liquidity could be buyback and switch operations. We are not yet using this instrument, but are closely following all developments in this area. We are also currently working on getting started on the repo market, which could also include special repos to support the market in times of market stress with scarce T-Bonds. Please note: There are no concrete plans yet for the implementation of these two instruments.
Türkiye	X			X												
UK	X			X												Buyback operations of near to maturity gilts (sub 1-year) has already been in place for a number of years for redemption management purposes.

Note: AP: Already in place; UC: Under consideration; NC: Not considered.

Table A B.15. Q 13, 14, 15, 16

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Australia		No			No			No			No	
Austria		No		Yes		We are evaluating to introduce specific quoting obligations for RAGBs.		No			No	There have been no significant changes to our communication strategy in recent months. However, with respect to our inaugural Green Bond syndication we have had a greater exchange and engagement with investors around the Green Bond Framework published on 9 May 2022, and in the run-up to the Green Bond issuance on 24 May 2022, than is typical for a syndication of a conventional RAGB.

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Belgium		No	On the contrary, we have shown some lenience given the extremely volatile backdrop in which they need to operate.		No			No			No	
Brazil	No			Yes		The National Treasury of Brazil is always looking to improve the rules on obligations and privileges for primary dealers. In particular, the main objective is currently looking for ways to prioritize the electronic market and to extend the maturity and improve the composition of the federal public debt.	Yes		We are studying ways to improve the secondary liquidity of interest rate-linked bonds and floating rate bonds, as they also represent relevant components of our federal public debt.	Yes		National Treasury is always trying to improve communication with markets participants.

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Bulgaria	Yes		Implemented market-making system as of 1 July, 2022.	Yes		We do not foresee the implementation of any new obligations and privileges as in 2021. The Criteria for the Selection of Primary Dealers of Government Securities and the issued Instruction on Reporting the Criteria for the Selection of Primary Dealers of Government Securities and Granting Primary Dealers the Right to Participate as Joint Lead or Co-Lead Managers in Syndicated Placement Transactions of Bonds Issued by the Republic of Bulgaria on International Markets were approved by Order No. ZMF - 1358/31.12.2021.	Yes		Efforts are aimed at integrating foreign investors, to the local sovereign debt market, through regulatory and infrastructural changes. In addition, the future accession to the T2S of the Depository of GS will contribute to enlarge the investors base.	Yes		In 2021, a Primary Dealers Committee was established pursuant to Article 8a of Ordinance № 15 of 4 October 2007 on the Control over Transactions in Government Securities, with advisory functions to exchange information and make recommendations between the issuer and the PD on the legal framework and market infrastructure, including the criteria for the selection of primary dealers. In the recent month we maintain intensive communication with all type of investors.

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Canada		No	N/A		No	N/A	Yes		Canada is considering re-introducing buyback operations in order to improve liquidity in the secondary market.		No	N/A
Chile		No			No			No			No	
Colombia		No	The requirements on market-makers in their provision of liquidity are regulated under Resolution 5112 of 12/21/2018.		No	The Resolution 5112 of 12/21/2018 incorporated recent modifications related to "obligations and privileges" for primary dealers.		No	New considerations could be reviewed whenever the market makers request it.	Yes		The Primary Dealer Program has a schedule for meetings with the DGCPTN and there is a direct communication channel with the DMO.
Costa Rica		No	The government has been working to development this market in Costa Rica. In this moment we haven´t market-makers.	Yes		The government has been working to development this market in Costa Rica. In the next months, we try to evaluate different kinds of measures, indicators and normative to development market-makers.	Yes		The government has been working to development this market in Costa Rica. In the next months, we try to evaluate different kinds of measures, indicators and normative to development		No	

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
									market-makers.			
Croatia								No			No	
Czech Republic		No			No			No			No	
Denmark		No		Yes		We consider to start use syndications for domestic bonds. Public ranking of the primary dealers is also considered.		No		Yes		We have increased our direct communication with investors.
Estonia		No			No			No			No	
Finland		No			No			No			No	
France		No	AFT is monitoring, thanks to PDs feedbacks, the liquidity of the French curve. There is no new requirement.		No	Obligations and privileges are based upon the SVT* Charter which is updated every 3 years. *SVTs: Primary Dealers in French Treasury securities		No	No specific consideration at the moment.		No	Communication strategy is based on transparency and regularity. No change.
Germany		No	We do not impose any requirements on market makers.		No			No			No	

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Greece		No		Yes			Yes				No	
Hungary	Yes		We have lowered the minimum quotation amount in case of T-bills and increased them in case of floating rate notes; decreased the number of series one PD has to quote prices for; we have decreased the daily minimum quotation time from 5 hours to 4 hours. We have widened the maximum bid-ask spread of the price quotation. Since July 2022 Non-PD Market Makers can also participate on MTS Hungary, and they also have quoting obligations. (The	Yes		We have a new Primary Dealer agreement, effective from July 2022. We have modified, adjusted, fine-tuned many obligations and rights. In addition, we created a new status: the Non-PD Market Maker, who has less rights and obligations than a PD, and whose main role is to provide liquidity on the secondary market. We have rationalized our sanctioning policy, but at the same time we have also built more incentives into the PD system.		No		Yes		We have been communicating more actively with our PDs.

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
			first Non-PD Market Maker is planned to enter the platform in Q4 2022). We have also introduced to measure the price quotation quality on MTS Hungary, which has become one of the factors to be taken into account in the calculation of the PD ranking.									
Iceland		No			No			No			No	

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Ireland		No			No			No			No	
Israel		No			No			No			No	

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Italy	Yes		Please refer to the answer to the question n. 11		No	Considering the adjustments already introduced in recent months, at the moment no additional changes are being considered. In fact, starting from 2021 the right to participate at Italian Government bonds auction has been limited to the Primary Dealers and Candidates. Moreover, there has been a slight revision to the share reserved in the supplementary placements in order to let the first eight Specialists (instead of the previous ten), ranked according to the performance, participate in the auctions' re-openings.		No	The measures implemented so far appear quite efficient to motivate dealers in improving market efficiency. However, we monitor closely the evolution of the market to react in a timely manner in case of need of any amendment to our Evaluation Criteria, even during the year.	Yes		Starting from June 2022, the format of the Quarterly Issuance Program Bulletin has been revised to provide more information to the market participants. In particular, it has been structured into four sections: the first, which is the standard section, dedicated to the quarterly issuance program; the second, which provides an update on the funding activity carried out during the year; the third, which provides a description of the macroeconomic context; the fourth, which provides an update on the public finance indicators

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Japan		No			No			No			No	
Korea		No			No			No			No	
Republic of Latvia		No			No			No			No	No, just because the strategy in general is correct and working. But we would like to improve the content of Investor Presentation and could consider more bilateral dialog with investors.
Lithuania		No			No			No		Yes		Contact PDs more often, distribute additional promotional materials to investors, resumed physical meetings with investors abroad
Luxembourg			Not applicable			Not applicable		No			No	
Mexico (Local)		No			No			No			No	Internal market debt On a quarterly basis, the Federal Government announces its auction calendar, which has allowed for a very effective communication dynamic. In this regard, we plan to continue with the quarterly announcements.
Mexico (External)								No			No	External market debt The Federal Government does not participate in any communication aimed at secondary market participants.

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Netherlands	Yes		Technically there are no new requirements we just adjusted the existing requirements to be easier to comply with.	Yes		Under consideration are now: less obligations and different structure for privileges	Yes		No concrete plans are announced at this moment but the following is under consideration: -extending the buyback programme to include more lines -regularly scheduled switch auctions -extend repo facility or become more active in repo market ourselves to increase liquidity -include secondary market performance into existing privileges for PD's in order to incentives activeness		No	
New Zealand		No			No			No			No	

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Norway		No		Yes		The primary dealers are obliged to quote firm prices with a maximum spread and for a minimum volume in each bond. Since June 2022 the DMO has allowed primary dealers to set a wider price spread in thei interdealer market for both government bonds and Treasury bills due to heightened market volatility. We will consider the obligation to quote firm prices going forward and consider the impact this has on the market for government debt.		No			No	
Poland		No			No			No			No	Our funding plans are published before coming months and quarters. Earlier, we contact our primary dealers to present our ideas and ask for their opinions. Our communication strategy was

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
												basically unchanged.
Portugal		No			No	We do an annual assessment of primary dealer business model. On that sense can be adjusted the obligations and privileges for primary dealers.		No	Please see question 14.		No	
Romania	Yes		A new regulation regarding the mandatory conditions for PDs / market-makers to be met in order to ensure provision of liquidity was approved this year. In this sense, the minimum volume that must be quoted for a period of time at a maximum spread was increased from RON 5		No		Yes		We would like to adapt our regulations to the current market conditions in order to improve secondary market liquidity. The additional measures might include changes in the quotation obligations and additional market-making conditions for PDs.	Yes		We have improved our market communication strategies in the recent months both by holding more frequent meetings with the market participants, extending the communication to the secondary dealers and as well by exchanging information electronically.

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
			million to RON 10 million.									
Slovak Republic		No	Brand new requirements were imposed with MTS launch in 2018.		No			No			No	
Slovenia		No	We consider current requirements as satisfactory.		No	We consider current set up as satisfactory.		No	We consider current set up as satisfactory.		No	

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Spain		No	We have maintained the same requirements that were in place in 2021.		No	We are not considering changes in the obligations, requirements and privileges for the primary dealers of our market. However, we are considering making small changes in the Evaluation System that we have for our Primary Dealers. These changes would be aimed at fine-tuning the current system and helping improve the incentives it provides for our Primary Dealers.	Yes		We are considering making small changes in the Evaluation System that we have for our Primary Dealers. These changes would be aimed at fine-tuning the current system and helping improve the incentives it provides for our Primary Dealers.	Yes		We are now looking to do more in-person meetings with investors as part of our investor outreach. With the pandemic we weren't able to do these in-person meetings, which we believe to be vital to establishing long-lasting communication and contact with investors.
Sweden		No			No			No			No	

Country	13. Have you imposed new requirements on market-makers in their provision of liquidity over the last 12 months?		Please explain:	14. Are you considering adjusting "obligations and privileges" for primary dealers and market makers?		Please elaborate:	15. Do you consider implementing additional measures to help improve the capacity of secondary-market intermediation?		Please elaborate	16. Have you made any changes to your market communication strategies in the recent months?		Please describe:
Switzerland		No	See Q9		No	See Q9		No	See Q9		No	We did not make any changes. We publish our issuance program for bonds and bills in December for the following year. This program includes the dates of our auctions as well as a net and gross target volume. If there is a material deviation from the program, we inform market participants in a timely manner.
Türkiye		No			No			No	No further measures are considered at the moment		No	Periodic meetings with market participants are being held for over 20 years. Also, participants have direct access to the market regulators in order to place a demand or a change.
UK		No			No			No			No	

Table A B.16. Q17 Have you experienced structural changes in the composition of your investor base in recent years?

Country		
Australia		No
Austria	Yes	
Belgium		No
Brazil	Yes	

Country		
Bulgaria		No
Canada	Yes	
Chile		No
Colombia		No
Costa Rica		No
Croatia	Yes	
Czech Republic		No
Denmark		No
Estonia		No
Finland		No
France		No
Germany		No
Greece		No
Hungary		No
Iceland		No
Ireland		No
Israel	Yes	
Italy		No
Japan		No
Korea		No
Republic of Latvia	Yes	
Lithuania	Yes	
Luxembourg		No
Mexico (Local)	Yes	
Mexico (External)	Yes	
Netherlands	Yes	
New Zealand	Yes	
Norway		No
Poland	Yes	
Portugal	Yes	
Romania		No
Slovak Republic	Yes	

Country		
Slovenia		No
Spain	Yes	
Sweden		No
Switzerland		No
Türkiye	Yes	
UK		No

Table A B.17. Q18 What were the trends in the composition of your investor base during the last 9 months? Please choose which best describes the trend.

	And by specific investor type:									
	Domestic investors: (Investor base)					Foreign investors:				
	Banks	Central Bank*	Institutional Investors (Pension, insurance and SWFs)	Asset managers and hedge funds	Others (Retail investors etc.)	Banks	Central Bank	Institutional Investors (Pension, insurance and SWFs)	Asset managers and hedge funds	Others (Retail investors etc.)
Australia	Decreased	Increased	No change	No change	Not applicable	No change	Increased	No change	Decreased	Not applicable
Austria	No change	Increased	Decreased	Decreased	No change	Increased	Decreased	Increased	No change	No change
Belgium	Increased	No change	Increased	Increased	No change	Increased	Decreased	Increased	Increased	No change
Brazil	Increased	No change	Decreased	Decreased	Decreased					
Bulgaria	No change	Not applicable	No change	Not applicable	No change	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Canada	No change	Decreased	Decreased	No change	No change	No change	Increased	No change	Decreased	No change
Chile	No change	Not applicable	No change	No change	No change					
Colombia	Increased	Increased	Increased	Decreased	No change	Increased	Increased	Increased	Increased	Increased
Costa Rica	Decreased	Decreased	Decreased		Increased	Increased	No change			Decreased
Croatia	No change	Not applicable	No change	No change	No change	No change	Not applicable	Increased	Increased	No change
Czech Republic	No change	Not applicable	No change	No change	Increased	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Denmark	No change	Not applicable	Increased	No change	No change	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Estonia										
Finland	No change	No change	No change	No change	Not applicable	No change	No change	No change	No change	Not applicable
France	No change	Decreased	No change	No change	No change	No change	No change	No change	No change	No change
Germany	No change	No change	No change	No change	No change	No change	No change	No change	No change	No change
Greece	Increased	Increased	Decreased	No change	Not applicable	No change	No change	No change	No change	Not applicable
Hungary	Increased	Decreased	Decreased	Increased	Decreased	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Iceland										
Ireland										

	And by specific investor type:									
	Domestic investors: (Investor base)					Foreign investors:				
	Banks	Central Bank*	Institutional Investors (Pension, insurance and SWFs)	Asset managers and hedge funds	Others (Retail investors etc.)	Banks	Central Bank	Institutional Investors (Pension, insurance and SWFs)	Asset managers and hedge funds	Others (Retail investors etc.)
Israel	No change	Increased	No change	No change		No change	No change	No change	No change	
Italy	Decreased	Decreased	Increased	Increased	Increased	Decreased	Increased	Increased	Increased	Increased
Japan	No change	No change	No change	No change	No change					
Korea	Increased	Decreased	Increased	Increased	No change	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Republic of Latvia	Increased	No change	No change	Decreased	Decreased	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Lithuania	Increased	No change	No change	No change	No change	No change	No change	No change	Decreased	Not applicable
Luxembourg	No change	No change	No change	No change	No change	No change	No change	No change	No change	No change
Mexico (Local)	Decreased	No change	Increased	Increased	Increased					
Mexico (External)										
Netherlands	No change	No change	Decreased	No change	No change	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
New Zealand	Decreased	Decreased			No change					Not applicable
Norway										
Poland	Decreased	Decreased	No change	Not applicable	Increased	Increased	Increased	Decreased	No change	Increased
Portugal	Increased	Increased	No change	Increased	No change	Increased	Increased	Increased	Increased	No change
Romania	Increased	Not applicable	Increased	Increased	Increased	Decreased	Decreased	Decreased	Decreased	Not applicable
Slovak Republic	Increased	Increased	No change	No change	Not applicable	No change	No change	No change	Decreased	Not applicable
Slovenia	Decreased	Increased	Decreased	Not applicable	No change	Decreased	No change	No change	No change	No change
Spain	Increased	Increased	Decreased	Increased	No change	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Sweden	Not applicable	Increased	Not applicable	Not applicable	Not applicable	Decreased	Decreased	Decreased	Decreased	Not applicable
Switzerland	No change	Not applicable	No change	No change	No change	Not applicable	Not applicable	No change	Not applicable	Not applicable

	And by specific investor type:									
	Domestic investors: (Investor base)					Foreign investors:				
	Banks	Central Bank*	Institutional Investors (Pension, insurance and SWFs)	Asset managers and hedge funds	Others (Retail investors etc.)	Banks	Central Bank	Institutional Investors (Pension, insurance and SWFs)	Asset managers and hedge funds	Others (Retail investors etc.)
Türkiye	Increased	No change	Increased	Increased	Not applicable	Decreased	Not applicable	Not applicable	Not applicable	Not applicable
UK	No change	Decreased	No change	No change	No change	Not applicable	No change	No change	No change	No change

Table A B.18. Q19 Could you please indicate the main driving forces you assume/identified to be behind changes in your investor base?

Country	Larger activities of hedge funds	Increasing yields	Credit rating developments	Monetary policy actions of your central bank	A change in risk-appetite in some parts of your investor base	New investment alternatives/opportunities for institutional investors	Other (i)	(i) please specify:	Other (ii)	(ii) please specify:	Country additional notes:
Australia		X		X	X						
Austria		X					X	Introduction of Green Debt Issuances			The increase in yields - especially over the past eight months - has attracted more “Real money Investors” which have not been interested in government bonds in the time of very low or even negative yields. More green investors as green funding programme started.
Belgium	X	X		X							
Brazil			X	X	X						Foreign participation has been decreasing since loss of investment grade. Liquidity

Country	Larger activities of hedge funds	Increasing yields	Credit rating developments	Monetary policy actions of your central bank	A change in risk-appetite in some parts of your investor base	New investment alternatives/opportunities for institutional investors	Other (i)	(i) please specify:	Other (ii)	(ii) please specify:	Country additional notes:
											shocks during COVID-19 crisis drove increase in Banks participation. Reduction in household income after COVID-19 also made Pension Funds decrease its share. In addition, the cycle of interest rate hikes over the last 12 months and this greatly affects our issuances and the demand for each type of bond an maturity.
Bulgaria						X					Efforts are aimed at diversifying the bond lines offered in line with leading European and national policies.
Canada	X	X									
Chile											
Colombia					X						
Costa Rica		X		X	X						
Croatia			X								
Czech Republic											
Denmark						X					
Estonia											Estonia does not collect data of investor base.

Country	Larger activities of hedge funds	Increasing yields	Credit rating developments	Monetary policy actions of your central bank	A change in risk-appetite in some parts of your investor base	New investment alternatives/opportunities for institutional investors	Other (i)	(i) please specify:	Other (ii)	(ii) please specify:	Country additional notes:
Finland											
France		X		X							French investor base is well diversified and stable over time in the rising rate environment. The only change is linked to ECB purchasing program.
Germany											
Greece		X	X	X							
Hungary	X	X		X							
Iceland											
Ireland	X			X							
Israel				X							
Italy		X		X	X						
Japan											There is no change in investor base.
Korea		X		X							
Republic of Latvia		X		X	X						
Lithuania		X			X						
Luxembourg											
Mexico (Local)		X		X	X	X					
Netherlands											Since 2015 the aggregate the share of the domestic central bank has increased while the

Country	Larger activities of hedge funds	Increasing yields	Credit rating developments	Monetary policy actions of your central bank	A change in risk-appetite in some parts of your investor base	New investment alternatives/opportunities for institutional investors	Other (i)	(i) please specify:	Other (ii)	(ii) please specify:	Country additional notes:
											share of domestic real money investors (pension funds and insurers) has remained stable. The higher share from the central bank appears to have come at the costs of domestic banks and foreign holdings whose share has decreased. More recent developments are harder to analyze because we lack granular data
New Zealand		X		X	X						
Norway											
Poland		X		X	X		X	increase of inflation and negative real interest rates	X	introducing of new bonds for retail investors	
Portugal		X		X	X						
Romania	X	X	X	X	X						
Slovak Republic		X		X							Return of real money investors due to higher yields. Lower presence of slightly speculative investors because of PSPP and PEPP end.
Slovenia											
Spain		X		X							As yields rise, domestic

Country	Larger activities of hedge funds	Increasing yields	Credit rating developments	Monetary policy actions of your central bank	A change in risk-appetite in some parts of your investor base	New investment alternatives/opportunities for institutional investors	Other (i)	(i) please specify:	Other (ii)	(ii) please specify:	Country additional notes:
											investors are more interested in our Public Debt, especially in the 5 to 10 year segments. The Spanish domestic investor base has a strong banking sector, which is especially interested in the 5 to 10 year part of the curve. Spain doesn't have a strong domestic pension fund and insurance community, which are generally interested in the longer part of the curve, so this demand is usually from non-resident investors.
Sweden				X			X	(i) please specify: Declining bond supply due stronger government position			
Switzerland											Our investor base is mostly domestic (more than 80 percent of bonds are held by domestic investors). The investor base remained largely stable over the last 9 months.
Türkiye	X	X	X	X	X						

Country	Larger activities of hedge funds	Increasing yields	Credit rating developments	Monetary policy actions of your central bank	A change in risk-appetite in some parts of your investor base	New investment alternatives/opportunities for institutional investors	Other (i)	(i) please specify:	Other (ii)	(ii) please specify:	Country additional notes:
UK		X		X	X	X					

Table A B.19. Q20 To what extent does your knowledge about the investor base and investor structure influence your issuance strategy?

Country	To a very large extent	To a moderate extent	To a small extent	Not at all	If possible, please provide a recent example:
Australia	X				All investors wish to maintain a level of liquidity in their portfolios. The two most liquid areas on the AGB curve are around the 10 year (and to a lesser extent the 3 year futures) basket bonds. We retain very strong demand from investors for these bonds and hence these bonds remain easier points for the AOFM to launch new issues and tap current bond lines. We also manage the volume being issued into these bonds to assist in controlling the weighted average term to maturity of the portfolio.
Austria		X			
Belgium			X		In the context of our recent new green bond, we did discuss the optimal maturity with investors in order to inform our choice.
Brazil	X				We know that different holders seek securities with different characteristics. Thus, we maintain constant dialogue with market participants and take this into account in our decisions.
Bulgaria	X				The Primary Dealers Committee and the regulatory changes through which was improved the communication and the ongoing monitoring of the government securities market led better knowledge of the investor base and investor appetite.
Canada		X			Relative issuance in parts of curve relies on the makeup of investors who participate in those sectors. As mentioned before, this provides the guidance for setting minimum issuance levels in each sector.
Chile	X				Pension managers are the main investor in the Chilean securities. The amount of local-external debt contemplated in the annual issuance, is strongly influenced by the appetite coming from pension funds to buy the debt. In this regard, before to publish the auction calendar, we needed to do a check with the pension managers, in order to verify that the amount could be absorbed by the market. At the same time, for book building operations in CLP, it is critical to know if there is a good moment for foreign investors to participate.
Colombia			X		The issuance strategy is defined by the Direction of Public Credit and National Treasury in the medium-term debt strategy of the Central National Government (GNC). It addresses conceptual aspects in terms of objectives, risks, economic benefits, and practices used by the Colombian government. Additionally, the Direction of Public Credit has an Investor Relations Office that organizes Non-deal Roadshows and meetings with investors to get to know their feedback.
Costa Rica	X				As the rise in inflation, we have once again issued securities indexed to inflation because we know that there are long-term investors who need this type of issue.
Croatia		X			
Czech Republic		X			
Denmark		X			
Estonia				X	
Finland				X	
France	X				AFT issuance strategy is based on market demand. This demand is mainly

Country	To a very large extent	To a moderate extent	To a small extent	Not at all	If possible, please provide a recent example:
					expressed through the regular advice provided by the PDs and the daily feedbacks from PDs. This, along with periodic direct contacts with investors, helps selecting the bonds for the auctions, and designing the yearly funding program.
Germany		X			
Greece		X			
Hungary		X			
Iceland	X				Domestic banks are the main investors in short-dated bonds whereas pension funds are the main investors on the longer end of the curve. We aim to meet the demand of both these investor types in most auctions.
Ireland		X			
Israel			X		
Italy		X			
Japan		X			We take market demands into account. In the initial FY2022 JGB Issuance Plan, the amount of 40-year bonds increased by 0.6 trillion yen, 10-year bonds by 1.2 trillion yen, and liquidity enhancement auctions by 0.6 trillion yen, based on higher demand in the market the amount of 2-year bonds decreased by 2.4 trillion yen, considering lower demand and its shorter maturity
Korea		X			
Republic of Latvia			X		Investor base have been quite stable in general, therefore it does not effect our issuance strategy, We acknowledge that for large transactions we need to look for international capital markets, as the domestic markets has its limitations
Lithuania		X			
Luxembourg			X		
Mexico (Local)		X			Internal market debt SHCP plans the issuance of debt according to the market conditions observed, in this sense and by observing the appetite that our investors show for certain instruments, we can make decisions for new issuances.
Netherlands				X	Issuance strategy is most influenced by other factors. For example our risk framework, the redemption profile, cash balance throughout the year
New Zealand		X			
Norway			X		
Poland		X			
Portugal		X			At the end of 2021 IGCP had the knowledge that buy & hold institutional investors were interested in a long term issuance and at the beginning of this year the funding plan started with a new 20y benchmark.
Romania	X				
Slovak Republic			X		
Slovenia		X			
Spain	X				When deciding our primary market issuance, both for auctions and syndications, we receive detailed feedback of investor demand from our Primary Dealers. This helps us understand how the investor base is evolving and the changes in investors' needs. We can therefore plan our issuance accordingly, and this feedback plays a key role in deciding what specific references and maturities we include in auctions and syndications.
Sweden				X	

Country	To a very large extent	To a moderate extent	To a small extent	Not at all	If possible, please provide a recent example:
Switzerland		X			In the week before an auction, we conduct a short telephone survey of our major counterparties to get their market assessment. We use the responses received from this survey to decide which maturities we will issue/tap in the auction. In addition to these insights, however, the financing needs and risk management of the Confederation play a critical role in the decision process.
Türkiye		X			Treasury provided information to the public about borrowing strategy, borrowing instruments, estimated annual debt services and borrowing amounts in Treasury Financing Program, which was published on October 2021. In this context, Treasury continue to issue various borrowing instruments, such as fixed-income TL-denominated securities, floating rate notes, Turkish Lira Overnight Reference Rate-indexed notes, inflation indexed securities, zero coupon securities, FX and gold denominated securities depending on the redemption profile and market conditions. On the other hand, in order to broaden the investor base and to diversify the borrowing instruments, Treasury also continues to develop new type of securities in accordance with market demand and investor structure.
UK		X			We try to ensure as diversified an investor base as we possibly can, which we believe is really important for the health of the gilt market. In practice, this means that we aim to issue at a diverse range of maturities in order to service all parts of the investor base. To be sure, we regularly liaise with our primary dealers and end-investors in order to be aware of their preferences on the DMO's issuance.

Table A B.20. Q 21 Do you think that you are more dependent on some kind of investors than others?

Country	Yes/No		If yes, what type of investors are concerned and how do you deal with this dependence?)
Australia	Yes		We are more concerned with the flows of Asset Managers and ADI's than Fast Money accounts as we value investors who will invest for the longer term.
Austria		No	
Belgium	Yes		For the important role of the initial absorption of auction supply, we do see that we are becoming more dependent of hedge fund activity.
Brazil		No	
Bulgaria	Yes		Domestic market depends on the PD's - banks, and we are willing to expand the market with involving institutional investors.
Canada	Yes		For participation in primary market auctions, we have net position reporting requirements in place where the investors are required to disclose existing holdings of the security. Their bidding limits may then be adjusted to ensure no investor owns a significant portion of the outstanding. This measure is in place to encourage broad distribution of securities among investors.
Chile	Yes		Pension Managers (see above) and foreign investors in the case of book building issuances in CLP.
Colombia		No	
Costa Rica	Yes		The government is more dependent on domestic investors.
Croatia		No	
Czech Republic		No	
Denmark	Yes		We have a large dependency on our domestic insurance and pension sector. To counter it we try to secure new foreign investors to complement them.

Country	Yes/No		If yes, what type of investors are concerned and how do you deal with this dependence?)
Estonia		No	
Finland		No	
France		No	Investor base is well diversified.
Germany		No	
Greece	Yes		
Hungary	Yes		Banks and foreign investors.
Iceland	Yes		See answer to question 20.
Ireland		No	
Israel	Yes		We are more dependent on local pension funds and are working on diversifying our investor base.
Italy		No	
Japan		No	
Korea		No	
Republic of Latvia		No	
Lithuania		No	
Luxembourg		No	
Mexico (Local)		No	
Netherlands		No	
New Zealand		No	
Norway		No	
Poland	Yes		The dominant type of investors in Polish Treasury securities are domestic banks. We are communicating with them on a regular basis to better understand their investment preferences.
Portugal		No	Real money investors play a relevant role in syndications, in order to guarantee price stability in secondary market. Bank trading and fast money accounts are also relevant in auctions and help ensure secondary market liquidity. It's important to stress that all investors play an important role in market functioning
Romania		No	
Slovak Republic	Yes		Strong presence of investors from German speaking countries and local banks.
Slovenia	Yes		Slovenia being a small country the capacity of the domestic investor base is limited. The predominant part of funding is supported by the international investor base. Banks/CBs (32%) and Asset Managers (47%) contribute major part of the funding.
Spain	Yes		As mentioned in the answer to question #19, Spain's domestic investor base is more skewed towards the short and middle part of the yield curve. We have a strong banking sector with more interest in the 5-10 year part of the curve, but we don't have such a strong pension and insurance sector which is generally more interested in the longer part of the curve. Thanks to the investor outreach efforts we have carried out in the past, we have managed to increase the share of non-resident investors in our holdings, and have a strong interest from foreign investors, which are key for the long part of our curve
Sweden		No	
Switzerland	Yes		Domestic institutional investors (investment funds, insurance companies, and pension funds) hold well over two-thirds of our bonds. Accordingly, these play a significant role in our issuance program. In order to know the needs of these investors, we hold regular discussions with individual ones.
Türkiye		No	
UK			We believe that underlying demand for the UK's debt is strong, supported by a well-diversified investor base. We try to ensure as diversified an investor base as we possibly can so as to make sure we are not overly reliant on a small group of investors who might want to buy only a limited range of instruments. As mentioned above, this is ensured by issuing at a diverse range of maturities in order to service different parts of our investor base.

Table A B.21. Q22 Indicate the share of CB's holdings of national government debt in total, with the distinction of your CB's holdings and foreign CB's ones. Please use information as of 30 June 2022.

Country	% held by own CB*	% held by all other foreign CBs	Details on the evolution of holdings going forward:
Australia	35	20	# As the AOFM does not maintain a registry showing beneficial ownership, we do not know exact holdings of most of our investor base. We use a number of sources of data, including our own engagement with investors to gauge approximate holdings.
Austria	43.7	n/a	Although the Eurosystems bond purchase programs (PSPP, PEPP / net purchases) have ended in the first half-year of 2022, we expect the share of CB holdings to decrease only slightly over the coming years due to continued reinvestment of maturing bonds.
Belgium	21.7	???	At the end of September 2021: • 19.5% of the consolidated gross debt (entire public sector) in nominal terms was owned by the National Bank of Belgium (excl. ECB). This was equivalent to 27.72% of the OLO's. • By then, the Eurosystem possibly held around 21.7% of the entire public sector debt or 30.0% of all OLOs.
Brazil	26.5		Under the Brazilian constitution, the Central Bank cannot finance the National Treasury. The Central Bank only uses federal government bonds to help carry out the monetary policy using open market operations.
Bulgaria			N/a
Canada	40	<10%	Since the Bank has started quantitative tightening from April 2022, we expect central bank holdings of government debt to steadily decline over the next year.
Chile	0	n/a	
Colombia	74	26	The behavior of the investors in general has been stable and consistent during the last years.
Costa Rica			
Croatia			
Czech Republic	0.0	-	
Denmark	0	NA	We don't have any detailed information on the holdings of foreign investors.
Estonia	39	N/A	
Finland	45	?	
France	20	17	Figures from the IMF "sovereign Debt investor Base for advanced economies". Very stable figures except for the own CB because of emergency program implementation by Banque de France on behalf of the Eurosystem.
Germany	40	15	"Central banks" defined as central banks and other official institutions.
Greece	38	12	
Hungary	7.00	N/A	The National Bank of Hungary stopped its government bond purchase program in December 2021. No changes are expected in this regard.
Iceland	1.50	?	The Central bank of Iceland has not bought any Treasury bonds since July 2021.
Ireland	29.00	n/a	
Israel	15.00		Increased demand for shorter bonds
Italy	25.80		In the future, the share of ECB's holdings of national government debt will probably decrease, due to the end of the asset purchase programs and the quantitative tightening that could be the next step after the rise of interest rates
Japan	44.3		44.1% held by the BOJ as of September 2021 43.4% held by the BOJ as of December 2021 43.3% held by the BOJ as of March 2022 We have no data about JGB holdings by foreign CBs.
Korea	4.8		
Republic of Latvia	31.19	0.17%	It is hard to forecast the evolution of CB`s holdings.
Lithuania	34.00	n/a	
Luxembourg	36.7	n/a	
Mexico (Local)	2		In 2019, the Mexican central bank, Banxico, had about 5% of the total value in circulation; this percentage decreased to about 2% by 2020 and has remained around that figure for the last 3

Country	% held by own CB*	% held by all other foreign CBs	Details on the evolution of holdings going forward:
			years.
Mexico (External)			
Netherlands	37.00		We only have data on our own national central bank and do not have data on the ECB or foreign central banks. Future evolution of holdings will depend on monetary policy decisions taken by the governing council of the ECB
New Zealand	37	n/a	The RBNZ are selling back holdings of New Zealand Government Bonds (NZGB) purchased under the Large-Scale Asset Purchase (LSAP) programme at a rate of NZ$5 billion per fiscal year and allowing bonds to mature without reinvesting the proceeds. The RBNZ expect their holdings of NZGBs purchased under the LSAP programme to be zero by mid-2027.
Norway	0		Norges Bank does not hold any Norwegian government securities. We have no information about foreign CBs holdings.
Poland	6.2	1.7	Before March 2020 National Bank of Poland (NBP) had no Treasury Securities in its portfolio. From March 2020 to November 2021 the NBP was purchasing TS and debt securities guaranteed by the State Treasury in the secondary market as part of structural open market operations. The aim of the programme was changing the long-term liquidity structure in the banking sector and ensuring liquidity of the securities on the secondary market. The share of NBP holdings of government debt in total State Treasury debt increased from 0.0% at the end of February 2020 to its peak of 7.3% in October 2021 and decreased to 6.2% at the end of June 2022 (as the central bank ceased to buy government bonds from banks). At the same time the share of foreign central banks** decreased from 1.8% at the end-2019 to 1.4% in November 2021 and increased to 1.7% in June 2022.
Portugal	50	No data available	We anticipate a decrease in holdings depending on evolution of QT (Quantitative tightening).
Romania			Insignificant
Slovak Republic	46	NA	We don't have the data what bonds are held by CBs outside the euro area but based on the allocations in syndications we expect them to be higher than 0. Based on the reinvestment plans of ECB we expect the holding in nominal terms to remain approximately the same but due to increasing nominal debt to decrease as a percentage.
Slovenia	35.5	1.4	
Spain	33.97	N/A	It's unclear how the share of ECB holdings in our debt will evolve in the future. Generally it should fall, with the end of net purchases in the APP and PEPP programs and the continued net issuance of debt from us as a DMO. However, due to the flexibility introduced with PEPP reinvestments, it is not clear how this will evolve going forward.
Sweden	45		
Switzerland	1.5	n/a	The SNB may not purchase government debt instruments issued by the Confederation, cantons and municipalities. However, it may purchase such bonds on the secondary market. As of the end of 2020, the SNB had CHF 932 million in Confederation bonds on its books, which corresponded to 1.5% of the total amount of outstanding Confederation bonds.
Türkiye	4.2		Since the beginning of the year, the given ratio has been stable around 4%.
UK	33	4	Latest data available on gilt holdings, as published by ONS are as at end-March 2022. Due to the passive unwind in place since February 2022 and the BoE's intention to commence sales of its gilt holdings, starting from October 2022, its share of gilts is expected to fall going forward.

Table A B.22. Q 23 Have you observed changes in investor behaviour in the wake of rising market uncertainties in recent months?

Country	*Yes/No*		Please explain:
Australia	Yes		Rather than changes, investors have increased their wariness around interest moves in Australia. For most of 2022, investors have been cautious but with the removal of QE early in the year and the advent of RBA rate rises, this cautiousness has increased. It manifests itself mainly in investors being underweight benchmarks and holding greater AUD cash positions. Outright trading is short term, and tends to focus on relative value trades, such as AGB

			curve movements and spreads to swaps and futures.
Austria	Yes		More “Real money” investors due to higher yields.
Belgium	Yes		Activity is very concentrated on the 5yr, 10yr and 30yr benchmarks
Brazil	Yes		In recent months we have seen volatility in financial markets. Many factors contributed to that, such as global inflation risks, geopolitical issues, restrictive monetary policy in major economies throughout the world and worries regarding global recession. In the domestic market we have seen volatility related to proximity of elections and political uncertainties. The volatility and the interest rate dynamics made investors averse of longer maturities during the first semester of 2022. We issued below average volumes of longer bonds during the months of January and February. In March and April we had reduced total issuance volumes, mainly due to decrease in demand for floating rate bonds.
Bulgaria	Yes		Due to the high volatility in the European and global markets, which is reflected in the Republic of Bulgaria, the investor base is turning to shorter-term government securities.
Canada		No	N/A
Chile	Yes		We have observed volatile behavior related to political risk in certain cases, and to external event in others.
Colombia		No	The behavior of the investors in general has been stable and consistent during the last years.
Costa Rica	Yes		We pay more interest rate.
Croatia	Yes		Lower investor total demand
Czech Republic		No	There have been no significant long-term changes in investor behaviour.
Denmark	Yes		Most investors is hesitant to buy in the current market environment.
Estonia		No	Estonia is not a frequent issuer.
Finland		No	
France		No	
Germany		No	
Greece	Yes		
Hungary	Yes		Retail investors have bought large volumes of wholesale government securities.
Iceland	Yes		More correlation with global bond markets.
Ireland		No	
Israel	Yes		Increased demand for shorter bonds.
Italy	Yes		During recent months, investors showed a greater risk aversion. Considering recent changes in liquidity conditions and market uncertainties, they have become more selective in investment choices, also looking for higher returns.
Japan		No	
Korea		No	
Republic of Latvia	Yes		Lower demand for Latvia’s securities, especially for longer tenors.
Lithuania	Yes		Smaller demand, lesser bids, in some cases total risk-off and even sell-off
Luxembourg		No	
Mexico (Local)	Yes		Internal market debt / External market debt In recent months, given the rise in the interest rates by most of the central banks around the world and an increase in uncertainty about recession in the next months, there has been a decrease of investor´s appetite for duration.
Netherlands			Don’t have a lot of information about investor behavior on the secondary market so not enough information to provide a decent answer here
New Zealand		No	
Norway		No	Not to a large extent
Poland	Yes		Rising inflation, monetary policy tightening, fears of economic slowdown and geopolitical risks had negative influence on investors risk appetite and thus the level of Treasury securities yields and market liquidity.
Portugal	Yes		The volatility has played a relevant role in the functioning of the market and has discouraged some Investors to add exposure.
Romania	Yes		Investor behavior is risk driven in the recent months and we have experienced an overall decrease in the demand for our government bonds (both domestic and external) due to this risk aversion caused mainly by the global inflation and cost of living crisis, energy crisis and the geopolitical situation related to the Russia-Ukraine conflict.
Slovak Republic	Yes		Investors are more cautious before placing bids in auctions.
Slovenia		No	
Spain	Yes		Overall the variety of global risks, such as geopolitical tensions, rising inflation, possible gas and energy shortages, among others, have led to increased volatility in markets, more uncertainty and a lower risk-appetite from investors.

Sweden		No	
Switzerland	Yes		The demand for ultra-long maturities has increased in the last few months, this trend held even in times when yields were decreasing and the yield curve became inversed. At the same time, secondary market liquidity in the long end of our yield curve slightly decreased, as buy and hold investors took up a large part of our issuance volume. Overall, the changes have not limited us in our issuance program.
Türkiye	Yes		Due to Covid-19 effects on domestic as well as global economies and global political climate, markets and investors are affected by the uncertainties on production and prices.
UK	Yes		Investor demand has shifted focus lower down the curve.

Table A B.23. Q24 Based on investors' feedback, which of the following statements best describes investors' confidence in the market in 2022?

Country	SIMILAR to 2021	WORSE than 2021	BETTER than 2021
Australia	X		
Austria		X	
Belgium		X	
Brazil			X
Bulgaria	X		
Canada			X
Chile			X
Colombia	X		
Costa Rica			X
Croatia		X	
Czech Republic	X		
Denmark		X	
Estonia			
Finland		X	
France	X		
Germany	X		
Greece		X	
Hungary		X	
Iceland	X		
Ireland	X		
Israel		X	
Italy		X	
Japan			
Korea		X	
Republic of Latvia		X	
Lithuania		X	
Luxembourg	X		
Mexico (Local)		X	
Mexico (External)		X	
Netherlands		X	
New Zealand	X		
Norway		X	
Poland		X	
Portugal		X	
Romania		X	
Slovak Republic		X	
Slovenia	X		
Spain		X	
Sweden		X	
Switzerland	X		

Türkiye	X		
UK		X	

Table A B.24. Q25 Have you observed an increase in duration risk appetite over the last 12 months?

	Comments	Yes	No
Australia	Rather than changes, investors have increased their wariness around interest moves in Australia. For most of 2022, investors have been cautious but with the removal of QE early in the year and the advent of RBA rate rises, this cautiousness has increased. It manifests itself mainly in investors being underweight benchmarks and holding greater AUD cash positions. Outright trading is short term, and tends to focus on relative value trades, such as AGB curve movements and spreads to swaps and futures.		No
Austria	More "Real money" investors due to higher yields.		No
Belgium	Activity is very concentrated on the 5yr, 10yr and 30yr benchmarks		No
Brazil	In recent months we have seen volatility in financial markets. Many factors contributed to that, such as global inflation risks, geopolitical issues, restrictive monetary policy in major economies throughout the world and worries regarding global recession. In the domestic market we have seen volatility related to proximity of elections and political uncertainties. The volatility and the interest rate dynamics made investors averse of longer maturities during the first semester of 2022. We issued below average volumes of longer bonds during the months of January and February. In March and April we had reduced total issuance volumes, mainly due to decrease in demand for floating rate bonds.	Yes	
Bulgaria	Due to the high volatility in the European and global markets, which is reflected in the Republic of Bulgaria, the investor base is turning to shorter-term government securities.		No
Canada	N/A		No
Chile	We have observed volatile behavior related to political risk in certain cases, and to external event in others.	Yes	
Colombia	The behavior of the investors in general has been stable and consistent during the last years.		No
Costa Rica	We pay more interest rate.	Yes	
Croatia	Lower investor total demand		No
Czech Republic	There have been no significant long-term changes in investor behaviour.		No
Denmark	Most investors is hesitant to buy in the current market environment.		No
Estonia	Estonia is not a frequent issuer.		No
Finland			No
France			No
Germany			No
Greece			No
Hungary	Retail investors have bought large volumes of wholesale government securities.		No
Iceland	More correlation with global bond markets.		No
Ireland			No
Israel	Increased demand for shorter bonds.		No
Italy	During recent months, investors showed a greater risk aversion. Considering recent changes in liquidity conditions and market uncertainties, they have become more selective in investment choices, also looking for higher returns.		No
Japan			No
Korea			No
Republic of Latvia	Lower demand for Latvia's securities, especially for longer tenors.		No
Lithuania	Smaller demand, lesser bids, in some cases total risk-off and even sell-off		No
Luxembourg			No
Mexico (Local)	Internal market debt / External market debt In recent months, given the rise in the interest rates by most of the central banks around the world and an increase in uncertainty about recession in the next months, there has been a decrease of investor´s appetite for duration.		No
Netherlands	Don't have a lot of information about investor behavior on the secondary market so not enough information to provide a decent answer here		No
New Zealand			No

Norway	Not to a large extent		No
Poland	Rising inflation, monetary policy tightening, fears of economic slowdown and geopolitical risks had negative influence on investors risk appetite and thus the level of Treasury securities yields and market liquidity.		No
Portugal	The volatility has played a relevant role in the functioning of the market and has discouraged some Investors to add exposure.		No
Romania	Investor behavior is risk driven in the recent months and we have experienced an overall decrease in the demand for our government bonds (both domestic and external) due to this risk aversion caused mainly by the global inflation and cost of living crisis, energy crisis and the geopolitical situation related to the Russia-Ukraine conflict.		No
Slovak Republic	Investors are more cautious before placing bids in auctions.		No
Slovenia			No
Spain	Overall the variety of global risks, such as geopolitical tensions, rising inflation, possible gas and energy shortages, among others, have led to increased volatility in markets, more uncertainty and a lower risk-appetite from investors.		No
Sweden			No
Switzerland	The demand for ultra-long maturities has increased in the last few months, this trend held even in times when yields were decreasing and the yield curve became inversed. At the same time, secondary market liquidity in the long end of our yield curve slightly decreased, as buy and hold investors took up a large part of our issuance volume. Overall, the changes have not limited us in our issuance program.	Yes	
Türkiye	Due to Covid-19 effects on domestic as well as global economies and global political climate, markets and investors are affected by the uncertainties on production and prices.	Yes	
UK	Investor demand has shifted focus lower down the curve.		No

Table B.25. Q26 Please describe the behaviour of non-resident investors during recent stressed periods (e.g., February 2022).

Country	Comments
Australia	Although non-resident investors still seem to retain a high degree of confidence in the AUD & AGB markets exemplified by the limited structural change in investor composition, under period of stress their behaviors do change. Generally this is typified by selling and a return to a investors home market a reduction in benchmark holdings and/or duration and often less trading.
Austria	Overall the share of non-domestic investors decreased slightly in the past months.
Belgium	
Brazil	We saw a decrease in the non-resident demand for government bonds given the greater risk aversion in the international market combined with uncertainty around the electoral scenario internally.
Bulgaria	After June 2022, we observe a decrease in the value of local currency government securities held by non-residents. Meanwhile, on 15 September the Ministry of Finance placed on the international capital markets EUR-denominated bonds in two tranches totaling EUR 2.25 billion. The first tranche is a 7-year tranche with an amount of EUR 1.5 billion and a coupon of 4.125%. The second tranche has a tenor of 12 years, its amount is EUR 0.75 billion and its coupon is 4.625%.
Canada	Non-residents were slightly less active, conservative, yet still present and more opportunistic during this period.
Chile	In general, the appetite was less, although it has recovered during the last months, but mostly in the short terms.
Colombia	In recent stressed periods (e.g. February 2022), Non-resident investors increased the demand for local bonds.
Costa Rica	We believe the behavior is the same.
Croatia	Lower investor demand
Czech Republic	There has been no significant outflow; the share of non-resident holders remains stable.
Denmark	Nothing specific.
Estonia	No information.
Finland	
France	No specific change reported by PDs
Germany	
Greece	
Hungary	After February 2022, in the first few months of the war in Ukraine, we haven't seen any significant, systematic outflows from non-resident investors. In fact, their auction demand has remained high.
Iceland	
Ireland	No observable difference.
Israel	Increased demand for shorter bonds.

Italy	Considering recent market developments, in the past months the share in total marketable Central Government securities held by non-resident investors decreased at a steady rate.
Japan	In early February 2022, global interest rates increased as foreign central banks tightened their monetary policies, and JGBs, especially long-term, were sold. From mid-February, under a global risk-off sentiment after Russia's invasion of Ukraine, JGBs were bought again.
Korea	Foreign investment shows constant net inflows
Republic of Latvia	Non-residents have become slightly cautious, but the demand in auctions reflects still good interest for Latvia government securities.
Lithuania	They sold off our bonds
Luxembourg	
Mexico (Local)	Internal market debt During recent periods of stress (e.g. in February of this year), we have seen a decrease in non-resident holdings of nominal rate instruments, while holdings of real rate instruments have increased. In February of this year, we observed a monthly increase of 9.74% in holdings of inflation-linked bonds and a monthly decrease of 1.29% in holdings of fixed rate bonds.
Mexico (External)	
Netherlands	We do not have enough data to monitor this behaviour
New Zealand	Offshore investors increased their holdings of New Zealand Government Bonds in February 2022.
Norway	Non-resident investors have held a stable ownership share of Norwegian government bonds through 2022. We have not seen large movements in this in relation to specific events.
Poland	Despite market uncertainty, non-residents holdings were gradually rising in 2022. In our opinion it was the result of significant yield increase.
Portugal	When Ukrainian and Russian tensions started between February and March investors held their positions with a very small increase in net buying. However, in the next couple of months they increased their net buying significantly.
Romania	The demand expressed by non-residents was greatly reduced as there were also exits from the remitted bonds. With the increase in yields in August, an increased demand from non-residents was observed
Slovak Republic	The demand in regular auctions is less stable than from domestic investors.
Slovenia	We have not noticed any significant deviations in behavior of eurozone investors in Slovenia bonds during the first half of 2022.
Spain	Overall non-resident investor holdings have stayed relatively stable during 2022, not reacting to any specific stress periods. We have seen a slight decrease in their share of our holdings in 2022, falling from around 42,9% to the current 41,5%. However, this is only a slight decrease, and doesn't correspond to any specific stress periods. For example, there was hardly any change in non-resident holdings of Spanish Public Debt during the month of February, mentioned in the question. This shows that non-resident investors in Spanish Public Debt have not have strong reactions during stress periods.
Sweden	Some non-resident investors has expressed their views about market liquidity more frequent
Switzerland	Despite the high volatility and uncertainty regarding monetary policy and economic activity, there was an increase in duration risk appetite. We tapped most of our ultra-long maturities in the last few auctions and received large amount of bids. The amount was much larger than the total bids received for shorter maturities that we tapped on the same auction dates. At the same time, longer dated bonds got even more expansive in relation to swap rates than shorter maturities. Non-resident investors are only a minor part of our investor base. As they invest much more opportunistically than our domestic investors, this is not concerning to us.
Türkiye	Due to the ongoing global volatility, we have experienced that investors have become more cautious when it comes make investment decisions. new issuance premium levels are elevated compared to 2021. Decrease in secondary market trading in domestic market.
UK	Non-resident investors have traditionally been active and continued to be active during recent stressed periods in the short-end of the conventional yield curve

Table A B.26. Q27 Please indicate your observations as to changes in investor demand for government securities over the last 9 months:

Table 1/3

	Investor base					
	Domestic Investors (overall/main trend)			*Foreign Investors (overall/main trend)*		
	For short-term securities	*For medium and long-term maturities*	*For indexed securities*	*For short-term securities*	*For medium and long-term maturities*	*For indexed securities*
Australia	Increased Demand	Decreased Demand	Similar Demand	Decreased Demand	Similar Demand	Similar Demand
Austria	Decreased Demand	Similar Demand	Not applicable	Increased Demand	Similar Demand	Not applicable
Belgium	Similar Demand	Increased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable
Brazil	Similar Demand	Increased Demand	Decreased Demand	Similar Demand	Decreased Demand	Decreased Demand
Bulgaria	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable
Canada	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Chile	Decreased Demand	Similar Demand	Increased Demand	Increased Demand	Similar Demand	Similar Demand
Colombia	Increased Demand	Increased Demand	Increased Demand	Similar Demand	Increased Demand	Increased Demand
Costa Rica	Similar Demand	Similar Demand	Increased Demand	Similar Demand	Similar Demand	Not applicable
Croatia	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable
Denmark	Similar Demand	Decreased Demand	Increased Demand	Increased Demand	Decreased Demand	Similar Demand
Estonia	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable
Finland	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable
France	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Germany	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Greece	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable
Hungary	Increased Demand	Similar Demand	Increased Demand	Not applicable	Decreased Demand	Not applicable
Iceland	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Ireland	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Israel	Increased Demand	Similar Demand	Increased Demand	Increased Demand	Similar Demand	Increased Demand
Italy	Decreased Demand	Increased Demand	Increased Demand	Decreased Demand	Decreased Demand	Decreased Demand
Japan	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Korea	Increased Demand	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable
Republic of Latvia	Not applicable	Increased Demand	Not applicable	Not applicable	Decreased Demand	Not applicable
Lithuania	Increased Demand	Decreased Demand	Not applicable	Similar Demand	Decreased Demand	Not applicable
Luxembourg	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable

	Investor base					
	Domestic Investors (overall/main trend)			*Foreign Investors (overall/main trend)*		
	For short-term securities	*For medium and long-term maturities*	*For indexed securities*	*For short-term securities*	*For medium and long-term maturities*	*For indexed securities*
Mexico (Local)	Increased Demand	Increased Demand	Decreased Demand	Increased Demand	Similar Demand	Decreased Demand
New Zealand	Increased Demand	Similar Demand	Increased Demand	Increased Demand	Increased Demand	Increased Demand
Norway	Similar Demand	Similar Demand		Similar Demand	Similar Demand	
Poland	Increased Demand	Increased Demand	Increased Demand	Decreased Demand	Increased Demand	Decreased Demand
Portugal	Increased Demand	Increased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable
Romania	Decreased Demand	Increased Demand	Decreased Demand	Decreased Demand	Decreased Demand	Similar Demand
Slovak Republic	Increased Demand	Increased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable
Slovenia	Increased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable
Spain	Similar Demand	Increased Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Sweden	Increased Demand	Increased Demand	Decreased Demand	Not applicable	Decreased Demand	Not applicable
Switzerland	Decreased Demand	Increased Demand	Not applicable	Decreased Demand	Increased Demand	Not applicable
Türkiye	Increased Demand	Increased Demand	Increased Demand	Decreased Demand	Decreased Demand	Decreased Demand
UK	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Not applicable

Table A B.27. Q27 Please indicate your observations as to changes in investor demand for government securities over the last 9 months:

Table 2/3

	And by specific investor type:														
	Domestic investors:														
	Banks			*Central Bank**			*Institutional Investors (Pension, insurance and SWFs)*			*Asset managers and hedge funds*			*Others (Retail investors etc.)*		
	For short-term securities	For medium and long-term maturities	For indexed securities	For short-term securities	For medium and long-term maturities	For indexed securities	For short-term securities	For medium and long-term maturities	For indexed securities	For short-term securities	For medium and long-term maturities	For indexed securities	For short-term securities	For medium and long-term maturities	For indexed securities
Australia	Increased Demand	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Not applicable	Decreased Demand	Similar Demand	Similar Demand	Decreased Demand	Similar Demand	Similar Demand	Decreased Demand		Not applicable
Austria	Similar Demand	Decreased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable	Increased Demand	Decreased Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable
Belgium	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Increased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable	Similar Demand	Decreased Demand	Not applicable
Brazil	Similar Demand	Increased Demand	Decreased Demand	Not applicable	Not applicable	Not applicable	Similar Demand	Similar Demand	Increased Demand	Similar Demand	Increased Demand	Decreased Demand	Similar Demand	Decreased Demand	Increased Demand
Bulgaria	Not applicable	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Similar Demand	Not applicable
Canada	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Chile	Decreased Demand	Increased Demand	Increased Demand	Not applicable	Not applicable	Not applicable	Similar Demand	Increased Demand	Increased Demand	Decreased Demand	Similar Demand	Similar Demand	Increased Demand	Similar Demand	Similar Demand
Colombia	Decreased Demand	Increased Demand	Increased Demand	Increased Demand	Increased Demand	Similar Demand	Increased Demand	Increased Demand	Increased Demand	Similar Demand	Similar Demand	Decreased Demand	Decreased Demand	Increased Demand	Decreased Demand
Costa Rica	Similar Demand	Similar Demand	Increased Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Increased Demand				Similar Demand	Similar Demand	Increased Demand
Croatia	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable	Decreased Demand	Increased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Similar Demand	Similar Demand	Not applicable
Denmark	Decreased Demand	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Similar Demand	Similar Demand	Increased Demand	Similar Demand	Decreased Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Estonia	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable
Finland	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable
France	Similar	Similar	Similar	Not	Not	Not	Similar	Similar	Similar	Similar	Similar	Similar	Not	Not	Not

	And by specific investor type:														
	Domestic investors:														
	Banks			*Central Bank**			*Institutional Investors (Pension, insurance and SWFs)*			*Asset managers and hedge funds*			*Others (Retail investors etc.)*		
	Demand	Demand	Demand	applicable	applicable	applicable	Demand	Demand	Demand	Demand	Demand	Demand	applicable	applicable	applicable
Germany															
Greece	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable
Hungary	Increased Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable	Increased Demand	Similar Demand	Not applicable	Increased Demand	Similar Demand	Not applicable	Increased Demand	Decreased Demand	Increased Demand
Iceland															
Ireland	Similar Demand	Similar Demand		Similar Demand	Similar Demand		Similar Demand	Similar Demand		Similar Demand	Similar Demand		Similar Demand	Similar Demand	
Israel	Increased Demand	Increased Demand		Not applicable	Not applicable	Not applicable	Increased Demand	Increased Demand	Decreased Demand	Similar Demand	Similar Demand	Similar Demand	Increased Demand	Increased Demand	Decreased Demand
Italy	Decreased Demand	Increased Demand	Increased Demand	Decreased Demand	Increased Demand	Increased Demand	Decreased Demand	Increased Demand	Increased Demand	Decreased Demand	Similar Demand	Increased Demand	Decreased Demand	Similar Demand	Increased Demand
Japan	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Korea	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Republic of Latvia	Not applicable	Increased Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Decreased Demand	Not applicable	Not applicable	Decreased Demand	Not applicable
Lithuania	Increased Demand	Decreased Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Decreased Demand	Not applicable	Similar Demand	Decreased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable
Luxembourg	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable
Mexico (Local)	Increased Demand	Increased Demand	Increased Demand	Not applicable	Not applicable	Not applicable	Increased Demand	Increased Demand	Increased Demand	Increased Demand	Increased Demand	Increased Demand	Increased Demand	Increased Demand	Increased Demand
New Zealand															
Norway	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable
Poland	Increased Demand	Increased Demand	Increased Demand	Similar Demand	Similar Demand	Similar Demand	Decreased Demand	Increased Demand	Decreased Demand	Not applicable	Not applicable	Not applicable	Increased Demand	Increased Demand	Increased Demand
Portugal	Increased Demand	Increased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable	Similar Demand	Increased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable
Romania	Decreased	Increased	Not	Not	Not	Not	Decreased	Increased	Not	Decreased	Similar	Not	Increased	Decreased	Not

	And by specific investor type:														
	Domestic investors:														
	Banks			*Central Bank**			*Institutional Investors (Pension, insurance and SWFs)*			*Asset managers and hedge funds*			*Others (Retail investors etc.)*		
	Demand	Demand	applicable	applicable	applicable	applicable	Demand	Demand	applicable	Demand	Demand	applicable	Demand	Demand	applicable
Slovak Republic	Increased Demand	Increased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable	Not applicable	Not applicable	Not applicable
Slovenia	Increased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Increased Demand	Similar Demand	Not applicable	Increased Demand	Decreased Demand	Not applicable	Similar Demand	Decreased Demand	Not applicable
Spain	Increased Demand	Increased Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Increased Demand		Similar Demand			Increased Demand	Increased Demand	
Sweden															
Switzerland															
Türkiye	Increased Demand	Increased Demand	Increased Demand	Not applicable	Not applicable	Not applicable	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
UK	Similar Demand	Not applicable	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Not applicable	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable

Table A B.28. Q27 Please indicate your observations as to changes in investor demand for government securities over the last 9 months:

Table 3/3

	And by specific investor type:														
	Foreign investors:														
	Banks			*Central Bank*			*Institutional Investors (Pension, insurance and SWFs)*			*Asset managers and hedge funds*			*Others (Retail investors etc.)*		
	For short-term securities	For medium and long-term maturities	For indexed securities	For short-term securities	For medium and long-term maturities	For indexed securities	For short-term securities	For medium and long-term maturities	For indexed securities	For short-term securities	For medium and long-term maturities	For indexed securities	For short-term securities	For medium and long-term maturities	For indexed securities
Australia	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Increased Demand	Not applicable	Not applicable	Similar Demand	Similar Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Not applicable	
Austria	Similar Demand	Increased Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Increased Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable
Belgium	Increased Demand	Increased Demand	Not applicable	Decreased Demand	Increased Demand	Not applicable	Similar Demand	Increased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable	Increased Demand	Increased Demand	Not applicable
Brazil															

	And by specific investor type:														
	Foreign investors:														
	Banks			*Central Bank*			*Institutional Investors (Pension, insurance and SWFs)*			*Asset managers and hedge funds*			*Others (Retail investors etc.)*		
Bulgaria	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Canada	Similar Demand	Similar Demand	Similar Demand	Increased Demand	Increased Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Decreased Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Chile															
Colombia															
Costa Rica	Similar Demand	Increased Demand	Not applicable										Similar Demand	Similar Demand	Increased Demand
Croatia	Decreased Demand	Decreased Demand	Not applicable	Not applicable	Not applicable	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable
Denmark															
Estonia	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable
Finland	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable
France	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable
Germany															
Greece	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable
Hungary	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Iceland															
Ireland	Similar Demand	Similar Demand		Similar Demand	Similar Demand		Similar Demand	Similar Demand		Similar Demand	Similar Demand		Similar Demand	Similar Demand	
Israel	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable			
Italy	Decreased Demand	Decreased Demand	Increased Demand	Decreased Demand	Decreased Demand	Increased Demand	Increased Demand	Decreased Demand	Increased Demand	Increased Demand	Decreased Demand	Decreased Demand	Similar Demand	Decreased Demand	Increased Demand
Japan	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
Korea	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable

	And by specific investor type:														
	Foreign investors:														
	Banks			*Central Bank*			*Institutional Investors (Pension, insurance and SWFs)*			*Asset managers and hedge funds*			*Others (Retail investors etc.)*		
Republic of Latvia	Not applicable	Decreased Demand	Not applicable	Not applicable	Decreased Demand	Not applicable	Not applicable	Decreased Demand	Not applicable	Not applicable	Decreased Demand	Not applicable	Not applicable	Decreased Demand	Not applicable
Lithuania	Increased Demand	Decreased Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Not applicable	Not applicable	Not applicable
Luxembourg	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable
Mexico (Local)	Similar Demand	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Decreased Demand	Increased Demand	Increased Demand	Decreased Demand	Increased Demand	Increased Demand	Similar Demand	Similar Demand	Similar Demand
New Zealand															
Norway			Not applicable			Not applicable			Not applicable			Not applicable			Not applicable
Poland	Decreased Demand	Increased Demand	Decreased Demand	Decreased Demand	Decreased Demand	Similar Demand	Decreased Demand	Increased Demand	Decreased Demand	Similar Demand	Similar Demand	Similar Demand	Decreased Demand	Increased Demand	Similar Demand
Portugal	Decreased Demand	Increased Demand	Not applicable	Decreased Demand	Increased Demand	Not applicable	Similar Demand	Decreased Demand	Not applicable	Decreased Demand	Increased Demand	Not applicable	Increased Demand	Decreased Demand	Not applicable
Romania	Decreased Demand	Decreased Demand	Not applicable	Not applicable	Not applicable	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable
Slovak Republic	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Not applicable	Not applicable	Not applicable
Slovenia	Decreased Demand	Decreased Demand	Not applicable	Decreased Demand	Similar Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable	Similar Demand	Decreased Demand	Not applicable	Decreased Demand	Decreased Demand	Not applicable
Spain	Similar Demand	Similar Demand	Similar Demand	Increased Demand	Similar Demand	Similar Demand	Decreased Demand	Increased Demand	Similar Demand	Similar Demand	Increased Demand	Similar Demand	Similar Demand	Similar Demand	Similar Demand
Sweden															
Switzerland															
Türkiye	Decreased Demand	Decreased Demand	Decreased Demand	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
UK	Similar Demand	Not applicable	Not applicable	Similar Demand	Not applicable	Not applicable	Similar Demand	Similar Demand	Not applicable	Similar Demand	Similar Demand	Not applicable	Not applicable	Not applicable	Not applicable

OECD Sovereign Borrowing Outlook 2023

This edition of the *OECD Sovereign Borrowing Outlook* analyses the impact of increased macroeconomic and geopolitical uncertainty on sovereign borrowing needs and borrowing conditions. It provides outstanding debt amounts from 2007 to 2022, along with 2023 projections for OECD member countries. It also reviews sovereign debt issuance trends in emerging markets and developing economies. This edition continues to explore the perspective of public debt managers on sustainable bonds, with a focus on reporting requirements and performance of these bonds in markets. It also provides recommendations for sovereign debt management offices on how best to develop and implement buyback programmes.

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