

Riding the rollercoaster: Subnational debt in turbulent times

**Acauã Brochado and
Sean Dougherty**

**OECD WORKING PAPERS
ON FISCAL FEDERALISM**

June 2024 No. 47

OECD NETWORK ON FISCAL RELATIONS ACROSS LEVELS OF GOVERNMENT (THE “FISCAL NETWORK”)

OECD Working Papers on Fiscal Federalism

This series is designed to make available to a wider readership selected studies drawing on the work of the OECD’s Network on Fiscal Relations across Levels of Government. Authorship is usually collective, but principal writers are named. The papers are generally available only in their original language (English or French) with a short summary available in the other.

OECD Working Papers should not be reported as representing the official views of the OECD or its member countries. The opinions expressed and arguments employed are those of the author(s).

Working Papers describe preliminary results or research in progress by the author(s) and are published to stimulate discussion on a broad range of issues on which the OECD works. This working paper has been authorised for release by Luiz de Mello, Director of Country Studies, OECD Economics Department.

Comments on Working Papers are welcome, and should be sent to either fiscalnetwork@oecd.org or the OECD Network on Fiscal Relations, 2 rue André Pascal, 75775 Paris Cedex 16, France.

This document and any map included herein are without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and the name of any territory, city or area.

The statistical data for Israel are supplied by and under the responsibility of the relevant Israeli authorities. The use of such data by the OECD is without prejudice to the status of the Golan Heights, East Jerusalem and Israeli settlements in the West Bank under the terms of international law.

You can copy, download or print OECD content for your own use, and you can include excerpts from OECD publications, databases and multimedia products in your own documents, presentations, blogs, websites and teaching materials, provided that suitable acknowledgement of OECD as source and copyright owner is given. All requests for public or commercial use and translation rights should be submitted to rights@oecd.org.

Copyright © OECD 2024.

Abstract

Riding the rollercoaster: Subnational debt in turbulent times

With interest rates at their highest levels in two decades, subnational governments (SNGs) are grappling with growing debt sustainability concerns. This paper investigates SNGs' financing vulnerabilities by examining their debt levels and sensitivity to interest rate fluctuations. It provides an in-depth analysis of SNG debt portfolios, with a particular focus on marketable debt or bonds. While most SNG bonds have fixed rates and long maturities, some jurisdictions are significantly exposed to interest rate and foreign currency risks. Simulations reveal that interest expenses could rise substantially for some SNGs. Yet, worryingly, the variation in borrowing costs among SNGs within countries is often limited, suggesting potential weaknesses in market discipline. To navigate these challenges, the paper briefly explores how well-crafted fiscal rules, tax autonomy, and insolvency frameworks can help mitigate risks. It also highlights the need for further assessment of bank loans, as systematic information remains scarce. The paper provides insights for policymakers seeking to address risks and inform future reforms of SNG bond markets, reinforcing market discipline and bolstering fiscal resilience.

Keywords: subnational debt, interest rates, debt sustainability, market discipline, fiscal rules, insolvency

JEL classification: H74; H77; E43

Riding the rollercoaster: Subnational debt in turbulent times

By Acauã Brochado and Sean Dougherty¹

Key messages

- With elevated debt levels, some SNGs may be vulnerable to a high interest rate scenario.
 - Vulnerability depends on debt characteristics – in particular maturity and instrument composition – but institutional frameworks also play an important role.
 - SNG interest payments are projected to increase by 0.4 to 1.0% of GDP, or by 4 to 11% of their own revenues, considering countries' average portfolio characteristics and several interest rate scenarios.
 - These aggregate values mask the fact that ratios are significantly larger in some individual jurisdictions.
- Bank loans account for 55% of SNG borrowing, on average in the OECD, with bonds representing 15%, although in certain countries, SNGs borrow almost entirely through bonds.
 - Bonds tend to be long-term and fixed-rate, but this is not true for all countries.
 - Although foreign currency bond issuances are low in general, some SNGs are highly exposed to exchange rate fluctuations.
- The heterogeneity of bond yields across SNGs is unusually small in some countries.
 - This could mean that investors expect risks to be absorbed by central governments, warranting caution for policymakers.
 - How individual SNGs situations translate into a need for action by central governments, or even direct fiscal costs, will then depend on each country's institutional settings.
 - Stylised facts from selected countries provide useful insights to address risks and inform future discussions about reforms on SNG bond markets.
- Fiscal rules and insolvency frameworks can help to mitigate the risks.
 - A deposit guarantee fund also reinforces credibility of the no-bailout clause.
- Further assessment of bank loans is essential, as systematic information is scarce.

¹ This paper was discussed at the 20th Annual Meeting of the OECD Network on Fiscal Relations across Levels of Government. It was prepared by Acauã Brochado, collaborator to the Network, with inputs from Pietrangelo de Biase, under the supervision of Sean Dougherty, Head of the Network Secretariat. We are grateful for comments on the document from delegates of the Network as well as Boris Cournède and Ane Kathrine Christensen of the OECD Economics Department.

1. Introduction

1. Subnational governments (SNGs) are responsible for a substantial share of government debt in many countries. For half of the countries covered, SNG debt averages 20% of GDP, while in Canada it reaches 50% of GDP. In the current macroeconomic environment of inflation above central banks' targets and tight monetary policy, this raises the question of what could be the effect of higher interest rates on SNGs' fiscal health and potential costs for central governments.

2. Aggregate numbers show a decade-long growth in the quantity and value of SNG bond issuances. This work reviews the structure of SNG debt, focusing on SNG bonds. The goal is to broaden the knowledge about potential problems that can arise from SNG debt, helping to assess risks and provide options for countries to deal with these issues.

3. While for half of OECD countries, SNG debt is under 10% of GDP, some countries have a much higher figure. As a share of their own revenues, six countries have SNG debt-to-own revenue ratios above 250%, higher than the average for central governments. Considering countries' average debt levels, shares of floating and short-term debt, and several interest rate scenarios, annual spending on debt service would grow by 0.4 p.p. to 1.0 p.p. of GDP or 4.0 to 10.7 p.p. of own revenues, potentially causing fiscal challenges for certain SNGs.

4. In contrast to central governments, which access the debt market mostly by issuing marketable bonds, most countries' SNGs have liabilities concentrated in bank loans or a mix between these two instruments. This debt mix has important implications for SNGs' debt sustainability in two main dimensions: their maturity profile and the rate of indexation, which greatly determine their overall exposure to interest rate variation. Since systematic data on bank loans to SNGs is scarce, this work explores in detail the bond liabilities and assumes, with a cautious scenario, that bank loans are based on floating rates.

5. In most countries, debt levels and debt portfolios, as well as economic and fiscal characteristics vary significantly across subnational entities. However, these differences often do not translate into differentiated borrowing costs. This lack of variation in bond yields reflects that markets evaluate risks similarly for different jurisdictions regardless of their fiscal and economic differences. One hypothesis is that investors believe the central government may step in and bail out SNGs in distress, equalising their credit risk regardless of their fiscal situation. While this perception reduces the likelihood of reinforcing feedback loops that could increase borrowing costs for financially weaker SNGs, it can be hazardous, as it reduces the market's role in disciplining SNGs' fiscal policy. The reliance on central government guarantees and subsidies contributes to this lack of market discipline, raising risks to the central government.

6. Although fiscal rules and administrative controls are not always sufficient substitutes for market discipline, a well-designed institutional framework can help significantly. The analysis indicates that SNG indebtedness is not strongly correlated with the strength of fiscal rules, but there is some relation with tax autonomy. Additionally, subnational insolvency frameworks can help to develop and maintain a healthy SNG debt market. While it is hard to draw a general pattern from a cross-country correlation, there is extensive evidence that well-designed and well-implemented fiscal rules help to avoid overborrowing and debt crises.

7. Finally, although ESG bonds still represent only a small share of total bond issuance, there have been nearly USD 50 billion in annual issuances of these instruments by SNGs since 2021. While the issuance process of ESG bonds is operationally burdensome, it also presents an additional source of funding for SNGs engaged in environmental, social and sustainability goals.

8. The paper proceeds to elaborate on the macroeconomic context and motivation in Section 2, then the overall subnational debt profile in Section 3. Subnational bond issuances and characteristics are reviewed in Section 4 while Section 5 examines the risks and how institutions may help, with an exploration

of several country cases. Section 6 concludes with a summary of the main findings. The analysis is complemented by annexes and boxes that provide more details on SNG bond issuances, explain how SNGs access ESG bonds, and provide a short literature review on subnational debt.

2. Macroeconomic context

2.1. Lower GDP growth, inflation and higher interest rates after zero-rate policies

9. Even with most OECD economies stabilising after the economic shocks of 2022, the current baseline macroeconomic scenario is still much worse than expected before Russia's war of aggression against Ukraine. Although updates from 2024 have been on the positive side, geopolitical risks and tight monetary policy stances hold down growth, which is among the lowest in the last decades. (OECD, 2024).

10. Headline inflation in most countries has declined from its peak, but it remains above targets and, thus, monetary policy will probably remain tight for the near future. This is because, even with energy prices declining sharply from their peaks last year, underlying measures of inflation remain higher than targets, among others, because labour markets are still tight, and wages keep rising. With underlying inflation still above targets, most central banks are unwilling to ease significantly monetary policy quickly. Potentially inflationary geopolitical risks also contribute to the cautious tone.

11. Therefore, one of the main downside risks to GDP growth is that a longer period of heightened interest rates may trigger financial vulnerabilities built up during the long period of extremely low rates and rising indebtedness (OECD, 2023). In particular, as will be discussed below, SNGs' debt is highly exposed to interest rate movements. Together with the fact that SNGs often also face liquidity and borrowing constraints, they are particularly vulnerable and may struggle to keep debt payments on schedule without major fiscal rearrangements.

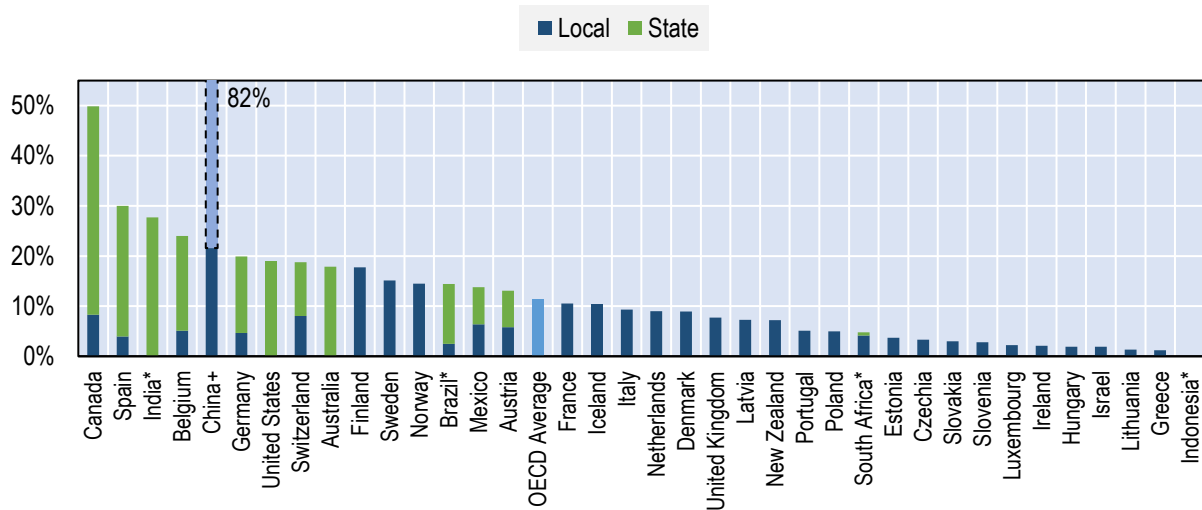
2.2. SNG debt represents, on average in the OECD area, 11% of GDP or 150% of their own revenues

12. General government debt levels have been historically high since 2020. This is mostly concentrated in central governments, but in some countries, SNGs represent a large share of public debt. Figure 1 shows that SNGs' debt is sizeable in a considerable number of countries. In Canada, for instance, SNG debt is almost 50% of GDP, while in several countries SNG debt is between 20% and 30% of GDP, and in another ten countries between 10% and 20%. The median and the OECD average are around 13% of GDP. For China, considering the Local Government Investment Vehicles (LGIVs) (OECD, 2022), SNG debt goes off the chart to between 70 and 80% of GDP, depending on the estimate for LGIVs (see Section 5.3 for details).

13. This measure, in per cent of GDP, is relevant to analyse the overall exposure of the country's economy and of the central government to SNGs' debt, but it does not show how SNGs are indebted according to their own relative size and fiscal capacity. Figure 2 shows the ratio between debt and consolidated own revenues² for SNGs and central governments. The average ratio is around 150% for SNGs. The most indebted SNGs are in Mexico, with a debt-to-own revenue ratio of almost 350%. The Netherlands, Ireland, Austria, Estonia and Spain follow closely with ratios of between 250% and 300%. On the other extreme are Czechia, Slovenia, Luxembourg and Hungary, with figures of around 50%. These numbers compare with central governments, for which the OECD average is around 200%, with eight countries close to or above 300% and two above 400% (United States and Greece), based on 2022 data.

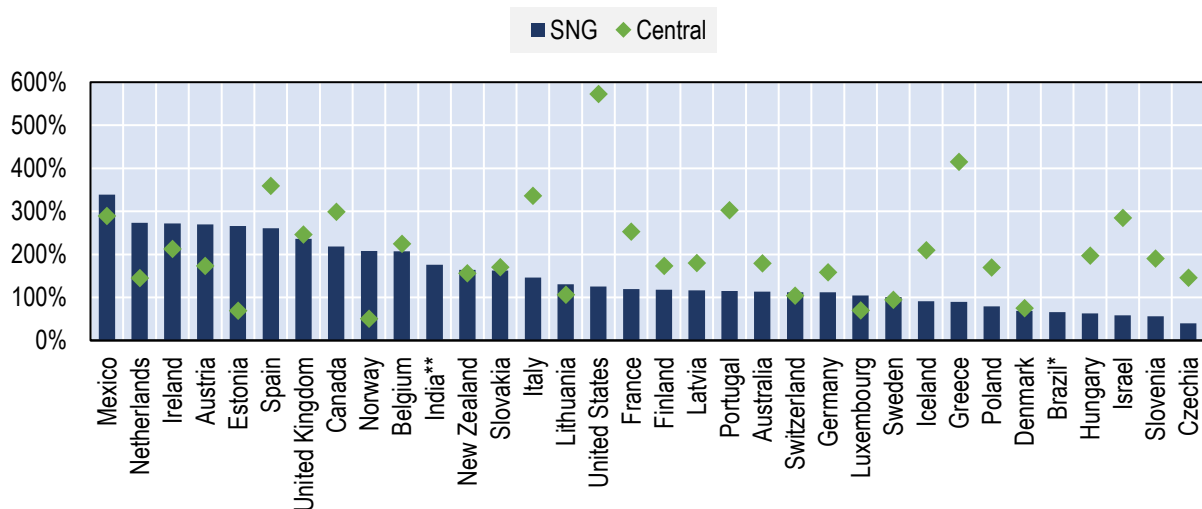
² Consolidated data from the OECD Fiscal Decentralisation database excludes transfers received. See Annex D for details.

Figure 1. Ratio of subnational government debt to GDP in 2022, in per cent



Notes: "Total liabilities excluding insurance technical reserves" in relation to national GDP. *Consolidated data, except for Brazil, Indonesia, India and South Africa (from IMF). *China also shows the estimates for Local Government Investment Vehicles (LGIVs), see (OECD, 2022). Sources: OECD Fiscal Decentralisation database and IMF (for Brazil, Indonesia, India and South Africa).

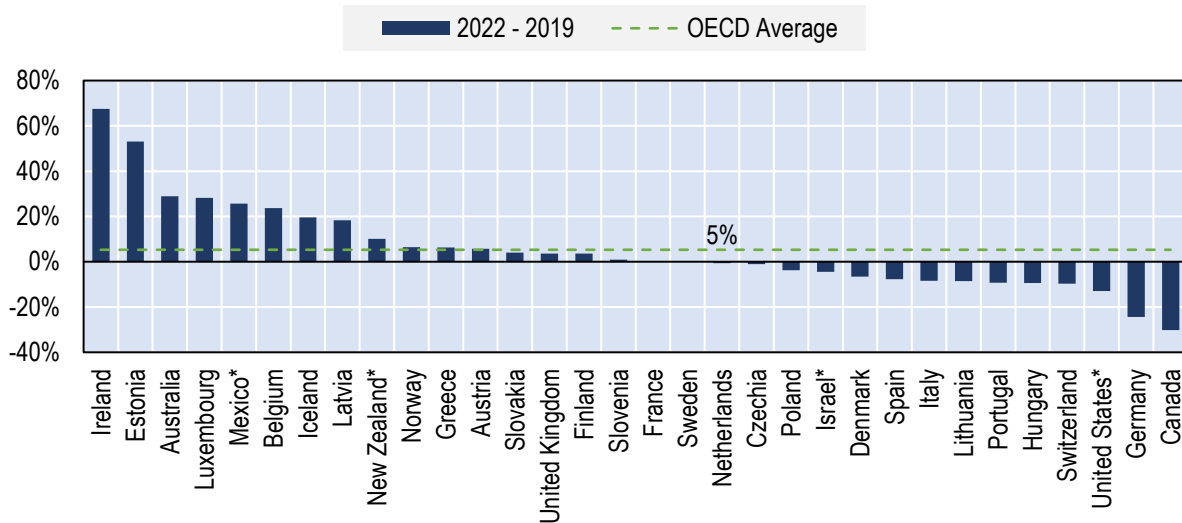
Figure 2. Subnational and central governments' debt-to-own revenues ratio in 2022



Notes: "Total liabilities excluding insurance technical reserves" in relation to "Consolidated government revenue" (does not include transfers). Data for 2022 except for Israel, Mexico, New Zealand and United States, with data for 2021. Sources: OECD Fiscal Decentralisation database, * IMF Article IV, ** RBI.

14. Looking briefly at the recent dynamics, SNGs in general incurred much lower debts than central governments during the pandemic, although in some countries, they saw growth in indebtedness. Figure 3 shows the change in the debt-to-own revenue ratio between 2019 and 2022. While the OECD average shows a growth of 5 percentage points, some countries show a much larger variation. Ireland stands out with its SNG debt-to-own revenue ratio growing almost 70 p.p., with Estonia close behind with more than 50 p.p. and another handful of countries between 20 and 30 p.p. On the other extreme, Canada witnessed a fall of 30 p.p. and Germany almost 25 p.p. These changes were caused by a varying mix of changes in revenues and debt, depending on the country.

Figure 3. Growth in subnational debt-to-own revenues ratio during the pandemic



Notes: Difference between 2022 and 2019, except countries marked with an “*”, between 2021 and 2019. “Total liabilities excluding insurance technical reserves” in relation to “Consolidated government revenue” (does not include transfers), in percentage points.

Source: OECD Fiscal Decentralisation database.

2.3. Recent SNG debt stress episodes warrant attention

15. Although there have not been any major subnational debt crises that triggered or risked disruptions in the OECD since the European sovereign debt crisis in the early 2010s, the issue of subnational debt remains a concern. Even inside the euro area, for example, the regional bank of Carinthia in Austria had to be rescued by the central government because the state of Carinthia itself, which guaranteed most of the bank’s liabilities. The bank required a multiple of the region’s budget to fulfil its obligations. The problems with the bank emerged during the Global Financial Crisis but were only resolved in 2016 (Jergitsch, Plesser, & van Wijngaarden, 2017).

16. Following a period of incentives for SNG borrowing, between 2015 and 2020, Brazil had major issues with states’ public debts. During this period the central government implemented many debt restructurings, both involuntarily and voluntarily, either by injunctions from the Supreme Court (OECD, 2024) or through laws passed by the Congress as well as through programs proposed by the executive. The episode did not evolve into a macroeconomic or otherwise systemic crisis but challenged (again) the stability and efficiency of the current subnational debt framework (Brochado & Cruz, 2022).

17. In the United States, SNG debt (municipal bonds, or “*munis*”) has a long history of very low default rates. However, the last decade provided a couple of large exceptions to this rule (Moody’s, 2023). In 2013, Detroit, Michigan, filed for insolvency, turning into the biggest municipal bankruptcy in history. Not long after, however, a much bigger subnational debt stress case emerged when the territory of Puerto Rico declared insolvency. Since Puerto Rico as a territory is not a municipality, the standard bankruptcy framework was not applicable and a special insolvency procedure was set out, the Puerto Rico Oversight, Management and Economic Stability Act (PROMESA) (Herold, 2018). In general, these cases are not associated with sizeable direct expenditures or costs incurred by the central government, and the United States is usually considered a federation with a credible no-bailout rule and no, or very weak, implicit guarantees from the central government to SNG fiscal liabilities. But during the COVID-19 pandemic, the Fed arranged a huge lending facility for states and municipalities, which could broadly be thought of as a type of pre-emptive bail-out arrangement. However, very few SNGs engaged (Federal Reserve, 2020).

18. Recently in the United Kingdom, Birmingham, one of the largest local UK authorities, declared itself in financial distress. A couple of months later, the Nottingham City Council followed (Hoddinott, 2023). There has been a series of such cases since 2020, and because of its size, the Birmingham case caused some apprehension of possible contagion (Stewart & Murray, 2023). The Office for Budget Responsibility in the United Kingdom, in its most recent “Fiscal risks and sustainability” report, calls attention to the “...growing number of de facto insolvencies among local authorities” (OBR, 2023).

19. In China, the financial problems of the infrastructure and real estate sector that have been widely discussed over the last several years are related to local government debt in at least two major ways. First, land sales revenues have been a major means for closing budget deficits and served as collateral for borrowing (IMF, 2024; OECD, 2021). However, these revenues suffered after slowing demand from private developers (Yu & Mitchell, 2022). Second, local governments have used the so-called Local Government Investment Vehicles (LGIVs), which are off-budget institutions created to undertake various urbanisation and infrastructure projects (OECD, 2022). These LSIVs had considerable borrowing freedom, contributing to the accumulation of local government debt. These developments have raised questions about the fiscal sustainability of local governments, spurring a wave of actions by the central government to increase transparency and gain greater control over local government debt (Bloomberg, 2023).

20. For further references on what is already known about SNG debt, Annex A provides a brief literature review.

3. Overall SNG debt profile

21. This section describes the overall debt profile of SNGs in terms of the main aggregate instruments (types of liabilities).

3.1. SNG borrowing frameworks have large heterogeneity across countries

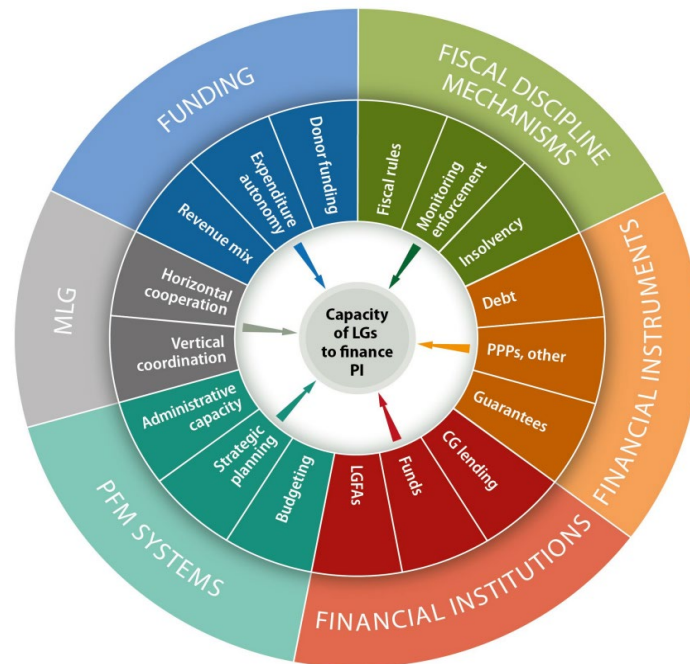
22. In a broad cross-country analysis, institutional frameworks that govern SNG borrowing differ significantly, probably more than the differences in overall decentralisation. For various reasons, some countries that are very decentralised and have always allowed for high freedom in borrowing had little SNG debt stress episodes. On the other hand, some more centralised countries experienced large crises, which motivated the build-up of strong rules, controls and even prohibitions over SNG borrowing.

23. For instance, (Vammalle & Bambalaite, 2021a) find that the most common fiscal rules for SNGs concerns debt rules. Only a few countries do not have debt rules, and these are mostly federal countries (Austria, Belgium, Germany, Canada, and Switzerland) or highly decentralised ones, such as Finland. New Zealand also stands out with no debt rule, relying heavily on the market-based approach explained below.

24. According to (Vammalle & Bambalaite, 2021b), the availability of funding and financing for SNGs depends on six groups of factors: the funding framework, fiscal discipline mechanisms, financial instruments, financial institutions, the public financial management system and multi-level governance. Those are illustrated in Figure 4. Here the focus is on the right-hand side, that is, fiscal discipline mechanisms, financial instruments and financial institutions, which refers to financing.³

³ The funding capacity refers to how the expenditure will eventually be paid for, while the financing capacity refers to how the immediate cash flow needs are covered.

Figure 4. Factors affecting SNG financing capacity



Notes: CG – Central Government, LGFA – Local Government Financing Agency, MLG – Multi-Level Governance, PFM – Public Financial Management, PPPs – Public Private Partnerships.

Source: Vammalle & Bambalaite (2021b).

25. Countries differ significantly in their frameworks for ensuring fiscal sustainability. Some give extensive freedom to SNGs, while others restrict their financing options. Vammalle & Bambalaite (2021b) identify four groups of systems that ensure fiscal sustainability is not threatened by excessive debt, detailed below.

26. The more decentralised countries set up market-based systems, relying on lenders to monitor their debtors. In this case, SNGs must have high fiscal autonomy, and a credible no-bailout clause is necessary. An insolvency framework and high-quality fiscal information are also fundamental for a market-based system to work properly. A little below on the autonomy scale, some countries focus more on the cooperative approach, in which objectives, limits and allocations are negotiated among peers and across levels, instead of being set up by the higher government level. In a rules-based system borrowing decisions are made by SNGs with some degree of flexibility, but within rules and limits usually set by higher levels of government, who often restrict their role in monitoring compliance. Direct control systems are the more centralised ones. In such systems, central governments concentrate most aspects of borrowing decisions and even processes, from pre-approval of borrowing requests to the definition of which expenditures are to be financed by debt, in some cases even performing the operational part of the borrowing.

27. Smoke (2023) also provides a global overview of how SNGs borrow, and a more detailed look into some countries. Reviewing many characteristics of these selected countries, including level and type of decentralisation, fiscal frameworks, fiscal rules, development of financial markets, and others, he cannot find one major defining feature and recommends more systematic action by the international development community to foster efficient subnational borrowing.

28. In practice, most countries implement a mix of these systems, with varying weights on each one. These significantly affect the absolute and relative size of SNG debt. Therefore, the levels of debt cannot be taken at face value for indicators of fiscal sustainability of SNGs without considering how this financing framework is set up in the country. Hence, the general cross-country analysis performed in this paper must

be weighed by each country's borrowing framework. Subsequent sections comment on possible institutional causes of documented debt profiles and evaluate some cross-country correlations between institutional indicators and levels of debt.

29. While Smoke (2023) argues that in some countries there is too little SNG debt, in most OECD and in at least another handful of non-OECD countries, SNG debt is sizeable, and the current scenario of high interest rates can translate into higher borrowing costs, which thus warrants attention. The following sections describe the main characteristics of SNG debt throughout OECD and additional selected federations, using more detailed data on SNG liabilities from the OECD National Accounts database and, in the latter sections, from London Stock Exchange Group (LSEG) data on SNG bond issuances.

3.2. Bank loans account for 55% of SNG borrowing in the OECD area

30. In contrast to central governments, which access the debt market mostly by issuing marketable bonds this is not always the case for SNGs. Though SNGs in some countries borrow almost only through bond issuances (e.g. Canada, India, and the United States), most countries will see SNGs have liabilities concentrated in bank loans or a mix of these two instruments.

31. This debt mix has important implications for SNGs' debt sustainability in two main dimensions: their maturity profile and the rate of indexation. Firstly, regarding indexation, SNG bonds in the OECD area, in general, pay fixed rates, which reduces the sensitivity of borrowing costs to interest rate movements. On the other hand, loans tend to feature floating rates, which imply that borrowing costs change almost immediately after movements in interest rates. Therefore, governments that rely on fixed-rate bonds are less vulnerable to interest rate hikes than those that rely on loans with floating rates. Additionally, loans usually take more time to be implemented, which creates a lag between the identification of a borrowing need and the provision of the funds.

32. Secondly, crucial to assess the exposure to interest rate fluctuations is the maturity profile of the debt. Short-term liabilities (those due in up to one year) are frequently refinanced under new rates, having exposure to interest rates similar to loans with floating rates, in addition to refinancing risks (i.e. the risk of not being able to roll over the maturing debt). For most countries analysed here, short-term liabilities, while significant at the central level, represent only a small part of total SNG bonds.

33. To assess the overall exposure of SNGs' debt to interest rates considering both dimensions, Figure 5 depicts loans and short-term bonds together as a share of total SNGs' liabilities. The vulnerability is high, with the OECD average showing almost 60% of SNGs' debt arguably exposed to short-term movements in interest rates.⁴

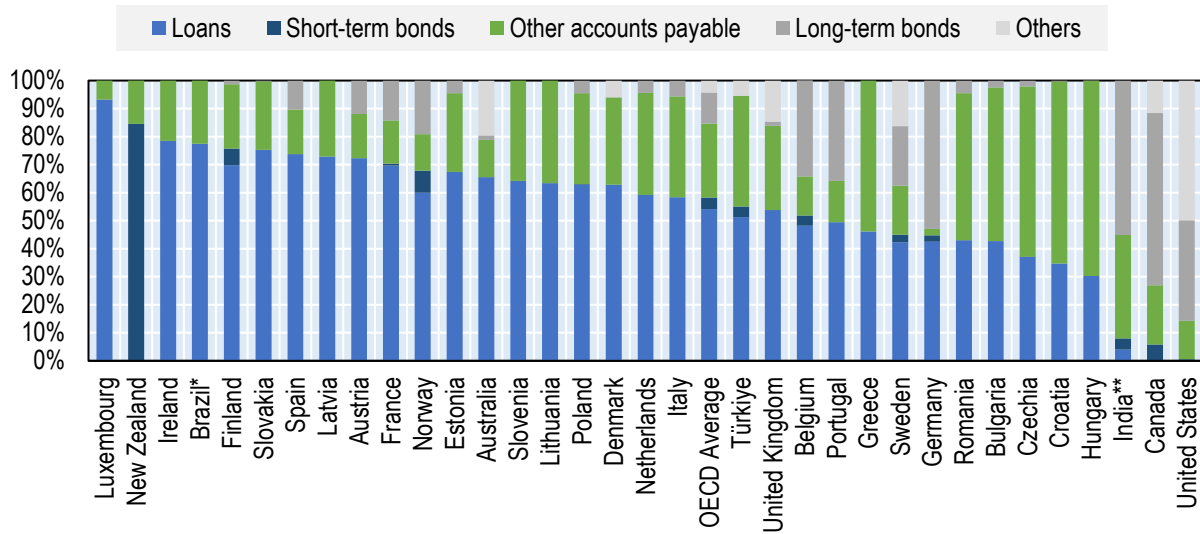
34. A third dimension in which the mix between bank loans and bonds is relevant to addressing SNG fiscal sustainability is that, while detailed data on traded bonds is generally available from financial data providers, information on bank loans is usually very scarce and requires further legislation to be regularly disclosed.⁵ This paper, therefore, performs a more detailed analysis of the bond issuances, their main characteristics and how these can relate to SNG debt sustainability, especially in the current macroeconomic scenario. It does not investigate the characteristics of bank loans because of the lack of comprehensive data. An important future extension of this project would be to gather and analyse such information.⁶ In this report, some analyses assume that bank loans have floating rates.

⁴ 4% in short-term bonds and 55% in bank loans.

⁵ Brazil is an example of transparency. Both SNGs and banks are obliged to disclose detailed information on individual loans to the National Treasury and the Central Bank, respectively.

⁶ Important dimensions to evaluate are: maturity profile, shares of floating and fixed-rate loans, which are the creditor banks (private, public, federal, subnational, etc.), currency exposure, guarantees, among others.

Figure 5. Share of SNGs' debt exposed to interest-rate risk in the short-term



Notes: Countries are ordered by the share of loans and short-term maturing debt (up to one year) over total SNGs' debt. As of 2021 or 2022 depending on data availability.

Sources: OECD System of National Accounts, Financial Accounts Balance Sheets, * National Treasury of Brazil ** Reserve Bank of India.

3.3. Who lends to SNGs?

35. In many countries, SNGs access competitive financial markets. However, there is compelling evidence that, even in many of those, loans from central governments (directly), commercial public banks, or SNG banks represent a relevant part of SNG borrowing. These sources are even more present for countries that do not access bond markets.

36. For instance, in the United Kingdom and Ireland, virtually all loans to SNGs are granted directly by the central government (Blöchliger & Kim, 2016). In Brazil, the vast majority of loans to SNGs in the last two decades were supplied by public banks (Brochado & Cruz, 2022). Also, in Nordic countries, public agencies dedicated to funding SNGs provide a relevant or major part of the loans to municipalities (Blöchliger & Kim, 2016). In Germany, a large number of local governments borrow from local “public” banks (Hoffmann, Stewen, & Stiefel, 2023). Even in the United States, with the most liquid and active financial system in the world, in some states, some municipalities borrow from a centralised agency (Liu, De Angelis, & Torbert, 2017). In general, however, in the United States, these pooled issuances account for a very small share (0.1%) of the total *munis*⁷ outstanding (Liu, De Angelis, & Torbert, 2017) and, as happens with other countries where the SNG bond market is liquid, like Canada, individual investors do play a relevant role in directly financing SNGs (around 50% in the United States) (Bagley, Vieira, & Hamlin, 2022).

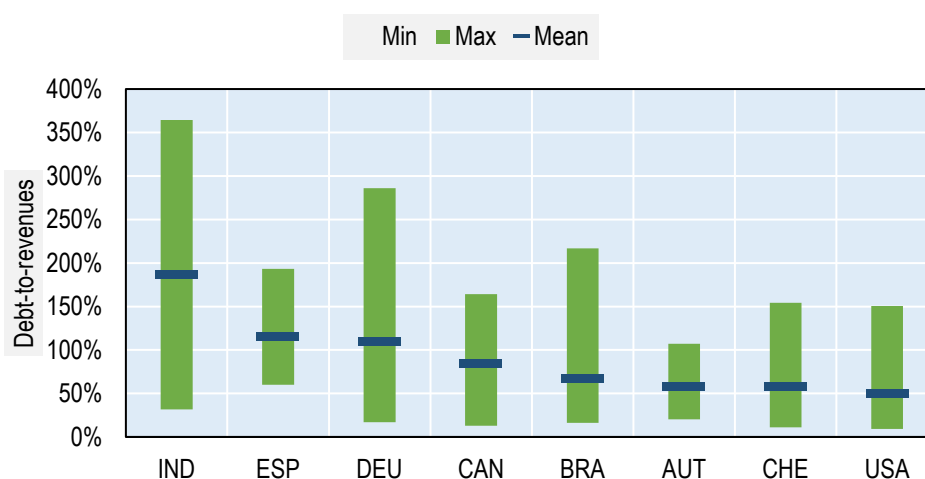
37. Different types of lenders can have different behaviours related to individual SNG fiscal situations and macroeconomic conditions. For example, in times of high macroeconomic uncertainty, private participants in the bond market may refrain from buying any security except the most liquid sovereign bond, while public banks may keep lending to SNGs following already-defined public policies.

⁷ Common name for SNG bonds in the United States.

3.4. Debt-to-revenue ratios vary considerably across SNGs within countries

38. Looking at the variation across states inside each country, it is noticeable that total debt in relation to revenues is highly heterogeneous. In India, for example, debt-to-revenue ratios range from around 30% to more than 350%. Even the country with the smallest inter-state variation in this sample, Austria, has a sizeable range of almost 90 percentage points between the most and least indebted states. These values are illustrated in Figure 6 and differ from those in Figure 2 as they cover all SNG revenues, from a receipt perspective, including net transfers, as these are readily available from national statistical offices.

Figure 6. Variation of debt-to-revenues across states in selected countries



Notes: Data for 2022, except USA for 2021. Gross debt or total liabilities to total revenues for states, cantons, provinces.
Sources: National statistics offices, ministries, central banks. Own calculations.

39. Since the debt-to-revenue ratio is one of the most relevant indicators for the fiscal sustainability of a subnational government, one could expect this wide variation to be reflected in the respective borrowing costs, if the SNG credit market was competitive, for instance, without explicit central government guarantees or implicit bailout expectations. In the section below, analysing the dispersion of bond yields, this does not seem to be the case for every country, which could be a sign of financial frictions.

3.5. Interest payments could increase by up to 1% of GDP

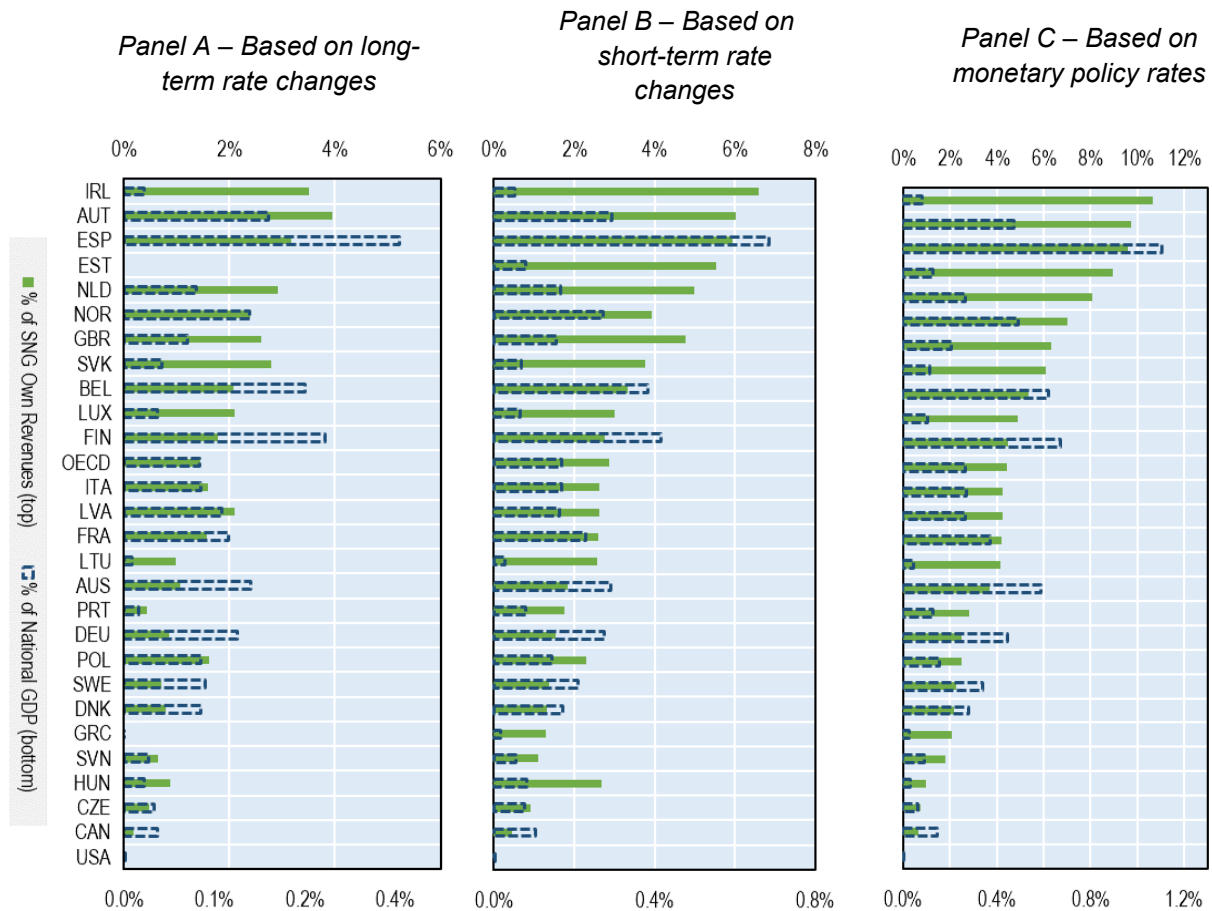
40. Although inflation can initially positively impact the nominal value of tax collections, it can seriously threaten highly indebted SNGs, with interest rate hikes, either through monetary policy tightening or higher risk aversion overall, causing higher borrowing costs. Looking at debt-to-own revenues ratios, six countries have numbers above 250%, higher than average for central governments⁸. With such a debt level, should interest rates on the total outstanding stock rise by 5 p.p. (close to what has been observed with monetary policy rates), annual spending on debt service would grow by 12.5 p.p. of own revenues, potentially causing major fiscal challenges for some SNGs. However, the degree and speed at which higher rates will translate into higher debt payments depends crucially on SNGs' debt profile, which varies significantly across countries and within jurisdictions.

41. Figure 7 shows some estimates of the growth in SNGs' expenditures with yearly interest payments for three different hypothetical scenarios. Since systematic information on actual past and current

⁸ See Annex D for a brief discussion on alternative measures of consolidated revenues and its impact on debt ratios.

borrowing costs for SNGs is scarce, the exercise bases the scenarios on the changes (not levels) of sovereign short- and long-term rates for each country.⁹ The idea is to capture the change from a low-interest rate environment to the current higher rates juncture, given the SNGs' current interest rate risk exposure. For this, the calculations use the difference between the average rates observed in the period 2015 to 2020, and the average between 2022-2023, for short and long-term rates, in each country.¹⁰ A stress scenario also looks at a hypothetical change of 5 percentage points in borrowing costs for all countries.¹¹

Figure 7. Estimated growth in annual interest expenses: three scenarios



Note: Bars represent estimated growth in interest expenditures, in percentage points of SNG own (no transfers) revenues (green) and national GDP (blue). Own revenues "collected by" SNGs (see Annex D).

Source: Authors' calculations based on the OECD Fiscal Decentralisation database, OECD System of National Accounts, Financial Accounts, and OECD Monthly Monetary and Financial Statistics.

42. The calculations consider the shares of floating¹² and short-term debt, as well as the shares of debt-to-GDP and debt-to-own revenues. Notably, the United States and Canada, two very decentralised

⁹ Implicitly the assumption is that spreads between SNG and sovereign borrowing costs remain constant in this period.

¹⁰ These sovereign yield changes are in line with observed changes in the SNG bond yields analysed in Section 4.5.

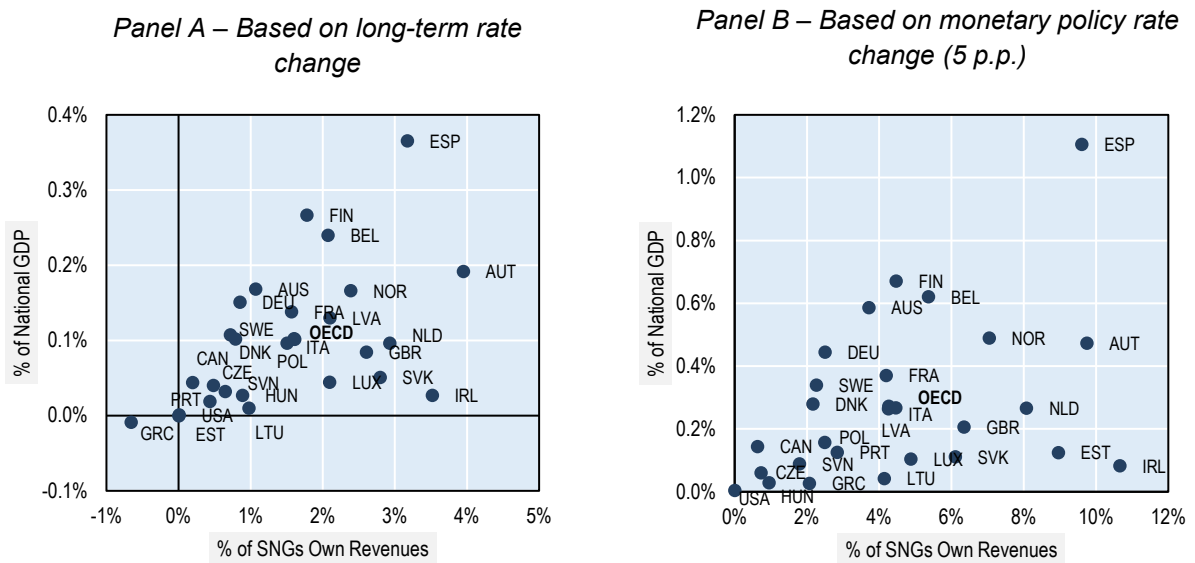
¹¹ Consistent with the movements in monetary policy rates seen in 2022/2023 in most OECD economies.

¹² Bank loans (or other type of loans that do not correspond to marketable bond issuances) are considered as floating rates. Therefore, countries with higher loan shares mechanically show a higher exposure to interest rate movements. Though outside the scope of this project, a deeper analysis of loan portfolio characteristics is warranted.

countries, are less vulnerable to this hike in interest rates, mainly because of the high share of fixed-rate bonds. They are followed closely by Czechia, Hungary, Slovenia and Greece. On the other hand, Ireland, Austria, Spain, and Estonia stand out, with high estimates in relation to SNG’s own revenues, and Spain, Finland, Belgium, Australia and Austria, with high numbers in relation to national GDP. These countries could be considered as having SNGs that are more vulnerable to interest rate movements.

43. This is even clearer in the scatterplot in Figure 8, where countries towards the upper-right corner could be considered more vulnerable. More precisely, the dots to the right show that SNGs are more likely to have a hard time keeping debt payments on track without relying on transfers (see Annex D) or undergoing major budgetary changes, while points to the top show countries where this problem might also be larger in relation to national GDP.

Figure 8. Estimated growth in annual interest expenses as a share of GDP and own revenues



Note: The scatterplot depicts the relation between estimated growth in interest expenses, with respect to SNG own revenues (“collected by”), and with respect to national GDP, for each country.

Source: Authors’ calculations based on the OECD Fiscal Decentralisation database and OECD System of National Accounts, Financial Accounts.

44. Since, in many cases, SNGs have lower borrowing freedom and lower tax autonomy than central governments, this strong growth in interest costs could pose serious liquidity stress to jurisdictions. The indicator explored here covers the SNG debt-to-own revenues, covering precisely the portion of the debt over which SNGs have the most autonomy. Although essential as a source of revenues for SNGs, central government transfers are largely outside their control and are unlikely to rise due to higher interest payments.

4. Subnational bonds profile

45. Borrowing through the sale of marketable securities (bonds) is relevant for SNGs in many countries, as seen in the previous section. This section then turns the focus to the part of subnational governments’ liabilities in the form of bonds and securities sold openly in the markets, either in exchanges

or over the counter. The analysis is based on data from LSEG that encompasses the vast majority of deals (issuances) made with subnational government bonds around the world during the last two decades.¹³

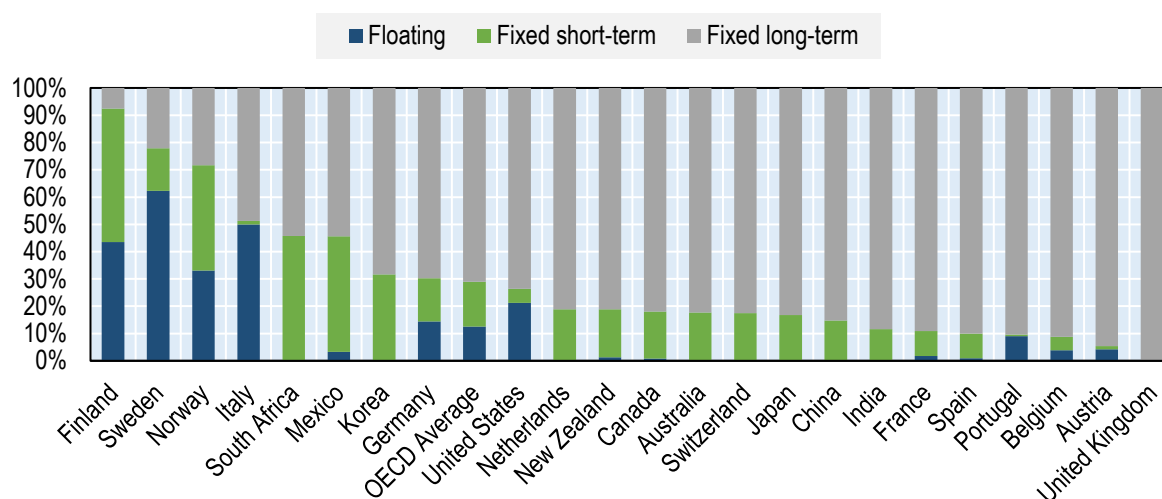
46. This section assesses the main characteristics of SNG bonds issued to evaluate possible risks to SNGs' fiscal sustainability and how these might translate into costs to central governments and the economy.

4.1. Although most of SNGs' marketable debt has fixed rates, some SNGs have a significant share of floating-rate bonds, increasing their interest rate risk

47. According to the LSEG classification of the bonds, most SNGs issue securities with either fixed coupons or discount/zero-coupon bonds, meaning that interest rates for the whole life of the security are fixed at the time of issuance. Considering all countries together, fixed-rate bonds represent more than 95% of the total number of bonds issued by SNGs since January 2000. This value contrasts with those from some central governments, whose share of index-linked (e.g. inflation-linked) and floating rate notes can exceed 10% and even reach more than 30% in a few OECD countries. In terms of value outstanding, the picture is similar, but even more concentrated in fixed-rate bonds, with the median of all countries being over 99%. This is, in principle, good news for those SNGs because it reduces their short-term exposure to interest rate hikes. However, this is only one of the three main factors that determine exposure.

48. The second factor that is key to determine the exposure of SNGs' debt to rate movements is the maturity profile of the outstanding liabilities, which was discussed above. This is because even if a government issues only fixed-rate bonds, if they are only short-term, new bonds will have to be issued at current high rates, raising the average cost of debt dynamically. This is especially important to SNGs who have high ongoing financing needs (the third factor), either because of large debt repayments or large deficits that need to be covered by new issuance. The plot in Figure 9 shows the share of short-term maturing bonds (up to two years) and the share of bonds with floating rates.

Figure 9. Instrument composition of SNG bond portfolio



Notes: Share the amount outstanding as of October 2023. The OECD average is a simple average of the floating/short-term shares. Short-term refers to bonds maturing in up to two years.

Source: LSEG, own calculations

¹³ Annex C provides an analysis of the recent trends in the numbers of SNG bonds issued, how many SNGs access that market across the countries and how the volumes evolved through the last decades.

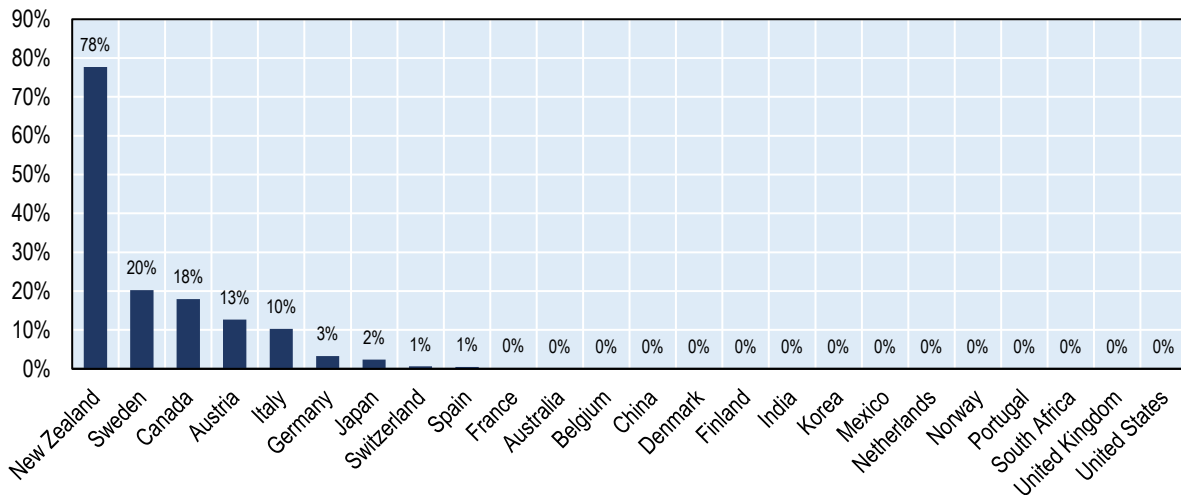
49. Considering only bond liabilities, the Nordic SNGs stand out as the most exposed to interest rate hikes. Yet, to fully assess the size of the risks, this must be considered together with their overall level of debt and their expected near-term deficits.

50. South African SNGs exhibit a high share of short-term bonds, but with a zero share of floating rates, they may navigate well if they can hold back issuances until rates go down. Italy stands out for the high share of floating rates, which means that, even if they do not need to issue new debt in the near future, Italian SNGs may (already) suffer from a surge in interest payments. Again, this must be weighted by the value of the bonds outstanding.

4.2. Issues in foreign currency are very low for most countries, but some portfolios are heavily exposed to exchange rate fluctuations

51. Looking at the aggregate picture, SNGs have relied very little on bonds issued in foreign currency in the last 20 years.¹⁴ On average, issues in foreign currency were 0.8% of the total amount issued since 2000. Though the average participation is low, some countries do issue a relatively high share of bonds in currencies other than that of their own country's. The plot in Figure 10 shows the shares of bonds outstanding.

Figure 10. Share of SNG bonds outstanding in foreign currency



Notes: Share of total amount outstanding by SNGs in each country at the time of data extraction (16/10/2023).
Source: LSEG, own calculations.

52. New Zealand stands out with the highest share (77%) of foreign currency bonds. Also with relevant shares appear Sweden (17%), Austria (13%) and Canada (9%). Germany with 2% and Spain with 1% have a lower share and the others do not show any exposure. It is important to notice that these ratios relate only to marketable bonds, so a high share here does not directly mean that the country's SNGs are highly exposed to foreign currency liabilities overall. At the same time, a low ratio here does not always mean low exposure, since bank loans and other liabilities are not considered. Another important dimension to consider while evaluating exchange rate risk is the currency in which the exposure is and how volatile it is in relation to the domestic currency.¹⁵ Additionally, some of this currency risk might be mitigated by

¹⁴ See Figure 28 in Annex C.

¹⁵ For instance, the exchange rate between the US Dollar and the Brazilian Real is much more volatile than between the US Dollar and the Euro.

swaps, which are often done by central governments in OECD countries that issue foreign currency-denominated debt. Overall, exposure to foreign currency risks seems low in SNG bond portfolios in the OECD and partner countries.

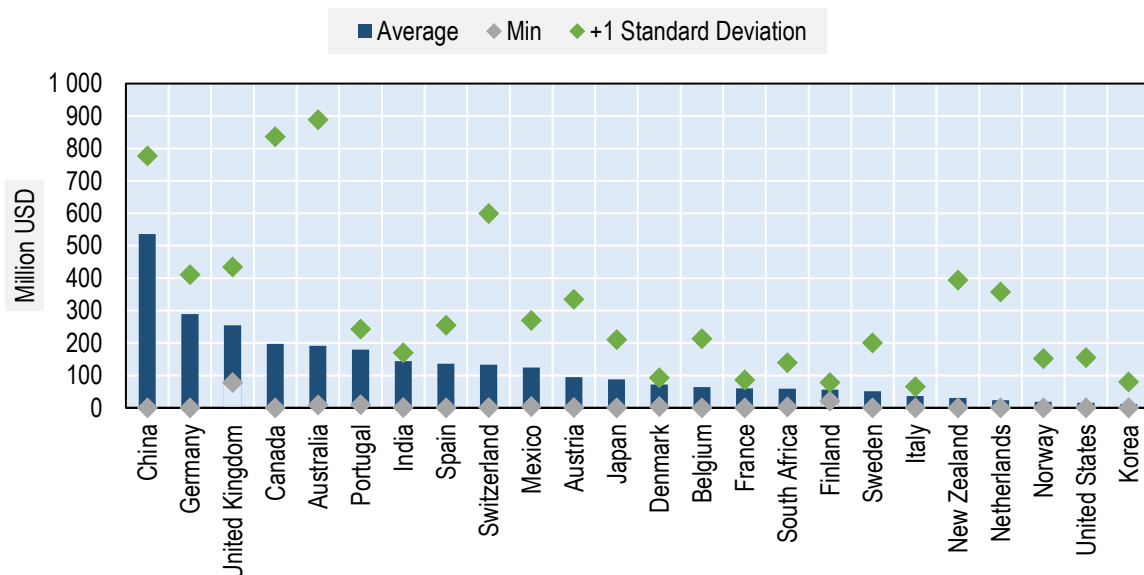
4.3. The size of bonds and their age influence liquidity

53. One of the conditions of a well-functioning SNG bond market is adequate liquidity of the bonds, which allows for efficient pricing and timely access to credit when SNGs need financing. In Canada, for example, there is evidence that newer and larger bonds are traded more frequently (Fan, Gungor, Nolin, & Yang, 2018). One consequence of this preference for larger-sized bonds is the use of centralised pooled financing, as observed in some US states (Liu, De Angelis, & Torbert, 2017) or in Nordic countries (Blöchliger & Kim, 2016), for example. Therefore, the relative size of SNGs and the extent to which the framework allows small SNGs to issue bonds should be accounted for together with these considerations. With that in mind, this section analyses the size of issuances and age of outstanding SNG bonds.

54. Figure 11 shows some summary statistics for each country's whole sample of bond issuances since 2000. The blue bars represent the average size of the bonds at issuance, and the grey and green diamonds represent, respectively, the minimum and the one standard deviation above the mean.¹⁶

55. The highest mean size of individual SNG bonds is observed in China, with issues of a little more than 500 million USD on average. Next come Germany, the United Kingdom, Canada, Australia and Portugal, with values between roughly 300 and 200 million USD. Inter-country variation is again high, with more than half of the countries in the sample issuing SNG bonds below 100 million USD on average, with a handful even below 50 million. Some countries also show a big variation in values, with standard deviations up to ten times the average. Even countries with big issues show a high variation, with standard deviations of about four to six times the average in Australia, Canada and Switzerland.

Figure 11. Individual size of SNG bonds



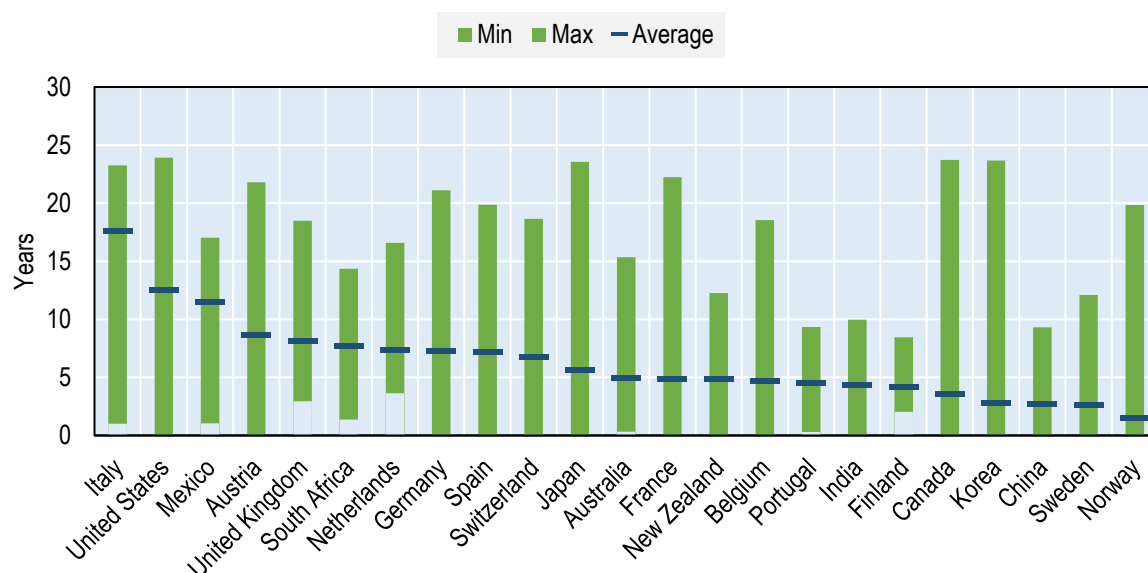
Notes: Size of SNG bond issuances. Values converted to USD with market exchange rates at time extraction, Oct/2023. The blue bars represent the average size in each country. The grey and green diamonds represent, respectively, the minimum size and the average plus one standard deviation observed in each country.

Source: LSEG, own calculations.

¹⁶ The maximum value issued is more volatile and prevents an efficient visualization of the different distributions across countries.

56. As for the age of the bonds outstanding (Figure 12), in most countries, the average age is between 4 and 10 years. More than half of the countries have bonds older than 15 years, and a handful have bonds older than 20. Italy stands out with the oldest bonds, though the most recent issues are not older than one year. On the other extreme, Norway shows the lowest average age, around 2 years, but the oldest bond is 20 years old. In some countries, SNGs have not issued any bonds for a few years.

Figure 12. Age of SNG bonds outstanding



Notes: Age in years of SNG bonds outstanding, as of October 2023. The green bars represent the range between the most recent and oldest issuance of SNG bonds still active in each country. The blue dashes represent the average age of the active bonds. Denmark has no SNG active bond.

Source: LSEG, own calculations.

57. From these figures, it is possible to conclude that the United States, which is often regarded as a standard for financial markets, has a very large and active SNG bonds market, but it may not be as liquid as it appears. SNG bonds in the United States are among those with smallest average size and highest average age. This probably means that the “buy-and-hold” strategy is dominant across investors, and market prices may potentially not reflect the full story of SNG debt. In Canada, on the other hand, SNG bonds seem much more liquid from that perspective, in accordance with existing evidence of efficient market pricing.¹⁷

4.4. Heterogeneity across SNGs’ borrowing costs within countries is small

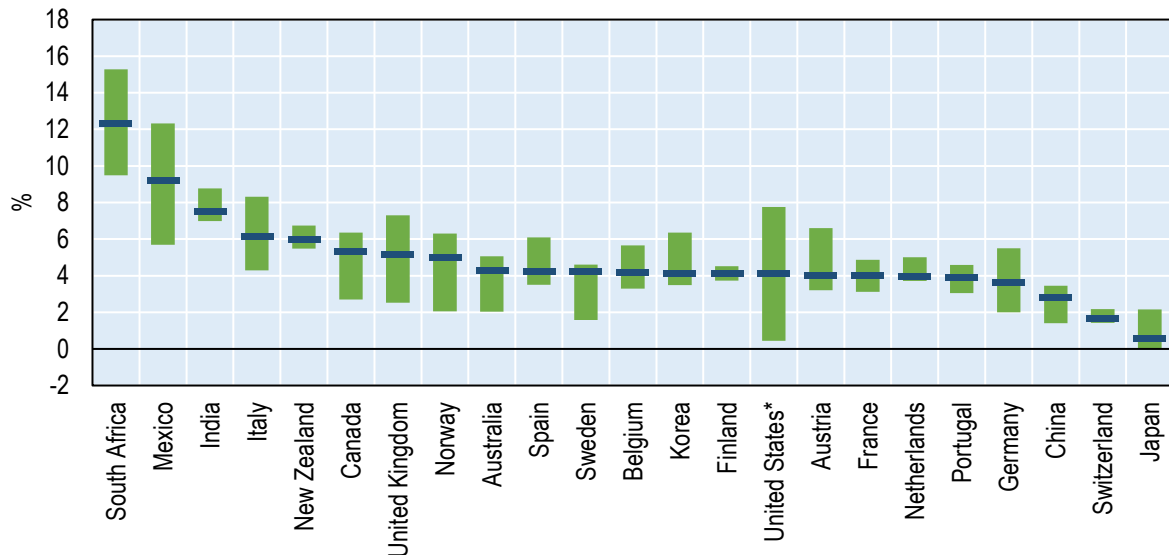
58. In general, economic and fiscal heterogeneity is relevant (not to say large) across subnational entities inside many countries, as can be seen for instance in some of the figures above. These differences, however, do not translate into the borrowing costs in many cases. The plot in Figure 13 depicts the range of current yields-to-maturity¹⁸ in the secondary markets as of October 2023 across SNG issuers within each country. It is noticeable that for some countries the variation is sizeable, reaching up to 6 percentage points for South Africa and Mexico, and almost 8 p.p. for the United States. In other countries – for example,

¹⁷ See country cases in Section 5.

¹⁸ Overall return of the bond implied by its current price if the bond would be held until maturity.

India, New Zealand, Finland, the Netherlands, and Switzerland – the variation of borrowing costs across different SNGs is very low. Broadly speaking, this could be a sign of friction in subnational bond markets. Some frictions that are common in the SNG universe are, for example, explicit or implicit guarantees from the central government, and the concentration of bonds in the hands of public banks or public companies.¹⁹

Figure 13. Yield-to-maturity across SNGs' bonds in secondary markets as of October 2023



Notes: Only bonds issued in domestic currency. Yields in p.p. as of 16/10/2023. Green bars represent the range of yields from all bonds outstanding, with extremities at the minimum and maximum in each country. Blue lines represent the average. Three outliers were not counted: two bonds of Ontario and Quebec, from Canada, with YTM of 17.4% and 12.9%; and one bond from Seoul, Korea, with YTM of 24.5%.

* US considers data only for primary market issues during Oct/2023 (2846 bonds from 207 issuers in 40 states).

Source: LSEG, own calculations.

59. Figure 14 further explores the differences in yield variance for each country across time. The graphs are composed of monthly boxplots representing observed secondary market yields across SNG bonds in a country. The expected change in variance through time, depending on the macro-fiscal scenario, is present, but what stands out is a marked difference in the pictures between countries. The presence or lack of variance does not correlate with the degree of decentralisation or the number of bond issuances, for example.

60. This similarity in bond yields across SNGs in some countries reflects that markets evaluate risks similarly for different jurisdictions regardless of their fiscal and economic differences. One hypothesis is that markets believe the central government may step in and bail out SNGs, equalising their credit risk. On the plus side, this reduces the chances of reinforcing feedback loops that increase borrowing costs for SNGs in a worse fiscal situation. Nevertheless, this can be particularly hazardous, as it reduces the market's role in disciplining SNGs' fiscal policy. In the case of rising borrowing costs due to fiscal profligacy, SNGs would be forced to improve their finances to avoid incurring higher borrowing costs. However, if borrowing costs are not responsive to SNGs' fiscal policy, SNGs may ultimately go unpunished for their poor fiscal management, leaving the burden to central governments.

¹⁹ Information on explicit guarantees is scarce in this data set and implicit guarantees warrant further investigation.

Figure 14. Individual SNG bond yield variance across countries and time



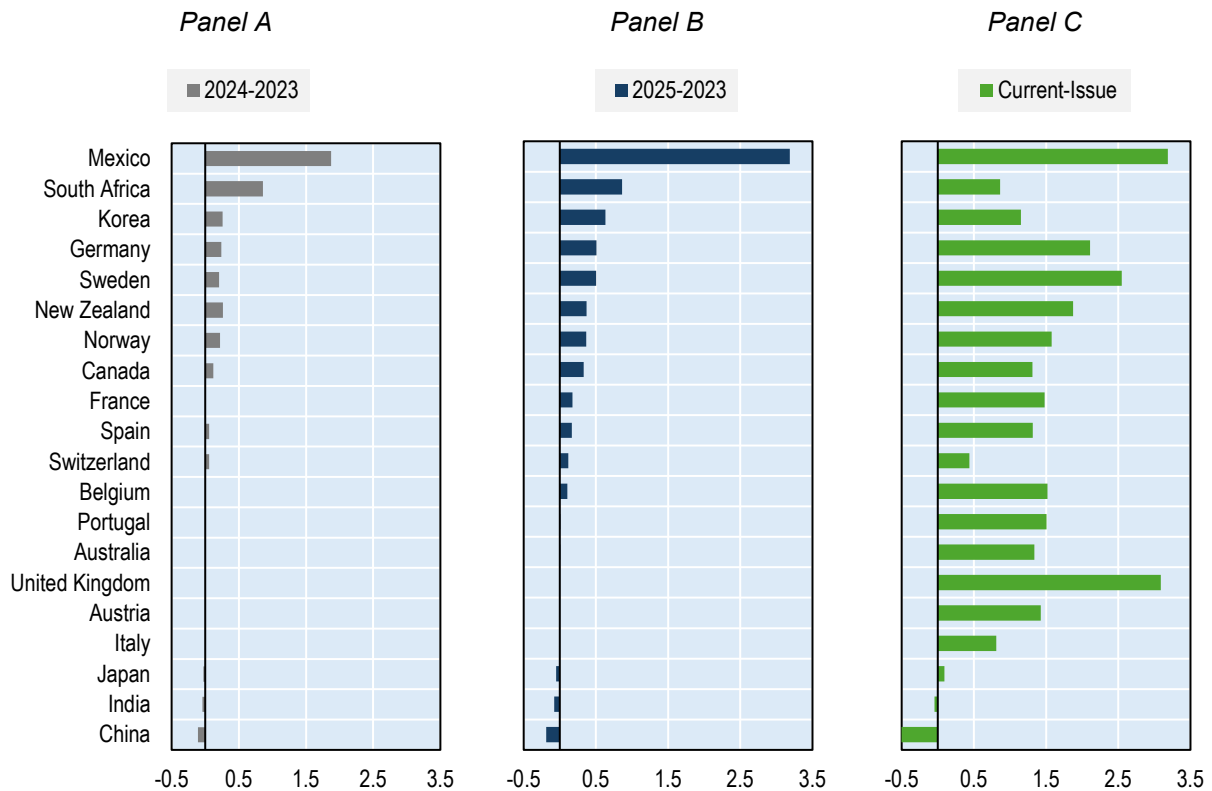
Notes: Only bonds issued in domestic currency. Monthly boxplots without outliers. Periods with higher variance show a thicker area. The Y-axes are from -1% to 15% percentage points. The X-axes go from Apr/2008 to Jan/2024, for all countries.
 Source: LSEG, own calculations.

4.5. Expected yield changes of up to 3.5 p.p. with high dispersion across SNGs

61. To assess current risks to SNG debt sustainability, on top of evaluating SNGs portfolio characteristics, it is also important to assess how they might translate into expected changes in borrowing costs caused by the current high interest-rates scenario. Using individual bond information about type of rate indexation (floating or fixed), maturity, yield at issuance and current secondary market yield, it is possible to approximate the expected change in the weighted average (bond) borrowing cost for each SNG, in each country. Figure 15 illustrates the weighted country average of the expected change in SNG bond borrowing costs between 2023 and 2024 (Panel A), between 2023 and 2025 (Panel B), and what would happen if all bond yields were refinanced by prevailing secondary market rates (Panel C).²⁰

²⁰ Assumes bonds costs are defined by their issue yield until maturity and substitutes the maturing amount outstanding by the same amount, but with current observed secondary market yields. Amounts outstanding as of October 2023.

Figure 15. Change in average SNG bond yields by country



Notes: Only bonds issued in domestic currency. Changes in percentage points. Bars represent the simulated changes in SNG bond yields, as weighted average by amount outstanding for each country. The simulated change considers that bonds maturing in 2024 (Panel A), up to 2025 (Panel B), or all outstanding bonds (Panel C) will be refinanced with the prevailing secondary market yields. All bonds with floating rates are assumed to follow prevailing secondary market yields..

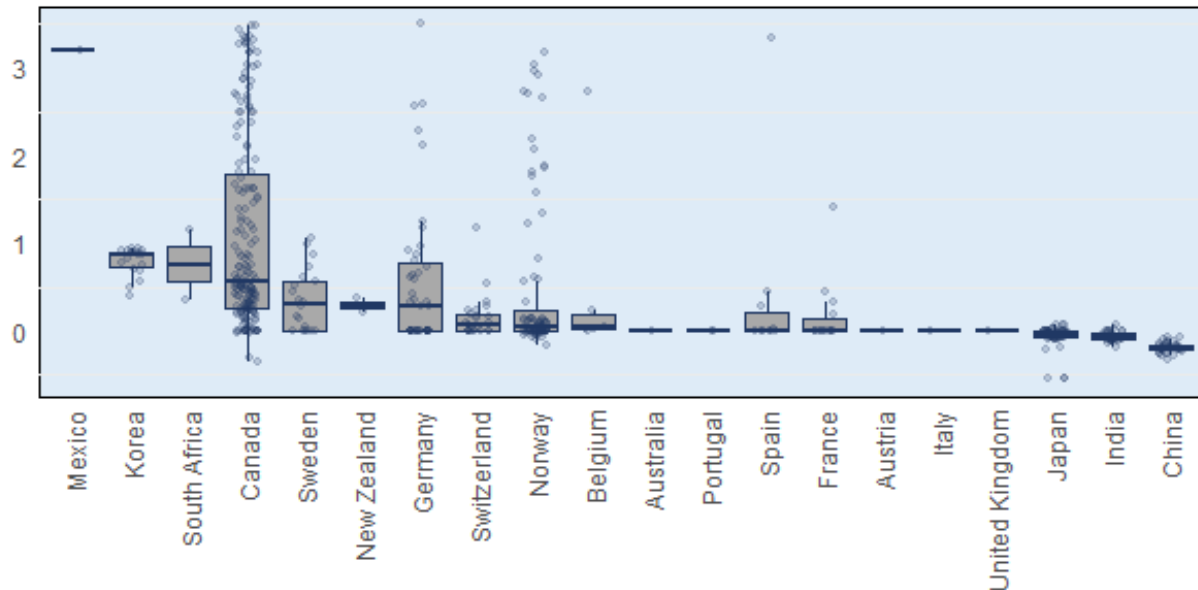
Source: LSEG, own calculations.

62. Mexico stands out with the highest expected change in borrowing costs, but it has only a single bond, so it's hardly representative of Mexican SNGs. Apart from Mexico, the picture shows only mild changes between 2023 and 2025, up to around 0.7 percentage points, with the average closer to 0.1 p.p. If rates were to remain at current levels for longer, refinancing all outstanding bonds with prevailing market yields would lead to SNG borrowing costs increasing 1.3 p.p. on average for the countries in our sample, with numbers reaching up to 2.5 for Sweden, 3.1 for the United Kingdom and 3.2 for Mexico.

63. Looking at these hypothetical changes in yields simulated for individual jurisdictions, however, the picture is very different than the country averages (Figure 16). Especially for Germany, Norway, and Canada, while country averages show a mild change in rates (Panels A and B of Figure 15), many individual SNGs in those countries may see borrowing costs rising much more (up to 3.5 percentage points) between 2023 and 2025. For Belgium and Spain,²¹ this is the case for only one of the few SNGs with outstanding bonds. These simulations warrant further investigation by central governments into individual jurisdictions' levels of debt, especially for those in the upper parts of the estimates, to assess whether the interest rate vulnerability can turn into liquidity and solvency problems.

²¹ This is a hypothetical exercise that considers what would happen if SNGs reissued their bonds under current secondary market yields. It is not, however, a projection since, for instance, current Spanish rules do not allow SNGs to issue with spreads above 50 basis points over the Spanish Treasury bonds.

Figure 16. Change in average SNG bond yields by issuer



Notes: Light blue dots represent the simulated yield changes for each jurisdiction, in percentage points (Y-axis). Dark dashes show the median for each country and the boxplots represent the dispersion. Consider bonds maturing in 2024 and 2025 will be fully refinanced at current (Dec/2023) prevailing market yields. All bonds with floating rates consider prevailing market yields. The zeros indicate jurisdictions that have neither bonds maturing in this period, nor bonds with floating rates. Countries in the X-axis are ordered by the median.
Source: LSEG, own calculations.

4.6. Possible weak links in SNGs' debt sustainability should be assessed in detail

64. For central governments, it is crucial to assess whether possible weak links in SNGs' debt sustainability could pose a large enough risk to become systemic. In particular, the high volume of new issuances of subnational bonds in the last decade, marked by very low interest rates and high liquidity provided by central banks, has yet to be tested against financial market stress. The way each SNG bond market functions may be a determinant of how these may develop. On the one hand, some countries show bond prices (yields) that are very stable and with little differentiation across SNGs, which may be seen as a sign of stability but could also mean that the market is not fully pricing in all the risks. On the other hand, some countries show already sizeable time volatility and cross-sectional variance in SNG bond prices which may appear to reveal a sense of instability but can also mean that risks are already mostly priced in, so future corrections would tend to be less drastic.

65. To assess these risks, it is important to investigate the characteristics of these liabilities in more detail, including the heterogeneity across SNGs inside each country. For instance, though the country aggregates may not show high short-term debt relative to revenues, it may well be that just a few SNGs are in a weak situation. Moreover, on top of debt levels and ratios, portfolio profiles may also vary widely in terms of maturity, share of floating-rate liabilities, and, therefore, exposure to interest rate changes, as seen, for example, in Figure 16.

66. How individual subnational jurisdictions' situations translate into a need for action by central governments, or even direct fiscal costs, will then depend on each country's institutional settings. The next section briefly overviews the SNG bond market in selected countries, mentioning some of these institutional settings. After that, Section 6 evaluates how institutions can relate to SNG debt sustainability in a cross-country comparison.

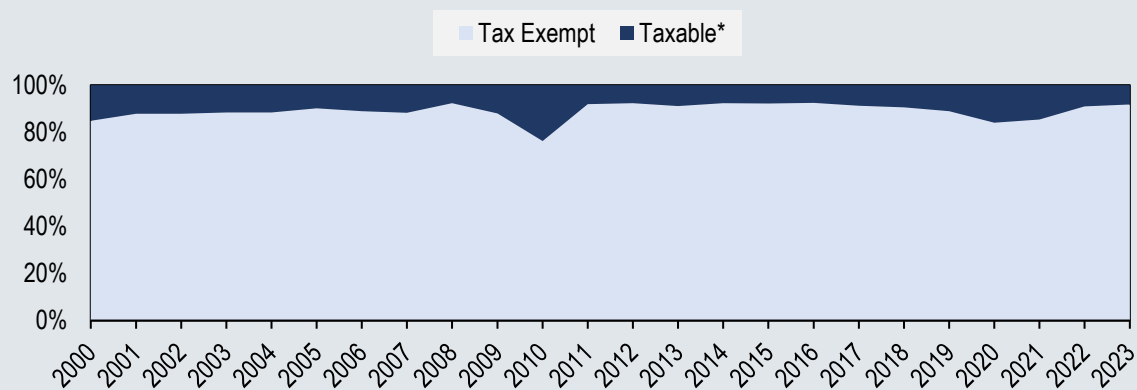
Box 1. Explicit and implicit guarantees

Though most countries claim SNG bonds are not guaranteed by the central government, there are other types of credit enhancements and subsidies provided by the central government to support SNG bond markets

One of the reasons why SNG yields do not strongly reflect their unique situation is the large amount of guarantees (explicit or implicit) and subsidies they receive from central governments. Unfortunately, the information about guarantees is scarce, but there is relevant data on subsidies for SNG bonds.

In the United States, for example, almost 90% of the *munis* issued since 2000 are tax-exempt, or subject to the alternative minimum tax.²² As these tax revenues accrue to the central government, this exemption works similarly to a central government subsidy. Figure 17 illustrates the share, in value, of tax-exempt bonds issued by US SNGs since 2000. On top of this tax exemption, at least two other types of programs from the central government have been put in place to support SNG borrowing.

Figure 17. Share of tax-exempt bond issuances in United States



Notes: Share of bonds issued in each year, in dollar values. * Includes bonds subject to the alternative minimum tax (MSRB, s.d.).
Source: LSEG, own calculations.

The spike in the share of taxable bonds in 2009 is explained by an even larger subsidy. In that year, the federal government created the Build America Bonds (BAB), which was a program that gave direct subsidies to reduce interest payments by SNGs' bond issuers to help the recovery after the Great Financial Crises. For those bonds, the federal government subsidised 35% of the interest payment to the issuer, though the bonds were taxable. Between 2009 and 2010, more than 180 billion dollars of such bonds were issued, representing more than 20% of total US SNG issues in that period, and there has been talk about reviving the program (Salwati & Wessel, 2021). Some types of SNG bonds directed to housing are also guaranteed by operations with the big federal housing corporations Freddie Mac and Ginnie Mae (Fitch Ratings, 2023).²³

As explained throughout this paper, a lack of price signalling can be hazardous to SNG fiscal sustainability, so these policies might entail risks.

67. In addition to managing short-to-medium-term fiscal risks, long-term risks should also be assessed, for instance, by incorporating climate and social dimensions in the analysis. Box 2 quickly explores how ESG bond issuances by SNGs have evolved in the last years. Annex A provides more details and explores how ESG bonds can help SNG sustainability and the challenges the SNG-ESG market faces.

Box 2. ESG-labelled bonds: a new tool to help SNGs achieve their goals

Environmental, Social and Governance (ESG) labelled bonds emerged as an innovation from the beginning of this century to channel funds from financial markets to sustainable projects. Although these are global problems, a substantial portion of the government's social and environmental activities are decentralised to SNGs (Dougherty & Nebreda, 2023). Thus, it is unsurprising that SNGs with market access have issued ESG-labelled bonds to help them fulfil their ESG-related roles.

Issuing ESG-labelled bonds offers both advantages and challenges for SNGs (OECD, 2023). The primary benefits include securing potentially favourable rates from climate-sensitive investors, even in uncertain times. However, these bonds entail a rigorous issuance process, encompassing considerable administrative tasks, with heavy compliance and auditing demands. Moreover, they impose limitations on how the resources can be utilised, constraining the financial flexibility of issuers.

Proceeds from GSS bonds²⁴ should be spent on eligible projects, usually defined in the bond's framework, in principle, even if priorities change. For instance, proceeds from a green bond issued in January 2020 would not have been available for pandemic-related support. In practice, however, there are no penalties if the resources are not used for eligible projects, and the risk is reputational.

At the end of 2023, nearly 250 jurisdictions across 24 countries had issued ESG-labelled bonds. The first issuances by SNGs were from three French jurisdictions in 2008 and 2012²⁵, preceding the first sovereign issue, by Poland in 2016. The ESG subnational bond market got traction in 2014 and issuances have grown steadily until 2021, reaching nearly USD 50 billion in 2021 and remaining around that level in 2022 and 2023 (Figure 18). SNGs from Belgium, Canada, France, Germany, Japan, Spain and Sweden have been particularly active in this market, while SNGs from the United States became active in 2021, responding to nearly half of all issuances in 2021-2023.

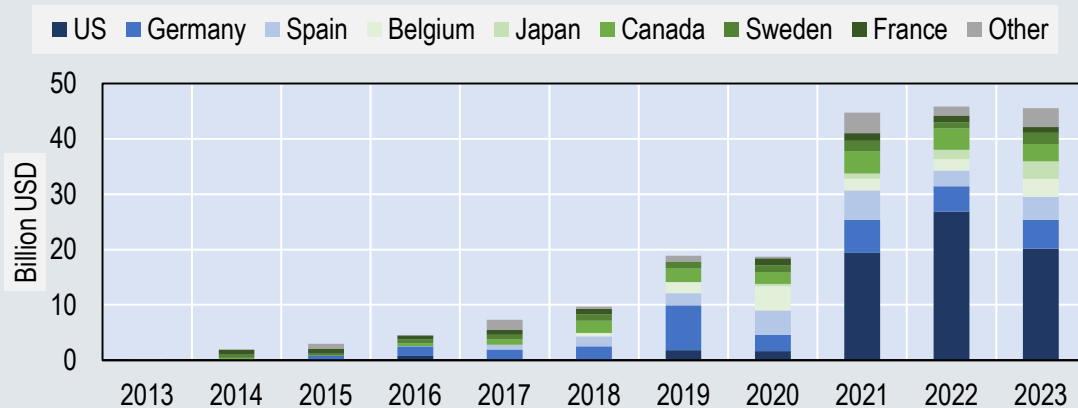
²² A reduced federal tax (MSRB, s.d.).

²³ Subsidies to SNG borrowing are of course present in other countries. In Brazil, for example, though not related to bonds, most loans to SNGs are, in great part, subsidised by the central government and the average interest rate paid by Brazilian SNGs is considerably lower than the rates paid by the National Treasury bonds (Brazil, 2024).

²⁴ GSS bonds are a category of ESG bonds (see Annex B).

²⁵ These are Region of Hauts de France, Ile de France and Provence-Alpes-Cote d'Azur.

Figure 18. SNG issuances of ESG-labelled bonds



Source: LSEG, own calculations.

Despite these developments, the actual number of issuances of ESG-labelled bonds by SNGs has not been particularly high, which can be partially explained by the burdensome process of these issuances, which require a significant administrative capacity. Annex A complements this box with more information on ESG bonds and their use by SNGs.

5. SNG bonds: stylised facts from selected countries

68. This section provides an overview of how SNGs rely on bond issuances in selected countries and discusses whether these have worked particularly well or not, depending on each country's specific features.

5.1. Brazil

69. Currently, in Brazil, SNGs are not allowed to issue bonds. Even so, the country still has important lessons to provide because this was not always the case. The uncontrolled issuance of bonds from SNGs was one of the major causes of the big fiscal and banking crisis in the late 1990's, entailing a debt restructuring of almost 15% of Brazilian GDP at the time.

70. In short, in the early 1990's, Brazilian SNGs were issuing bonds directly to their own state public banks, effectively having unlimited access to credit. The banks were however also big deposit banks, and their liquidity problems prompted recurring interference by the central bank. The phenomenon also jeopardised the newly achieved inflation stabilisation. Eventually the practice could turn into a systemic banking crisis and the central government stepped in. Virtually all state and local debt was absorbed by the central government, and SNGs signed new favourable debt and fiscal adjustment contracts (Salviano Junior, 2004).

71. In the decade that followed, SNGs had a more limited access to credit, subject to higher control. Currently, apart from the restructured debt with the central government, the majority of the debt is composed by subsidised public bank loans or by loans from international multilateral institutions, mostly also with guarantees from the central government.

72. The so-called “independent” state-owned enterprises (SOE) are however usually not subject to the prohibition to issuing bonds and there have been some recent isolated cases, mainly in bigger states, in which specially created SOE issue bonds on the market and rebate the proceedings to the state treasury, for instance, by buying non-performing tax credits rights.

73. The greatest issue in Brazil currently, however, comes from the constant requests for haircuts and renegotiations on the stock of restructured debt, or waivers for counter-guarantees (Brochado & Cruz, 2022). The big role of the central government on SNG borrowing, acting as rule maker, administrative controller, rule supervisor, guarantor and direct creditor, is probably the root of the problem (Medas, El Rayess, Perrelli, Soto, & Glória, 2019).

74. An important policy lesson from this Brazilian experience is that, especially if SNG debt is concentrated in banks, either by loans or bond holdings, the institution of a deposit guarantee fund is essential (though not sufficient) to make the no-bailout clause credible.

5.2. Canada

75. Canada has the most developed and liquid SNG bond market, maybe only behind the United States. Canadian SNGs rely heavily on bond issues, which represent almost 70% of outstanding SNG liabilities. The Canadian SNG bond market even surpassed the size of the Canadian sovereign bond market around 2016 (Fan, Gungor, Nolin, & Yang, 2018). This is of course also a consequence of the high decentralisation of Canadian federalism.

76. Unlike in the United States, there are no tax exemptions for SNG bond returns. Accordingly, even though the total volume of provincial bonds is bigger, Canadian SNGs pay a positive spread over the central government bonds. There has been only one default from a province registered in history, from Alberta in 1936, during the Great Depression, but at the time the central government provided direct loans to other provinces to avoid further outright defaults (IFSD, 2018).

77. There is some evidence that across Canadian SNGs, bond spreads are correlated to fiscal fundamentals. As for the size of the issuer, which strongly determines the liquidity of the bonds, the evidence is mixed. There is also some evidence that transfers from the central government reduce spreads (IFSD, 2018), but in all, it can be said that market prices reflect fundamentals.

5.3. China

78. China’s SNG bond market has been in the spotlight of financial market news for a couple of years, both because of its impressive volumes, but also because of its linkages to the ongoing housing and infrastructure construction sector crisis in China.

79. According to the IMF (2024), China’s SNGs historically relied on land sale revenues and off-balance sheet borrowing, mainly through local government investment vehicles (LGIV), to fund public spending. The lack of reporting requirements allowed LGIVs to accumulate heavy debt loads. These practices, initiated in the mid-1990s, led to the build-up of debt and increased exposure to real estate market risks. The recent real estate downturn additionally led some SNGs to use LGIVs to support real estate markets, exacerbating this exposure (IMF, 2024). But most of this debt was not accounted for in the official statistics, or directly linked to SNGs by the markets. Though there are no official numbers available, recent estimates put the size of LGIVs debt between 50% (IMF, 2024) and 60% of GDP (OECD, 2022).

80. This recent growth in Chinese issuances has its roots in changes in regulation from the central government. Until 2014 local governments were generally not allowed to directly issue debt, which they did through LGIVs (Bloomberg, 2023). In an attempt to reduce fiscal risks, the central administration has then allowed local governments to issue bonds directly and incentivised (off-budget) LGIVs’ liabilities to be

swapped by newly issued (official) local public debt (Lam, 2019). That is, most of this volume of Chinese issuances that appeared starting in 2015 is not exactly new debt, but a change of instruments.

81. Even so, the SNG bond market in China continues to attract investors (Bloomberg, 2023), but an important consequence of this relation between SNG debt and the housing market, is that the current property crisis may hit Chinese provinces unevenly. Moreover, the SNGs close linkages to banks and firms results in potential macroeconomic risks. Reforms to decentralization of revenues, transfers and SNG fiscal rules are advised to avoid a further deepening of the crisis (IMF, 2024).

5.4. Germany

82. In Germany the federative system is marked by the symbiotic-but-conflicting relation between solidarity and autonomy among the Länder,²⁶ in which there is a strong sense of political and fiscal autonomy but also a great deal of redistribution of resources across the states through an equalisation mechanism.

83. SNG debt in Germany is almost equally divided between bank loans and bonds (Figure 5), the latter a little ahead. In general, the bonds market is accessed more by states and bigger municipalities (some have a special state-city status).

84. In recent history, Germany witnessed two interesting episodes of default-bailout. In the late 1980s, two Länder requested the supreme court for a bailout from the central government, which was granted four years later. Ten years later, in 2003, Berlin claimed a similar treatment, which was denied in 2006. These cases have provided empirical evidence of moral hazard by investors in German SNG bonds (Heppke-Falk & Wolf, 2008). With this constant autonomy-solidarity duality, rating agencies diverge in their assumptions about the possibility of a bailout for their analysis of German SNG credit.

85. While smaller municipalities usually do not access this bond market and rely mainly on bank loans, they also provide an interesting case for study. An important share of these loans is provided by local public banks, which are run by local politicians, who are members of the boards (Hoffmann, Stewen, & Stiefel, 2023). As seen in Brazil, this is a case for caution.

5.5. India

86. India's SNG bond market is vibrant, with multiple hundreds of yearly offerings, accounting for around 70% of total SNG liabilities. The bond market is mostly accessed by states (or territories). While some states access the market multiple times per year, every year, half a dozen states almost don't issue bonds at all, with only one or two issuances throughout. Another handful of states issue bonds every year but with only very few offerings per year.

87. Though the Indian federation is substantially decentralised in many ways, the decisions, and operations of SNG debt are, to the contrary, very centralised. States need the consent of the central government to borrow. After having the authorisation to borrow, in general also the issuance of bonds is done centrally. Most states have an agreement with the central bank (Reserve Bank of India) to manage their debt. The auctions of the bonds are performed by the central bank on the same platform as the central government auctions, with a regular pre-defined calendar (India, 2020).

88. One remarkable characteristic of the Indian SNG bond market is that borrowing costs are very stable, following closely the central government bond yields. As expected, the rates paid by states are higher than the rates paid by the central government. What is noteworthy, though, is that the variation of rates across states is very small, arguably much lower than the cross-state variation of economic and fiscal fundamentals, starting with debt-to-revenues ratios, as shown in Figure 6. This weak linkage between

²⁶ German name for the states.

fundamentals and yields is empirically documented (Suraj, Pawar, & Seet, 2023) and indicates a low degree of market discipline and some perception of implicit guarantees from the central government, which could potentially lead to moral hazard problems.

5.6. United States

89. The United States has by far the deepest SNG bond market. This is because it is the largest economy and US SNGs rely almost exclusively on bonds for debt financing.²⁷ One of the reasons for this is the lower capital requirements for bank holdings of some types of SNG bonds compared to requirements for loans (Ivanov & Zimmermann, 2023).

90. In general, US SNGs must run a balanced budget, and some are not allowed to issue debt. Still, the majority of states and municipalities access the bond markets regularly to finance capital expenditures of various types. It is also interesting to note that in 19 states, only voters can approve general obligation debt issuance. In fact, these general obligation bonds represent less than 15% of the total outstanding, the rest being linked to specific revenue streams. Because general obligation bonds represent an unconditional claim on overall state fiscal resources, they usually pay lower rates. For the same reason that they are a more comprehensive liability, state laws also put more restrictions on their issuance, with some states allowing any (NASBO, 2014).

91. In the United States, SNG debt (municipal bonds, or “*munis*” as they are usually called) have a long history of very low default rates. However, the last decade provided a couple of big exceptions to this rule (Moody's, 2023). As already mentioned in Section 2.3. , in 2013, Detroit, Michigan, filed for insolvency, turning into the biggest municipal bankruptcy in history. Not long after, a much larger subnational debt stress case emerged when the territory of Puerto Rico declared insolvency. In general, these cases are not associated with sizeable direct expenditures or costs incurred by the Federal government and the United States is usually considered a federation with a credible no-bailout rule and none, or very few, implicit guarantees from the central government to SNGs fiscal liabilities. However, there are at least two types of credit enhancements for US *munis*, one market-based, the other purely public.

92. One of the reasons that credit to SNGs might be more costly is that investors often have less information on SNG fiscal situation than about the central government. In the United States, during the 1970's, this gave rise to a market-based solution which was the appearance of private insurance for municipal bonds. In 2007 more than 30% of those were issued with insurance, but with the financial disruptions of the Global Financial Crisis, most insurers exited the market and in the last decade less than 5% of issuances were insured (Amornsiripanitch, 2022).

93. The other institution that affects SNGs' borrowing costs significantly and is a purely public solution is the tax-exempt status of returns on SNG bonds. The vast majority of *munis* (around 90%) are either tax-exempt or fall into a reduced tax scheme (see Box 1). Only around 10% are subject to full federal taxes on capital income. On top of that, most states also provide exemptions from state taxes for their own bonds.

94. Another interesting characteristic of the US *munis* market is the existence of centralised agencies for pooled issuances. In some states, there is a centralised agency that provides pooled financing, collecting credit demands from many small local authorities and bundling them in fewer and bigger bond issuances, which circumvent market restrictions on smaller issuances (Liu, De Angelis, & Torbert, 2017).

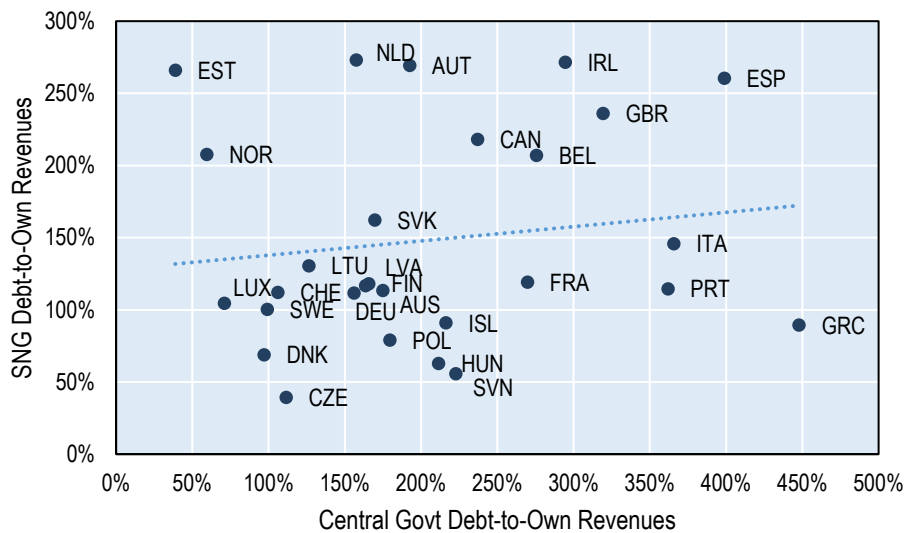
95. As can be seen in this section, details of the institutional frameworks can have a major impact on the efficiency and sustainability of SNG borrowing. The next section discusses cross-country correlation analysis between several institutional indicators and SNG debt, focusing on the effects of fiscal rules, tax autonomy and insolvency frameworks.

²⁷ Considers that in Figure 5 “Others” refer to unfunded future social security deficits.

6. Mitigating the risks – SNG debt and institutions

96. A well-designed and efficiently implemented institutional framework is essential to allow governments to provide public services while avoiding fiscal crises. Looking at the relation between debt-to-revenues in SNGs and central governments (Figure 19), the lack of a strong correlation is noticeable,²⁸ with some countries showing high debt-to-own revenue ratios in SNGs but low at the central government level, like Estonia, and vice-versa, like Greece. This illustrates that it is probably not a country's preference for high or low debt that determines how much SNGs are indebted but rather many other characteristics, including, for instance, the institutional framework for SNG borrowing. With this motivation, the next subsection briefly examines whether fiscal rules or tax autonomy correlate with SNG debt. The following one briefly recaps a study on subnational insolvency frameworks (Herold, 2018) and how they can help to develop and maintain a healthy SNG debt market.

Figure 19. SNG compared to central government debt-to-own revenue ratios



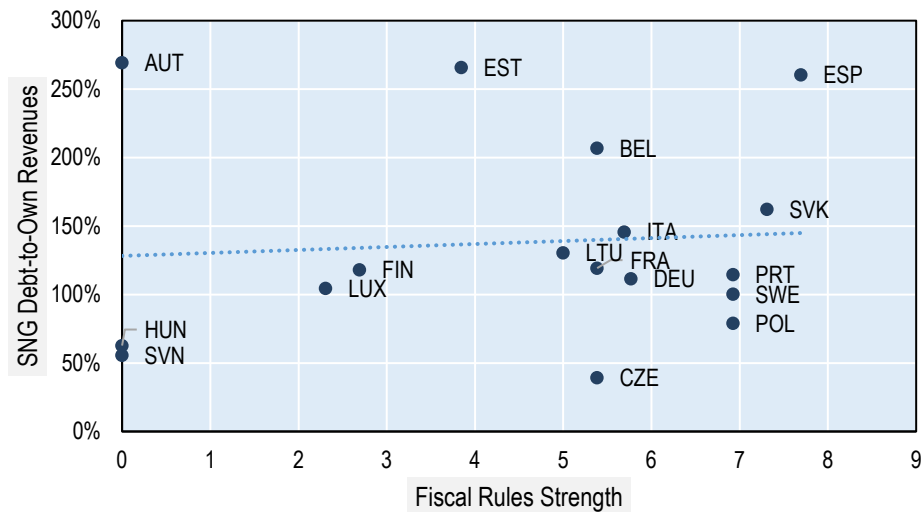
Notes: SNG debt-to-own revenues x Central Govt debt-to-own revenues in each country, measured in 2022. "Total liabilities excluding insurance technical reserves" in relation to "Consolidated government revenue" (excluding transfers). SNG include Local and State levels. Sources: OECD Fiscal Decentralisation database.

6.1. SNG indebtedness is not clearly correlated with the strength of fiscal rules, but there is some correlation with tax autonomy

97. Fiscal rules have been gaining attention from academia and policymakers for a couple of decades already, and there is a well-documented increase in the number and effectiveness of their implementation, although rules for subnational still lag behind rules for the general government (de Biase & Dougherty, 2022). One would expect that well-implemented rules avoid situations that could lead to fiscal distress. High indebtedness is one of these situations. Figure 20 depicts the most recent (2022) value for debt-to-own revenue ratios from the OECD Fiscal Decentralisation database against a measure of the strength of fiscal rules taken from the work of de Biase and Dougherty (2022).

²⁸ At least in this exercise which does not control for any other characteristics.

Figure 20. SNG indebtedness versus fiscal rules



Notes: The dotted line represents the simple linear trend (regression). The fiscal rules strength is the maximum value across any of the three types of rules (BBR, DR, ER) of the mean across SNGs (LG & RG) of the index of each type of rule. Only countries with data available are represented.

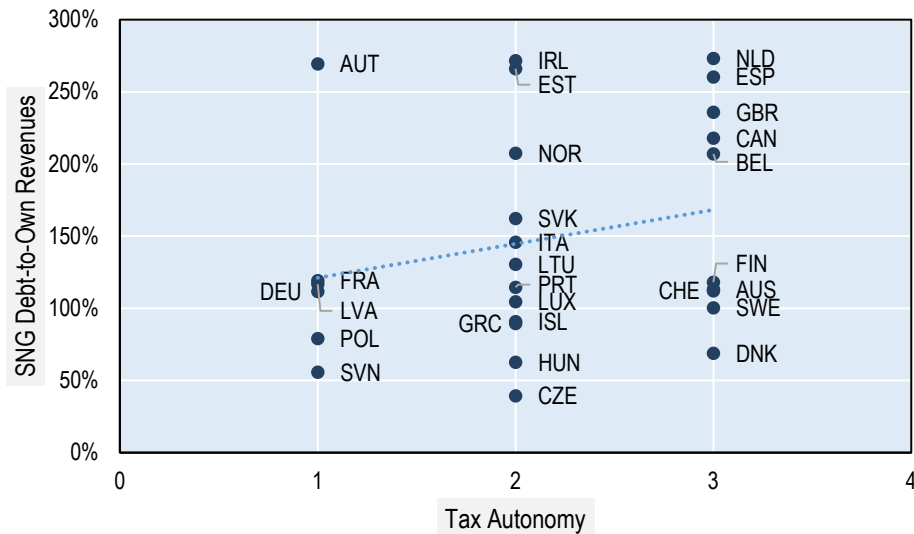
Source: de Biase & Dougherty (2022), own calculations.

98. There is no strong direct correlation between these characteristics. What could potentially explain this is the following. On the one hand, stronger fiscal rules could help prevent the build-up of (excessive) debt, and one would see a negative relation in the plot. On the other hand, stronger fiscal rules might have been implemented precisely because debt (or fiscal stress in general) was high, and a positive relation would have arisen. So here it might be that some countries in the sample represent one case, and others represent the other, so for the aggregate picture, both effects cancel each other out. Another explanation discussed in de Biase and Dougherty (2022) is that it could be that, though the rules are strict in the sense they are well designed, supervised and enforced, the actual limits might be non-binding for some countries or some SNGs in each country, so aggregate SNG debt can still be high or even grow further. Consistent with this explanation, it might also be the case that because of well-designed fiscal rules, governments and creditors are more confident in allowing for higher levels of debt. Which case represents the situation of each country is a matter for a much more detailed investigation.

99. Another important institutional factor that may influence how much SNGs can rely on debt is their tax autonomy. Of course, the overall degree of decentralisation should be very important for this question, but this is somewhat controlled for when looking at the debt-to-own revenues ratio. But to the extent that SNGs can steer their revenues – notably the ability to raise them to pay the debt if needed – this factor may be more relevant for how much SNGs can borrow. Figure 21 compares the debt-to-own revenues ratio of SNGs across different degrees of tax autonomy, as defined in de Biase & Dougherty (2022). A slightly positive relation between debt and autonomy can be seen.²⁹

²⁹ To make statements about significance and causality, a much deeper analysis would be needed.

Figure 21. SNG indebtedness versus tax autonomy



C

Notes: The countries are grouped into lower (1), medium (2) and high (3) tax autonomy. The dotted line represents a simple linear trend (regression).

Source: OECD Fiscal Decentralisation database and de Biase & Dougherty (2022).

100. Countries with similar institutional characteristics, as measured by these two indicators, have very different SNG debt levels. Sweden, for example, has strong rules, high tax autonomy for SNGs, and low debt-to-own revenues. Spain has even stronger fiscal rules and the same indicator for tax autonomy but, contrary to Sweden, has higher SNG debt-to-own revenues and GDP ratios.

101. While it is hard to come up with a general pattern in such a simple cross-country correlation assessment, there is extensive evidence that well-designed and well-implemented fiscal rules help to avoid overborrowing and debt crises (de Biase & Dougherty, 2022).

6.2. Well-designed insolvency frameworks can also help

102. While fiscal rules can be considered proactive measures that discourage fiscally irresponsible behaviour or effectively limit some governments' actions to avoid or correct an excessive build-up in debt so that it does not become unsustainable, there is scope for also adding ex-post reactive frameworks to deal with extreme cases. Insolvency frameworks that give clarity about how unsustainable debt cases will be resolved can reduce the costs of crises and even create an environment where excessive debt is effectively avoided because risks are well-defined. This sub-section briefly summarises the chapter "Insolvency Frameworks for State and Local Governments" from *Fiscal Federalism 2022* (OECD, 2022), which was based on the work of Herold (2018).

103. Essentially, an insolvency framework is a guide, that specifies rights and duties for all participants of the credit market, including debtors and creditors, but also which public services are protected from budget cuts and how higher-level governments can or have to behave. It is a pre-specified comprehensive statutory approach, that should provide a clear roadmap from actions to consequences for all participants, in contrast to an *ad hoc* approach of negotiated solutions, where actions and results are unclear. This turns unknown uncertainty into measurable risks, which tends to improve efficiency.

104. There are several different possible objectives for an insolvency framework: "...providing essential public services and enforcing fiscal adjustment and consolidation, deterring strategic default of an SNG,

facilitating debt restructuring, protecting the contractual rights of the creditors and limiting interference with sub-national sovereignty and constitutional rights” (OECD, 2022).

105. One key aspect of insolvency frameworks is clearly defining that the debtor’s decision-makers and creditors are responsible for resolving the debt with their own policies and financial actions instead of waiting for help from third parties, like a bailout from a higher level of government, for example.

106. Therefore, implementing an insolvency regime can both reduce costs from potential stresses in current debt and discourage irresponsible behaviour from SNGs and creditors (moral hazard), reducing the probability of future crises.

107. The work describes some cases with existing insolvency frameworks that have been generally successful but encompass only the municipal level. It also recognises that implementation of a new insolvency framework is hard because the interests of both current creditors and debtors are affected, and most discussed gradual or compensated implementation schemes impose additional trade-offs that can erase most of the benefits of the insolvency regime.

108. Coming back to the focus of the current paper, on SNG marketable bonds, a comprehensive insolvency regime should help with one important aspect of liquid bond markets, which is the potential hold-out problem (Herold, 2018). If a debt restructuring is necessary, to change contract conditions usually unanimous consent is required, which may be difficult (or virtually impossible) if bonds are widely held across thousands of individual investors. So, for countries who plan to implement or boost an SNG bond market, an insolvency framework should include the so-called Collective Action Clauses (CAC), which help to mitigate this risk. Since changing contracts is hard and costly, considering that when planning future SNG debt market reforms would be advised.

7. Concluding remarks

109. SNGs navigated through the COVID-19 pandemic reasonably well, partly because of the large support from central governments, yet SNG debt levels are not far from historical highs. Moreover, central government debt levels are also close to historical highs, reducing the likelihood of further support in case of need.

110. Coupled with this fiscal landscape, the current macroeconomic scenario also presents challenges. The last decade was marked by low inflation and extremely low interest rates. But in the last couple of years, inflation shot up, and central banks tightened monetary policy, bringing rates to levels not seen in 15 to 20 years in most countries.

111. SNGs that benefited from this low-rate environment by accessing cheap credit and building up debt should evaluate their exposure to higher interest rates and how this can translate into higher borrowing costs for future financing and, more importantly, for current interest expenditures. Central governments should assess these risks and determine how they can translate them into potential direct costs for central budgets and the economy.

112. This work contributes to this discussion with an overview of SNG debt across OECD and other selected federations, particularly with an in-depth analysis of SNG marketable bonds. An overview of SNG borrowing reveals great heterogeneity across countries. Looking at the total financial liabilities, it is possible to notice that bank loans account for 55% of SNG borrowing in OECD countries, on average. The prevalence of bank loans to SNGs is common even in large federations, such as Brazil. An exception among emerging markets, in India, states borrow almost entirely, issuing marketable bonds. Canada and the United States stand out among OECD countries, with SNGs borrowing almost exclusively in bonds.

113. Looking at the variation across states inside each country, total debt in relation to revenues is highly heterogeneous. In India, for example, debt-to-revenues ratios range from around 30% to more than

350%. Even the country with the smallest inter-state variation in the analysed sample, Austria, has a sizeable range of almost 90 percentage points between the more and the less indebted states.

114. Now turning the focus to marketable securities, the paper finds that, although most of the SNGs' marketable debt is fixed-rate, some SNGs have a significant share of floating-rate bonds, making them more vulnerable to higher interest rates. Looking into the maturity profile, most of the bonds are long-term, but some countries have high shares of bonds maturing in up to two years.

115. Considering only bond liabilities, the Nordic SNGs are the most exposed to interest rate hikes. South African SNGs exhibit a high share of short-term bonds, but with a zero share of floating rates, they may navigate well if they can hold back issuances until rates go down. Yet, to fully assess the size of the risks, this must be considered together with their overall debt level and expected near-term deficits.

116. Another highly relevant risk factor is that issues in foreign currency are very low for most countries, but some portfolios are heavily exposed to exchange rate fluctuations. New Zealand stands out with the highest share (77%) of foreign currency bonds outstanding. In addition, those with relevant shares include Sweden (17%), Austria (13%) and Canada (9%). In contrast, Germany, with 2%, and Spain, with 1%, have a lower share, and the others do not show any exposure. It is again important to notice that these ratios relate only to marketable bonds, so a high share here does not directly mean that the country's SNGs are highly exposed to foreign currency liabilities.

117. There is evidence that the bonds' size and age influence liquidity. For instance, one consequence of this preference for bigger bonds is the use of centralised pooled financing for small municipalities, as observed in some US states or in Nordic countries, for example. Since liquidity is an important factor determining efficient credit access, this work considers these two measures in the data set. From these figures, one can conclude that the United States has a very large and busy SNG bond market, but it may not be as liquid as it seems. US SNG bonds are among the ones with the smallest average size and highest average age. This probably means that the "buy-and-hold" strategy is dominant across investors, and market prices may potentially not reflect the full story of SNG debt. In Canada, on the other hand, SNG bonds seem much more liquid from that perspective, in accordance with existing evidence of efficient market pricing.

118. Heterogeneity across SNGs' borrowing costs inside each country is smaller than expected. In general, economic and fiscal heterogeneity is significant across subnational entities. However, these do not often translate into borrowing costs. For some countries the variation is sizeable, reaching up to 6 or 7 percentage points for South Africa, Mexico, United States and Germany. In other countries – for example, India, New Zealand, Finland and the Netherlands – the variation of borrowing costs across different SNGs is very low. Broadly speaking, this could be a sign of friction in subnational bond markets. Some potential sources of friction in the SNG universe are, for example, explicit or implicit guarantees from the central government and the concentration of bonds in the hands of public banks or companies.

119. Although most countries claim SNG bonds are not guaranteed by the central government, there are other types of credit enhancements and subsidies. In the United States, for example, almost 90% of the *munis* issued since 2000 are tax-exempt, and there were recent programs subsidised up to 35% of the interest bill to SNG issuers. As explained throughout this paper, a lack of price signalling can be hazardous to SNG's fiscal sustainability.

120. It is crucial for central governments to assess whether a lack of SNGs' debt sustainability could pose a large enough risk to become systemic. The way each SNG bond market functions may be a determinant of how these may develop. On one hand, some countries show bond prices (yields) that are very stable and with little differentiation across SNGs, which may be seen as a sign of stability but could also mean that the market is not fully pricing in all the risks. On the other hand, some countries show already sizeable time volatility and cross-sectional variance in SNG bond prices, which may appear to

reveal a sense of instability but can also mean that risks are already mostly priced in, so future corrections tend to be less drastic.

121. To assess these risks, it is important to investigate the characteristics of these liabilities in more detail, including the heterogeneity across SNGs inside each country. For instance, though the country aggregates may not show high short-term debt relative to revenues, it may well be the case that just a few SNGs are in a weak situation. Simulated changes in bond borrowing costs, for example, show a very heterogeneous picture of vulnerabilities in countries like Canada, Germany, and Norway, where some SNGs may face significantly higher interest payments in the coming years.

122. At this juncture, evaluating institutional frameworks to strengthen resilience is important. SNG debt-to-own revenue ratios are not clearly correlated with the strength of their subnational fiscal rules, but there is some correlation with tax autonomy. Countries with similar institutional characteristics, as measured by these two indicators, have very different SNG debt levels. Sweden, for example, has strong rules, high tax autonomy for SNGs, and a low debt-to-own revenues ratio. Spain has even stronger fiscal rules and the same indicator for tax autonomy, but contrary to Sweden, it has higher SNG debt-to-own revenues and debt-to-GDP ratios. In all, it is hard to come up with a general pattern in such a simple cross-country correlation assessment, but there is extensive evidence that well-designed and well-implemented fiscal rules help to avoid overborrowing and debt crises.

123. While fiscal rules can be considered proactive measures that discourage fiscally irresponsible behaviour or effectively limit some government actions to avoid or correct an excessive build-up in debt, there is also scope for implementing ex-post reactive frameworks to deal with extreme circumstances. Insolvency frameworks that give clarity about how unsustainable debt cases will be resolved can reduce the costs of crises and even create an environment where excessive debt is effectively avoided because risks are well-defined. In particular, countries that plan to implement or strengthen an SNG bond market would benefit from discussing the inclusion of the so-called Collective Action Clauses (CAC), in the insolvency framework. These can help to mitigate the risks of a hold-out problem, for example, but since changing contracts is hard and costly, considering this issue when planning future SNG debt market reforms is advised.

124. Setting up a well-functioning SNG bond market is not a trivial task. As usual in economic policy, especially regarding fiscal federalism in such a wide range of countries, there is no “one size fits all” solution. However, this work should help clarify the options available, with their consequences and caveats, allowing policymakers to have more well-informed discussions about the issue.

References

- Aguiar, M., Amador, M., Farhi, E. & Gopinath, G. (2015). Coordination and Crisis in Monetary Unions. *The Quarterly Journal of Economics*, Volume 130, Issue 4, pp. 1727–1779. Fonte: <https://doi.org/10.1093/qje/qjv022>
- Amornsiripanitch, N. (2022). The real effects of municipal bond insurance market disruptions. *Journal of Corporate Finance*, Volume 75. Fonte: <https://doi.org/10.1016/j.jcorpfin.2022.102240>
- Bagley, J., Vieira, M. & Hamlin, T. (2022). Trends in Municipal Securities Ownership. Fonte: <https://www.msrb.org/sites/default/files/Trends-in-Municipal-Securities-Ownership.pdf>
- Blöchliger, H. & Kim, J. (2016). Monitoring sub-central government debt: Trends, challenges and practices. Em *Fiscal Federalism 2016: Making Decentralisation Work*. Paris: OECD Publishing. doi:<https://doi.org/10.1787/9789264254053-7-en>
- Bloomberg (2023). China LGFV Bond Sales Boom Again as Beijing Steps Up Support. Fonte: <https://www.bloomberg.com/news/articles/2023-09-19/china-igfvs-in-yuan-bond-sales-boom-as-policy-help-gathers-pace#xj4y7vzkg>
- Bloomberg (2023). China's Budget Shift Risks Local Officials 'Lying Flat'. Fonte: <https://www.bloomberg.com/news/articles/2023-12-20/china-s-power-shift-risks-wave-of-local-officials-lying-flat>
- Brazil (2024). Fiscal statistics. *Banco Central do Brasil - Statistical Press Releases*. Fonte: <https://www.bcb.gov.br/en/statistics/fiscalstatistics>
- Brochado, A. & Cruz, I. D. (2022). Estímulo ao endividamento de estados e municípios. Em M. Mendes, *Para não esquecer: políticas públicas que empobrecem o Brasil*. Rio de Janeiro: Insper / Autografia.
- Chari, V., & Kehoe, P. (2008). Time Inconsistency and Free-Riding in a Monetary Union. *Journal of Money, Credit and Banking*, Vol. 40, No. 7, pp. 1329-1355 (27 pages). Fonte: <https://www.jstor.org/stable/25096313>
- de Biase, P., & Dougherty, S. (2021). Federalism and public health decentralisation in the time of COVID-19. In *OECD Working Papers on Fiscal Federalism*. OECD Publishing, Paris. doi:10.1787/b78ec8bb-en
- de Biase, P. & Dougherty, S. (2022). The past and future of subnational fiscal rules: An analysis of fiscal rules over time. *OECD Working Papers on Fiscal Federalism*, No. 41. doi:<https://doi.org/10.1787/d2798c9e-en>.
- de Biase, P., Dougherty, S. & Lorenzoni, L. (2022). Ageing and the long-run fiscal sustainability of health care across levels of government. In *OECD Working Papers on Fiscal Federalism*. OECD Publishing, Paris. doi:10.1787/7c184406-en
- Dougherty, S. & de Biase, P. (2021). Who absorbs the shock? An analysis of the fiscal impact of the COVID-19 crisis on different levels of government. *Int Econ Econ Policy*, 18, pp. 517–540. doi:10.1007/s10368-021-00518-1
- Dougherty, S. & Montes, A. M. (2023). The multi-level fiscal governance of ecological transition. *OECD Working Papers on Fiscal Federalism*, No. 44. Fonte: <https://doi.org/10.1787/2051f0f7-en>
- Dougherty, S. & Mota, T. (2024). Navigating Conflict and Fostering Cooperation in Fiscal Federalism. *OECD Working Papers on Fiscal Federalism, Forthcoming*. <https://www.oecd.org/tax/federalism/>
- Dovis, A. & Kirpalani, R. (2020). Fiscal Rules, Bailouts, and Reputation in Federal Governments. *American Economic Review*, 110 (3), pp. 860-88. doi:10.1257/aer.20181432
- Equiza-Goñi, J., Faraglia, E. & Oikonomou, R. (2023). Union debt management. *Journal of International Money and Finance*, Volume 130. Fonte: <https://doi.org/10.1016/j.jimonfin.2022.102747>

- Eyraud, L., Hodge, A., Ralyea, J. & Reynaud, J. (s.d.). How to Design Subnational Fiscal Rules: A Primer. *IMF How-To Notes, No. 2020/001*. Fonte: <https://www.imf.org/en/Publications/Fiscal-Affairs-Department-How-To-Notes/Issues/2020/02/25/How-to-Design-Subnational-Fiscal-Rules-A-Primer-48967>
- Fan, C., Gungor, S., Nolin, G. & Yang, J. (2018). Have Liquidity and Trading Activity in the Canadian Provincial Bond Market Deteriorated? *Bank of Canada Staff Analytical Note, No. 2018-30 (English)*. <https://doi.org/10.34989/san-2018-30>
- Federal Reserve (2020). Federal Reserve takes additional actions to provide up to \$2.3 trillion in loans to support the economy. *Press Release*. <https://www.federalreserve.gov/newsevents/pressreleases/monetary20200409a.htm>
- Feld, L., Kalb, A., Moessinger, M.-D. & Osterloh, S. (2017). Sovereign bond market reactions to no-bailout clauses and fiscal rules – The Swiss experience. *Journal of International Money and Finance, Volume 70*, pp. 319-343. <https://doi.org/10.1016/j.jimonfin.2016.09.002>
- Fitch Ratings (2023). Fitch Downgrades Muni Ratings Tied to U.S. Sovereign Ratings to 'AA+'; Outlook Stable. *Rating Action Commentary*. <https://www.fitchratings.com/research/us-public-finance/fitch-downgrades-muni-ratings-tied-to-us-sovereign-ratings-to-aa-outlook-stable-03-08-2023>
- Fitch Ratings (2023). Swiss Cantons Have Outstanding Debt Sustainability on Low Public Debt. *NON-RATING ACTION COMMENTARY*. <https://www.fitchratings.com/research/international-public-finance/swiss-cantons-have-outstanding-debt-sustainability-on-low-public-debt-29-11-2023>
- Gourinchas, P.-O., Martin, P. & Messer, T. (2022). The Economics of Sovereign Debt, Bailouts and the Eurozone Crisis. *International Finance Discussion Papers (IFDP), 1351*. Fonte: <https://doi.org/10.17016/IFDP.2022.1351>
- Grembi, V., Nannicini, T. & Troiano, U. (2016). Do Fiscal Rules Matter? *American Economic Journal: Applied Economics, 8 (3)*, pp. 1-30. <https://www.aeaweb.org/articles?id=10.1257/app.20150076>
- Guo, S., Pei, Y. & Xie, Z. (2022). A dynamic model of fiscal decentralization and public debt accumulation. *Journal of Public Economics, Volume 212*. <https://doi.org/10.1016/j.jpubeco.2022.104692>
- Heppke-Falk, K. & Wolf, G. (2008). Moral Hazard and Bail-Out in Fiscal Federations: Evidence for the German Lander. *KYKLOS, Vol. 61*, pp. 425–446. <https://doi.org/10.1111/j.1467-6435.2008.00411.x>
- Herold, K. (2018). Insolvency Frameworks for Sub-national Governments. *OECD Working Papers on Fiscal Federalism No. 23*. <https://doi.org/10.1787/f9874122-en>
- Hoddinott, S. (2023). The local government finance settlement is unlikely to end council 'bankruptcies'. Institute for Government. <https://www.instituteforgovernment.org.uk/comment/local-government-finance-settlement-council-bankruptcies>
- Hoffmann, M., Stewen, I. & Stiefel, M. (2023). Growing Like Germany: Local Public Debt, Local Banks, Low Private Investment. *mimeo*. Fonte: https://mathiashoffmann.net/wp-content/uploads/2023/03/GLG_WebPage_03Feb2023.pdf
- Holmes, A. & Lancaster, D. (2019). China's Local Government Bond Market. *Bulletin*. Fonte: <https://www.rba.gov.au/publications/bulletin/2019/jun/chinas-local-government-bond-market.html>
- IFSD (2018). Decomposing Provincial-Canada Yield Spreads: Does Fiscal Discipline Matter? <https://www.ifsd.ca/web/default/files/Presentations/Reports/18007%20-%20Decomposing%20Provincial-Canada%20Yield%20Spreads-%20Does%20Fiscal%20Discipline%20Matter%3F%20-%2030%20August%202018%20-%20FINAL.pdf>
- IMF (2017). Spain: Selected Issues. *IMF Staff Country Reports, No. 2017/024*. <https://www.imf.org/en/Publications/CR/Issues/2017/01/30/Spain-Selected-Issues-44600>

- IMF (2024). People's Republic of China: Selected Issues. *Country Report, No. 2024/050*.
<https://www.imf.org/en/Publications/CR/Issues/2024/02/08/Peoples-Republic-of-China-Selected-Issues-544651>
- India, R. (2020). Government Securities Market in India – A Primer. *FAQs*. Acesso em 07 de 03 de 2024, disponível em <https://www.rbi.org.in/commonperson/english/scripts/FAQs.aspx?Id=711>
- Ivanov, I. & Zimmermann, T. (2023). The “Privatization” of Municipal Debt. *Federal Reserve Bank of Chicago Working Papers, 2023-30*. <https://doi.org/10.21033/wp-2023-30>
- Jergitsch, D., Plessner, D. & van Wijngaarden, D. (2017). The Austrian HETA saga: successful investor appeasement at last? *Financier Worldwide*. <https://www.financierworldwide.com/the-austrian-heta-saga-successful-investor-appeasement-at-last>
- Lam, W. R. (2019). Chapter 5 Local Government Bonds. Em A. Schipke, M. Rodlauer, & L. Zhang (Eds.), *The Future of China's Bond Market*. International Monetary Fund.
 doi:10.5089/9781484372142.071.ch005
- Liu, L., De Angelis, M. & Torbert, S. (2017). *Municipal Pooled Financing of Infrastructure in the United States*. The World Bank.
https://www.thegpsc.org/sites/gpsc/files/municipal_pooled_financing_of_infrastructure_in_the_united_states_0_0.pdf
- MDR – Mitteldeutsche Rundfunk (2023). Einigung nach Konferenz: Länderchefs wollen einheitliche Bezahlkarte für Geflüchtete. <https://www.mdr.de/nachrichten/deutschland/politik/mpk-ministerpraesidenten-einigung-bezahlsystem-gefluechtete-100.html>
- Medas, P., El Rayess, M., Perrelli, R., Soto, M. & Glória, A. (2019). Strengthening the Framework for Subnational Borrowing. *IMF Staff Country Reports, No. 2019/302*.
<https://www.imf.org/en/Publications/CR/Issues/2019/09/19/Brazil-Technical-Assistance-Report-Strengthening-the-Framework-for-Subnational-Borrowing-48693>
- Moldogaziev, T., Espinosa, S. & Martell, C. (2018). Fiscal Governance, Information Capacity, and Subnational Capital Finance. *Public Finance Review, 46(6)*, pp. 974-1001.
<https://doi.org/10.1177/1091142117711018>
- Moody's (2023). US municipal bond defaults and recoveries, 1970-2022. *US Public Finance Data Report*. http://www.moody.com/researchdocumentcontentpage.aspx?docid=PBM_1375879
- MSRB. (s.d.). *Tax Treatment*. <https://www.msrb.org/Tax-Treatment>
- NASBO (2014). *Capital Budgeting in the States*. National Association of State Budget Officers.
<https://www.nasbo.org/reports-data/capital-budgeting-in-the-states>
- NASBO (2023). FY24 Enacted Budget Summaries. <https://www.nasbo.org/reports-data/summaries-proposed-enacted>
- OBR (2023). Fiscal risks and sustainability – July 2023. <https://obr.uk/frs/fiscal-risks-and-sustainability-july-2023/>
- OECD (2021). Making Property Tax Reform Happen in China: A Review of Property Tax Design and Reform Experiences in OECD Countries. In *OECD Fiscal Federalism Studies*. OECD Publishing, Paris. doi:10.1787/bd0fbac3-en
- OECD (2022). *G20-OECD Policy Toolkit to Mobilise Funding and Financing for Inclusive and Quality Infrastructure Investment in Regions and Cities*. Paris: OECD Publishing.
 doi:https://doi.org/10.1787/99169ac9-en
- OECD (2022). Insolvency frameworks for state and local governments. Em *Fiscal Federalism 2022 : Making Decentralisation Work*.
- OECD (2022). OECD Economic Outlook, Volume 2022 Issue 2. doi:10.1787/f6da2159-en
- OECD (2022). OECD Economic Surveys: China 2022. doi:10.1787/b0e499cf-en

- OECD (2023). Background Note: Intergovernmental Fiscal Outlook for 2023 and 2024. Paris: OECD.
Fonte: <https://www.oecd.org/tax/federalism/intergovernmental-fiscal-outlook-2023-2024.pdf>
- OECD (2023). *Financing Cities of Tomorrow: G20/OECD Report for the G20 Infrastructure Working Group under the Indian Presidency*. Paris: OECD Publishing.
doi:<https://doi.org/10.1787/51bd124a-en>
- OECD (2023). OECD Economic Outlook, Interim Report September 2023: Confronting Inflation and Low Growth. doi:10.1787/1f628002-en
- OECD (2023). *OECD Sovereign Borrowing Outlook 2023*. Paris: OECD Publishing.
doi:<https://doi.org/10.1787/09b4cfba-en>
- OECD (2023). The intergovernmental fiscal outlook and the implications of Russia's war against Ukraine, high energy prices and inflation. *OECD Working Papers on Fiscal Federalism*, 42.
doi:10.1787/3623ab61-en
- OECD (2024). *OECD Economic Outlook, Interim Report February 2024: Strengthening the Foundations for Growth*. Paris: OECD Publishing. doi:<https://doi.org/10.1787/0fd73462-en>
- Pérez, J. & Prieto, R. (2014). The structure of sub-national public debt: liquidity vs credit risks. *Bank of Spain Working Papers*, N.º 1403.
<https://www.bde.es/f/webbde/SES/Secciones/Publicaciones/PublicacionesSerias/DocumentosTrabajo/14/Fich/dt1403e.pdf>
- Qu, X., Xu, Z. & Yu, J. (2023). The Pricing of Local Government Bonds in China: A Bank-Government Relationship Perspective. SSRN. <http://dx.doi.org/10.2139/ssrn.4560074>
- Salviano Junior, C. (2004). *Bancos Estaduais: dos problemas crônicos ao Proes*. Brasília: Banco Central do Brasil. https://www.bcb.gov.br/htms/public/BancosEstaduais/livro_bancos_estaduais.pdf
- Salwati, N., & Wessel, D. (2021). What are Build America Bonds or direct-pay municipal bonds? *Brookings Commentary*. <https://www.brookings.edu/articles/what-are-build-america-bonds-or-direct-pay-municipal-bonds/>
- Saxena, S. (2022). How to Manage Fiscal Risks from Subnational Governments. *IMF How-To Notes*, No 2022/003. <https://www.imf.org/en/Publications/Fiscal-Affairs-Department-How-To-Notes/Issues/2022/09/01/How-to-Manage-Fiscal-Risks-from-Subnational-Governments-522609>
- Smoke, P. (2023). Fiscal Decentralization and Subnational Government Investment in Developing Countries: The Case for Increasing Subnational Borrowing and Commercial Debt. *International Center for Public Policy Working Paper*. <https://icepp.gsu.edu/files/2023/12/paper2322.pdf>
- Stewart, H. & Murray, J. (2023). Councils in England in crisis as Birmingham 'declares itself bankrupt'. *The Guardian*. <https://www.theguardian.com/society/2023/sep/05/councils-in-england-in-crisis-as-birmingham-declares-itself-bankrupt>
- Suraj, S., Pawar, A. & Seet, S. (2023). Subnational Borrowings in India – Volatilities and Determinants of State Government Securities Spread. (R. B. India, Ed.) *RBI BULLETIN*.
https://www.rbi.org.in/Scripts/BS_ViewBulletin.aspx?Id=21669#SJ
- Vammalle, C. & Bambalaite, I. (2021a). Fiscal rules for subnational governments: The devil's in the details. *OECD Working Papers on Fiscal Federalism*, 35. <https://doi.org/10.1787/531da6f9-en>
- Vammalle, C. & Bambalaite, I. (2021b). Funding and financing of local government public investment: A framework and application to five OECD Countries. *OECD Working Papers on Fiscal Federalism*, 34. <https://doi.org/10.1787/162d8285-en>
- Yu, S. & Mitchell, T. (2022). China's local government financing vehicles go on land-buying spree. *Financial Times*. <https://www.ft.com/content/b6ef0852-6d51-44eb-9c7c-128f9c47c75a>

Annex A. What do we know about SNG debt?

A brief literature review

Academic literature in economics and related fields has already a lot to say about fiscal policy, but still, we see a lot of fiscal crises resurging every few years across the world, in developing countries, emerging and advanced as well. Part of it may be related to the fact that many, if not most, country governments are organised in more than one level, which in practice imposes probably all types of externalities documented in the economic theory, at least potentially. This is, for example, very strong for the case of SNG's public debt.

The literature on government decentralization and fiscal federalism studies the relations across levels of government from the perspective of several dimensions. However, probably all (or most) of them can be put under the umbrella of the question about the effects of decentralization on economic efficiency. Among others, some of the most common themes are the decentralization of taxes and efficiency of tax revenues, decentralization of expenditures and efficiency of public services, decentralization of debt and efficiency of fiscal policy. On this paper we focus on some aspects of the latter.

This section briefly cites some key references on the academic and policy literature about decentralisation of public debt and its consequences.

Dimensions: decentralization and economic efficiency, moral-hazard and soft budgets

Focusing on debt, the question of whether decentralization brings economic efficiency still has many aspects.

Are SNGs well equipped (or have adequate incentives) to choose their own debt? Do their choices of i) total indebtedness, ii) debt instruments and iii) portfolio characteristics align with the whole society's objectives? The academic and policy research about fiscal rules speaks mostly to these questions. In general, academic papers focus on point (i), while policy practice papers go all the way to point (ii) and (iii).

Herold (2018) provides a comprehensive literature review, mostly focused on the empirical and policy practice side. Here we complement this with a few more recent works and briefly cite the benchmark theoretical macroeconomic references.

Theories

A great part of the more theoretic macroeconomic literature on fiscal federalism and public debt focuses on the relation of SNGs' debt with inflation and monetary policy. For instance, Chari and Kehoe (2008) and Aguiar et al. (2015) study whether and why a fiscal federation with a monetary union can suffer from overborrowing, inflation pressures and (time) inconsistencies of the monetary policy. In these models, the imposition of a fiscal rule (limit) on subnational debt can avoid these issues.

The models above however suppose that, even if a central bank cannot credibly commit to a pre-determined monetary policy rule or objective (inflation target, for example), the government can credibly impose a fiscal rule to its SNGs and will undoubtedly enforce it. This is however not always the case.

Dovis and Kirpalani (2020) discuss a model in which the central government decides ex-post whether or not to enforce the SNG debt limit and the no-bailout clause. They conclude that the model can rationalize the evidence that for high reputation countries (or unions) it can be optimal to allow for “small” sporadic bailouts (as seen, for instance, in the Eurozone crisis of the 2010’s). The issue of a government that cannot commit is further discussed by the IMF (2017), which proposes a framework about the non-compliance of governments to fiscal rules.

Gourinchas et al. (2022) measure the size of the bailouts observed in the Eurozone crisis in the early 2010’s and develop a model to understand why they occurred even with a no-bailout clause in the monetary union.

Guo et al. (2022) note that the decentralization of revenues often lags that of expenditure mandates. This creates widening vertical imbalances that are offset by either transfers from the central government or debt by SNGs. They develop a model that explains how this relationship creates incentives for SNGs to overborrow. In their estimates, the model indicates that the unbalanced decentralization accounted for roughly 20 to 40% of total government debt between the 1980’s and 2000’s in Spain. Interestingly, in a previous working paper, they also propose to counterbalance the overborrowing incentive by imposing a tax on SNG debt. This is, however, the opposite of what is observed in many countries that provide tax exemptions or even subsidies to subnational borrowing (Brazil and the United States are important examples, with a wide use of subsidised loans and tax exemptions, respectively).

Theoretical academic literature also goes into issues of how different debt portfolios affect economic efficiency. Equiza-Gofi et al. (2023) model and test how the issuance of nominal or inflation-linked bonds can help governments hedge their budgets in currency unions (federations). Therefore, apart from the effects on the fiscal risk and potential fiscal cost for the central government, there is also a case for rethinking debt portfolios to improve economic efficiency and social welfare.

Empirical evidence

Another line of academic literature, more empirical, focuses on evaluating whether and by how much fiscal rules do constrain SNGs’ public debt, and why do they work (or not).

For example, Grembi et al. (2016) exploit a discontinuity on the relaxation of fiscal rules for municipalities below 5 000 inhabitants in Italy and find evidence that “relaxing fiscal rules increases deficits and lowers taxes.”

About the ability of SNGs to access credit and the effects of guarantees for subnational debt, Amornsiripanitch (2022) argues that local governments in USA that had a less reliable insurance³⁰ for their bond issuances had lower public expenditures and issued less debt.

In another strand of the literature, that directly studies the efficiency of SNG debt markets, Moldogaziev et al. (2018) use a large sample of countries to show that higher transparency, deeper credit information and extent of disclosure are correlated with the size of SNG debt markets. Our work here goes in that direction, contributing to the literature with an international overview of SNG debt and a detailed view of SNG bonds, which should improve knowledge about these institutional settings both for governments from other countries and for the markets.

³⁰ Guarantees to bond holders given by private insurance companies.

Policy evidence and recommendations

The policy practice literature refers to the empirical evidence and delves into detailed case studies to provide practical policy advice. These also try to answer the question whether and by how much fiscal rules work, and why, but they usually also go further to discuss how they work in what conditions.

Herold (2018) reviews a vast literature on most of the aforementioned issues and discusses benefits of insolvency frameworks for SNGs and their design. This work will be more explored in a dedicated section below.

Eyraud et al. (2020) take stock of the empirical evidence and policy experience to propose a guide for designing fiscal rules to SNGs. In the Annex they present how the various types of fiscal rules allow and constrain subnational borrowing.

Further motivating this project, SNGs' debt is a major source of fiscal risk that can turn into costs for the central government. According to Saxena (2022), assessing the risk is the first step for management and mitigation and SNG debt is one of the five analytical dimensions listed by the author. This study about the current characteristics of SNG debt portfolio also goes in that direction.

With a somewhat diverse motivation, which is to understand subdued financing for subnational infrastructure investment, Smoke (2023) study a selected sample of 14 middle-income (developing) countries to understand why in some of them SNGs that could probably have access to commercial borrowing, and even issue bonds in competitive international markets, do not do so. We will discuss some of his findings in a subsection below.

Case studies

There are several case studies about many episodes of economic phenomena related to SNG debt around the world and across time. Here we cite three examples closely related to the motivations of this work.

Salviano Jr. (2004) documents the important episode of subnational debt restructuring that occurred in Brazil in the late 1990's, when around 15% of GDP in SNG public debt was restructured. The work describes the relations between states and municipalities deficits and their ability to borrow (issue bonds) directly to public banks owned by themselves. It highlights the importance of evaluating how the public debt market is structured, how SNGs conduct their financing operations and who is providing the credit and bearing the risks. This is especially important in SNG, because, in general, state and local finances are subject to less scrutiny than central government ones.

More recently, Qu et al. (2023) use a policy reform in China in 2018 to assess the pricing of subnational bonds and conclude that SNGs more closely linked to underwriting banks paid lower borrowing costs. This again highlights the importance of carefully evaluating the relationship between banks and issuing SNGs.

Pérez and Prieto (2014) study the structure of SNGs' public debt in Spain and what factors determine the choices between, for example, short- versus long-term debt and loans versus bonds. They argue that those choices are related to rollover risk and to expectations of central government support. This is in fact one of the main motivations of this work, that is, to describe the characteristics of SNG debt and how they can potentially relate to risks to the central government and the economy.

The OECD also has many references that transition between policy evidence, recommendations, and case studies. Some of the most recent works that relate to the current project and discuss SNG debt financing, including cases about ESG bond issuances, are the book "*G20-OECD Policy Toolkit to Mobilise Funding and Financing for Inclusive and Quality Infrastructure Investment in Regions and Cities*" (OECD, 2022) and "*Financing Cities of Tomorrow*" (OECD, 2023).

Annex B. ESG-labelled bonds: a new funding source for sustainable investments

Environmental, Social and Governance (ESG) labelled bonds emerged as an innovation from the beginning of this century to channel funds from financial markets to sustainable projects. Although these are global problems, a substantial portion of the government's social and environmental activities are decentralised to SNGs. For instance, in a sample of 25 OECD countries, only four central governments execute more than 50% of environmental public spending (Dougherty & Nebreda, 2023). Thus, it is not surprising that SNGs with market access have issued ESG-labelled bonds to help them fulfil their ESG-related roles.

Issuing ESG-labelled bonds offers both advantages and challenges for SNGs (OECD, 2023). The primary benefits include securing potentially favourable financing rates from climate-sensitive investors, aligning funds with substantial expenditure requirements, and advancing sustainable and transparent investments. It is also possible that, with current efforts to boost ESG practices, the ESG-bond market may be a more stable supply of credit, even in times of uncertainty. However, these bonds entail a rigorous issuance and allocation process, encompassing considerable administrative tasks due to ongoing compliance and auditing demands. Moreover, they impose limitations on how the raised resources can be utilised, thereby constraining the financial flexibility of issuers.

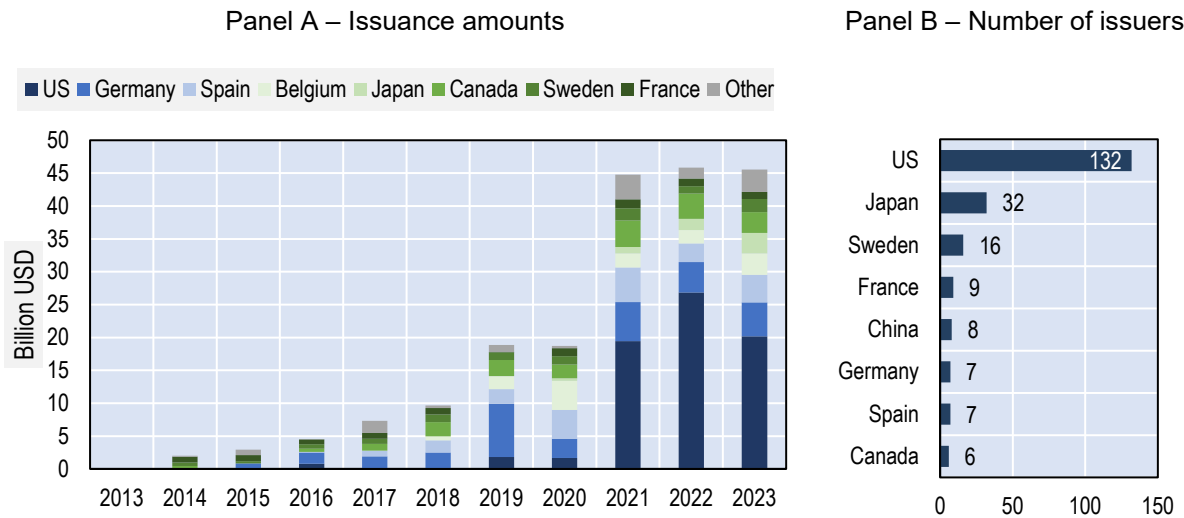
At the end of 2023, nearly 250 different jurisdictions across 24 countries had issued ESG-labelled bonds, largely preceding the issuance of sovereign ESG-labelled bonds. The first issuances of ESG-labelled bonds by SNGs were from three different French jurisdictions in 2008 and 2012.³¹ These issuances preceded the first sovereign ESG-labelled bond, which was made by Poland in December 2016. Actually, at that time, SNGs from 10 countries had already made their debut in ESG-labelled bond issuance. Additionally, from the 15 countries where both SNGs and the central government have issued ESG-labelled bonds, in 11 of them, SNGs were the first to issue.

The ESG subnational bond market got traction in 2014 and issuances have grown steadily until 2021, reaching nearly USD 50 billion in 2021 and remaining around that level in 2022 and 2023 (Figure 22, Panel A). SNGs from Belgium, Canada, France, Germany, Japan, Spain and Sweden have been particularly active in this market, while SNGs from the United States became particularly active since 2021, with their issuances comprising nearly half of all issuances in 2021-23.

Despite these developments, the actual number of issuances of ESG-labelled bonds by SNGs has not been particularly high (Table 1). Aside from Japan in 2022-23, Sweden and the US, in no other country, SNGs issued more than six different bonds in the same year – considering all subcentral levels of government. Additionally, aside from these three countries, in no other country has more than ten different jurisdictions issued ESG-labelled bonds (Figure 22, Panel B). This reveals that only a minority of jurisdictions have actually issued ESG-labelled bonds, which can be partially explained by the burdensome process of these issuances, which require a significant administrative capacity.

³¹ These are the region of Hauts de France, Ile de France and Provence-Alpes-Cote d'Azur.

Figure 22. SNG issuances of ESG-labelled bonds



Source: LSEG, own calculations.

Table 1. Number of ESG issuances by country

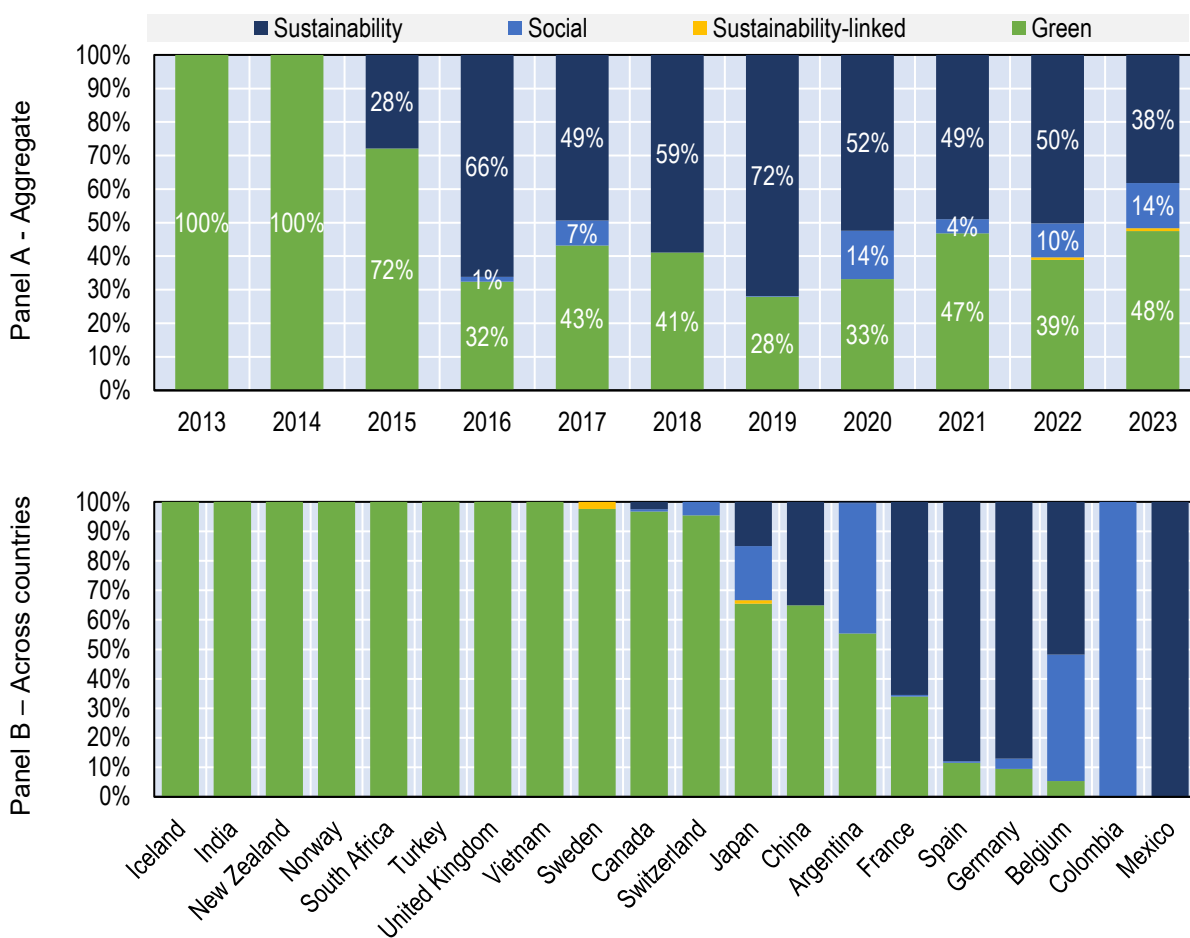
	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
US				1			7	9	8	72	66
Sweden	1	3	2	6	6	9	7	8	11	7	12
Japan					1	1	1	3	5	16	31
Canada		1		1	2	5	5	3	5	5	5
France		2	2	1	2	3	1	2	4	5	4
Spain				1	2	2	3	4	4	4	5
Germany			1	1	1	1	1	2	3	3	5
Belgium						1	2	2	2	2	2
China							2		2	3	2
Switzerland					1	1	2			1	2
New Zealand						1	1	1	1	1	1
Argentina					3						2

Source: LSEG, own calculations.

In some countries, SNGs have been accessing the market only through ESG-labelled bonds, while in others, they issued ESG-labelled bonds alongside conventional bonds. The average share of the amount issued in ESG-labelled bonds to total SNGs issuances in the last five years shows that Mexico (100% of all issuances), New Zealand (75%) and Spain (60%) have been issuing mostly ESG bonds. These high shares, however, are probably a consequence that these countries' SNGs have been issuing fewer bonds in general and are probably only accessing the bond market, focusing on ESG projects. In Mexico, for example, SNGs had not issued bonds since 2015 until this single ESG operation in 2022. For countries where SNGs rely mostly on bond issuances for funding, this share is highest in Sweden (30%), followed by Belgium (21%), and is below 10% in Germany (7%), France (7%), Switzerland (7%), the United States (3%), Canada (2%), and Japan (1%).

ESG-labelled bonds are generally classified into two types of bonds: 1) Green, Social, and Sustainability (GSS) Bonds, whose proceeds are channelled to certain eligible projects,³² and 2) Sustainability-linked Bonds (SLBs), whose bond terms (e.g. coupon size) might vary depending on the achieving of pre-defined sustainability performance targets. SNGs have issued mostly GSS bonds with the predominance of green and sustainability bonds (Figure 23, Panel A). Sustainability-linked bonds were issued by SNGs only in Japan and Sweden (Figure 23, Panel B). These shares contrast slightly with those from sovereigns, whose green bonds comprise nearly three-quarters of all the sovereign ESG-labelled bond issuance, with social and sustainability bonds representing a similar share of around 10%.

Figure 23. ESG-labelled bonds issued by SNGs classified by type



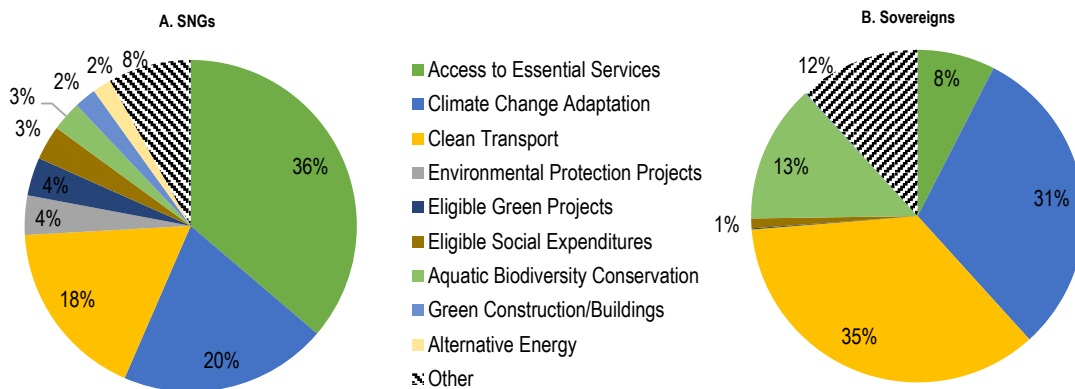
Note: The sample is limited to the bonds whose type was disclosed; US bonds are not included.
 Source: LSEG, own calculations.

GSS bond prospects and/or benchmarks provide general information on the use of their proceeds, revealing that SNGs and sovereigns have slightly different priorities in their allocation of resources (Figure 24). SNGs channel these proceeds mostly to access essential services (36%), climate change adaptation (20%) and clean transport (18%). This contrasts with sovereign issuances, which employ only 8% of the

³² Proceeds from GSS bonds should be spent only on eligible projects (see Box 2).

proceeds to access to essential services, 31% to climate change adaptation, 35% to clean transport and 13% to aquatic biodiversity conservation. This reflects that SNGs issued relatively more social bonds than central governments and, thus, focus more on the provision of essential services compared to green projects such as those related to climate change adaptation, clean transportation and biodiversity conservation.

Figure 24. ESG-labelled bonds issued by the use of proceeds



Note: The sample is limited to the bonds whose type was disclosed; US bonds are not included.
Source: LSEG, own calculations.

Although ESG-labelled bonds have offered a new avenue for SNGs to raise capital to fund projects and fulfil their crucial role in environmental, social and sustainability projects, it is unclear to which extent this new tool will be heavily used in the future. On the one hand, there is a substantial margin for the subnational ESG-labelled bond market to grow, as only a minority of jurisdictions that can issue bonds have done so (refer to Figure 22, Panel B). In fact, twenty jurisdictions alone are responsible for nearly 60% of all the amount issued in ESG-labelled bonds by SNGs.³³ On the other hand, issuance amounts have been stable since 2021, suggesting that the market might have already stagnated.

The future success of this market hinges on addressing several critical challenges (OECD, 2023). These encompass the establishment of regulatory frameworks that foster responsible fiscal management and investor confidence at the subnational level; the development of adequate institutional capacity at the subnational level to handle complex compliance, reporting, and auditing tasks; and the development of the broad sustainable finance market, ensuring adequate demand, liquidity, and supportive regulatory frameworks for ESG-labelled bonds in general.

³³ Twenty jurisdictions have issued close to 60% of all subnational ESG-labelled bonds. These are: State of North-Rhine Westphalia in Germany (14%), Province of Ontario in Canada (6%), Community of Madrid in Spain (6%), State of Wallonie in Belgium (3%), Region of Ile-de-France in France (3%), New York State Housing Finance Agency in the United States (3%), Community of Flemish in Belgium (3%), Autonomous Community of Basque Country in Spain (2%), Province of Quebec in Canada (2%), California Statewide Communities Development Authority in the United States (2%), Massachusetts in the United States (2%), Municipality of Gothenburg in Sweden (2%), Autonomous Community of Andalusia in Spain (1%), New York City Housing Development Corporation in the United States (1%), Metropolitan of Tokyo in Japan (1%), Municipality of Stockholm in Sweden (1%), Pennsylvania Housing Finance Agency in the United States (1%), Communaute Francaise in Belgium (1%), Triborough Bridge & Tunnel Authority in the United States (1%), and City of Paris in France (1%).

Annex C. More details on SNG bonds

Recent trends in the number and volume of operations

Borrowing through the sale of marketable securities (bonds) is relevant for SNGs in many countries. In this section, we show recent trends of subnational governments' liabilities in the form of bonds and securities sold openly in the markets, either in exchanges or over the counter. The analysis is based on data from LSEG that encompasses the vast majority of deals (issuances) made with subnational government bonds around the world during the last two decades.³⁴

The market for SNG bonds is lively in many countries

The plot in Figure 25 Panel A counts the number of different issuances in each country in the data set (logarithmic scale). The United States leads with more than 600,000 issuances of SNG bonds in the last 23 years.³⁵ Second comes Canada with a little more than 54 000 issues. This gives a sense of the overall liveness of the subnational bonds market in each country, but it does not show either the penetration of this instrument among SNGs or the frequency at which they access this market. The two neighbouring plots address those dimensions. Panel B depicts the number of SNGs that have issued a bond at least once and Panel C shows the average number of issues each SNG executed. Some countries show a very high penetration, that is, many subnational entities have accessed the bond markets in the last 20 years, but in some cases, they only did it a few times. In other countries, few SNGs issued, but did it many times.

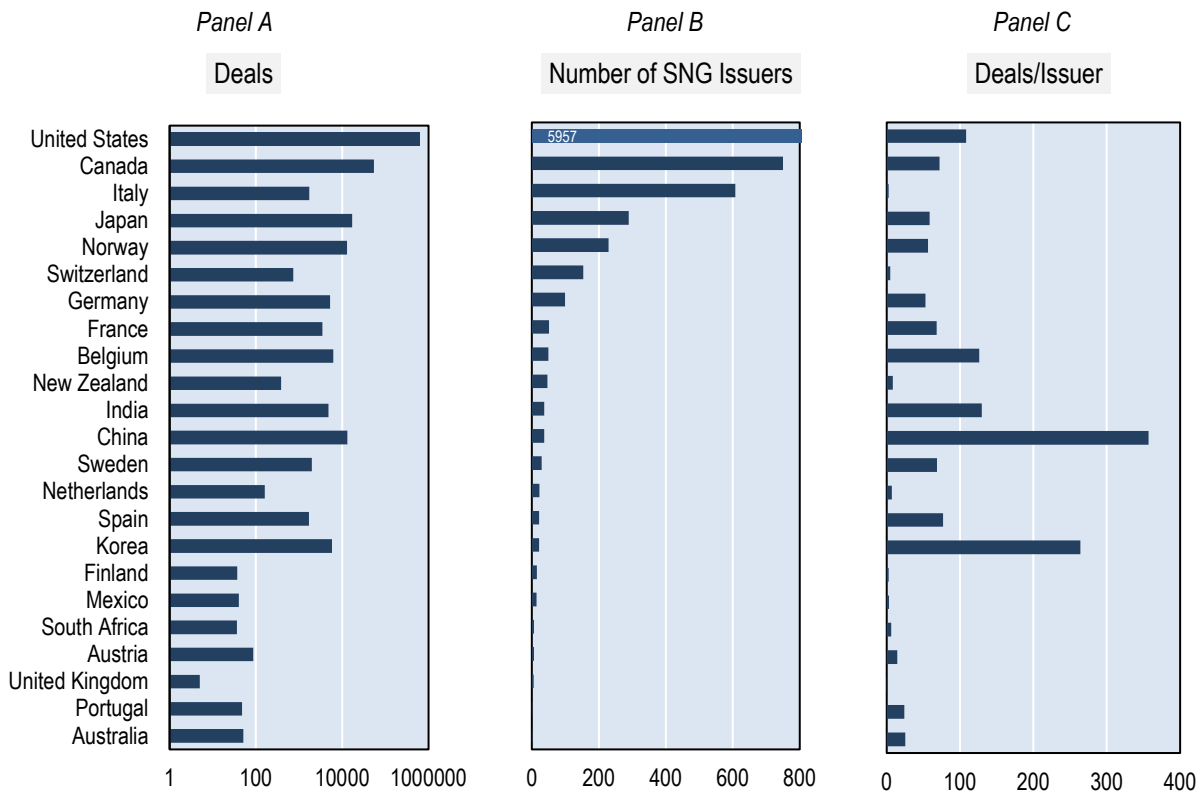
SNGs bond market's rapid growth may turn into a global risk due to China

The subnational bond market has gone through impressive trends in the last two decades. Regarding the number of issuances, the collected data show overall steady growth in the number of deals per year, from below 2 000 to almost 10 000 issues per year in 2020, for all countries except the United States. From the year 2000 until 2011, the growth was led by Canadian SNGs, then from 2014 onwards, the overall growth in the number of deals was mostly led by Chinese SNGs, while Canada stabilises (Figure 26, Panel A). While these numbers are impressive, they are still dwarfed by the market for US SNG bonds (commonly called "munis") where more than 100 000 bonds are issued every year (Figure 26, Panel B or see RHS axis). For US SNGs, however, the long-term trend is slightly downward-sloping.

³⁴ Specifically, the full set of bonds issued between January 2000 and September/October 2023, from sectors described as subnational governments in all countries with data available. This includes municipalities, states and regions and excludes sovereigns, supranational institutions and state-owned enterprises. The set contains data on more than 100 000 bond issuances, from 24 countries (Australia, Austria, Belgium, Canada, China, Denmark, Finland, France, Germany, India, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal, South Africa, Korea, Spain, Sweden, Switzerland, the United Kingdom and the United States).

³⁵ This is the number of tranches issued, but each tranche usually contains more than one bond. Counting individual bonds (by CUSIP) the number goes up to more than 2.8 million.

Figure 25. Number of deals and issuers of subnational bonds



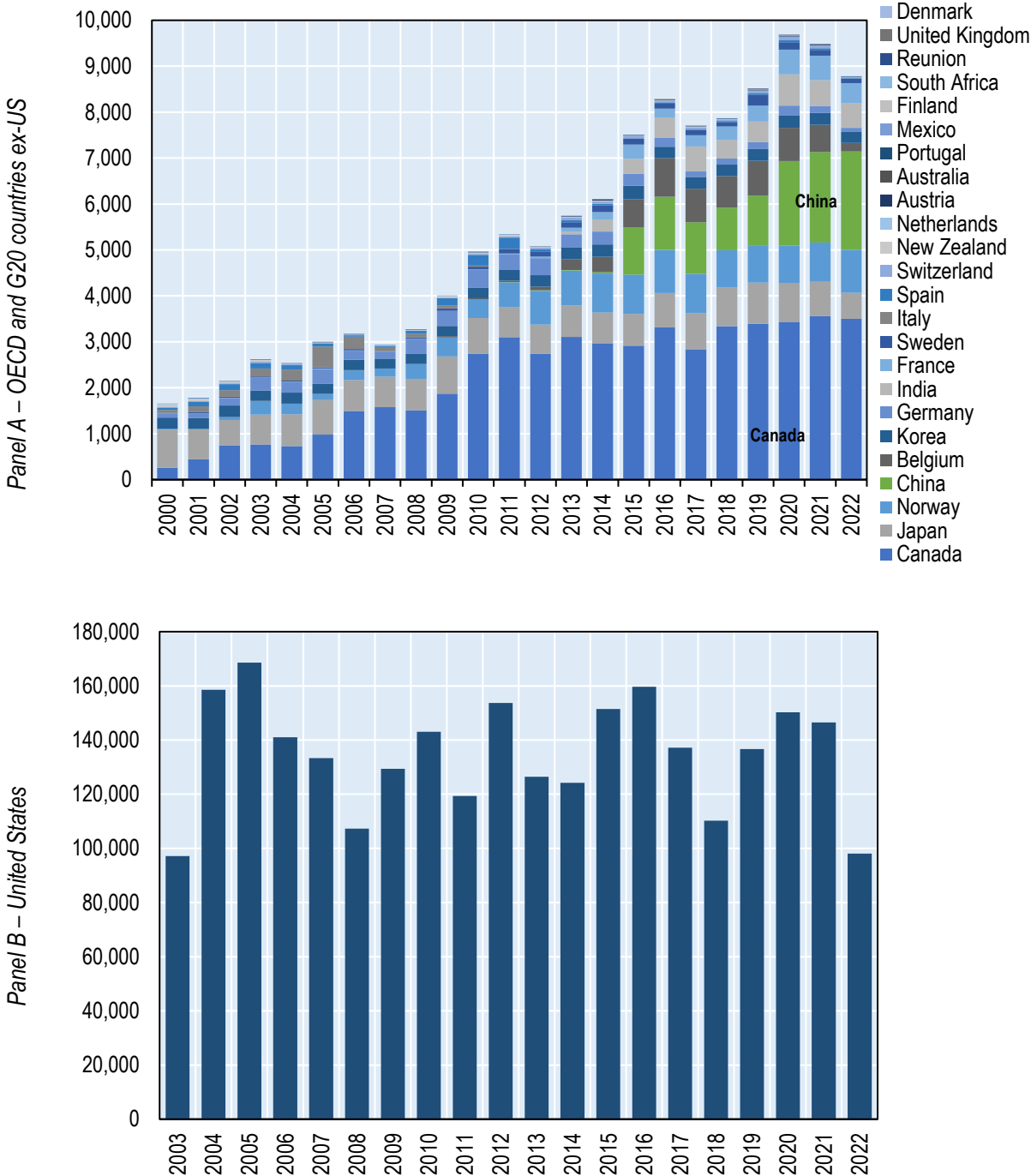
Notes: Panel A in logarithmic scale. Source: LSEG.

In terms of the amount issued, the US SNGs dominated the market until 2014. From 2015 onward, Chinese SNG issuances immediately surpass the US's, making the total size of world SNG issuances double (Figure 27). This recent growth in Chinese issuances has its roots in local government investment vehicles (LGIV), and most of this volume that appeared in 2015 is not exactly new debt, but a change of instruments.³⁶

Since almost all Chinese local government bonds, including the LGIVs, are held domestically (primarily by Chinese state-owned banks), the risk that stress in this market can potentially bring to global markets is not direct, but indirect. Should a credit crunch occur in China, reduced economic activity and falling import demand would likely have significant indirect effects on major trading partners and international financial markets.

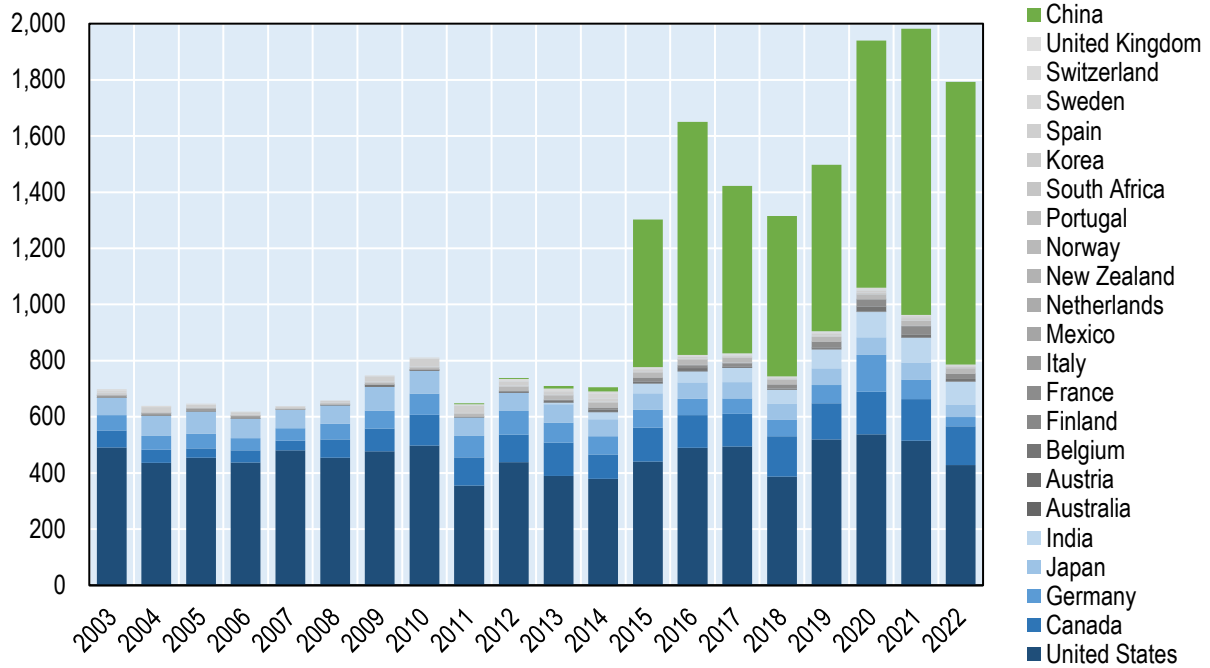
³⁶ This is better discussed in Section 5.3.

Figure 26. Number of SNG bond issuances in the last two decades



Notes: Panel A shows the number of issuances of SNG bonds across all countries, except the United States. Panel B shows the data for United States separately because the number of issuances is more than 10 times higher than the number of all other countries together, which would prevent the visualization of the trends in the rest of the world.
 Source: LSEG, own calculations.

Figure 27. Volume of SNG bond issuances in the last two decades – in USD billions



Note: In billions of US dollars, current market exchange rates.
Source: LSEG, own calculations.

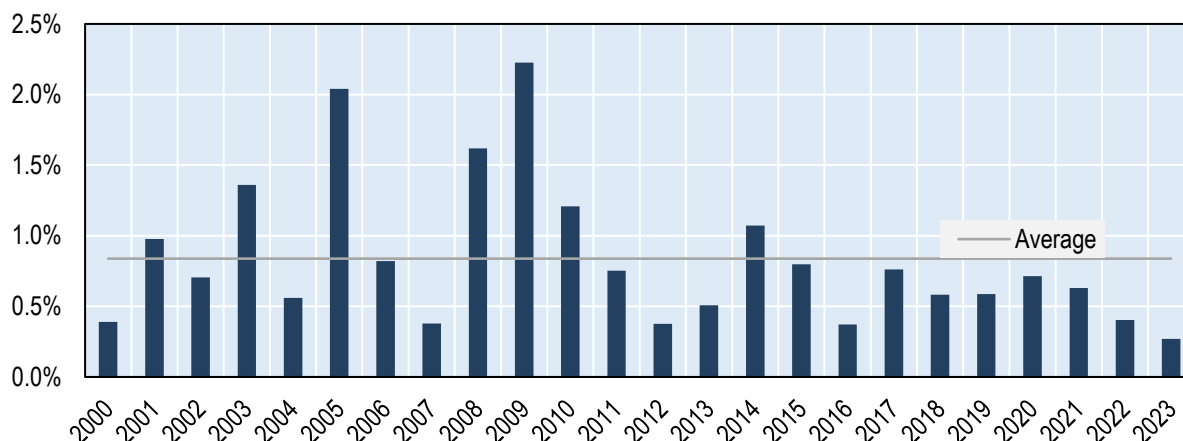
Foreign currency exposure in SNG bonds

Looking at the aggregate picture (Figure 28), SNGs have relied very little on bonds issued in foreign currency in the last 20 years. On average, issues in foreign currency were 0.8% of the total amount issued since 2000. The share fluctuates frequently around the mean, but it never reached 2.5% and the recent trend is downward sloping, with shares being below the average since 2015 and reaching the lowest level of the series in 2023.³⁷

Though the average participation is low, some countries do issue relatively a lot of bonds in currencies other than that of their own country. This is illustrated in Figure 29. In particular, Denmark, with 68%, Austria, with 50%, and New Zealand, with 37%, had their bond issuances highly concentrated in foreign currencies.

³⁷ Data up to October 2023.

Figure 28. Evolution of the share of bonds issued in foreign currency

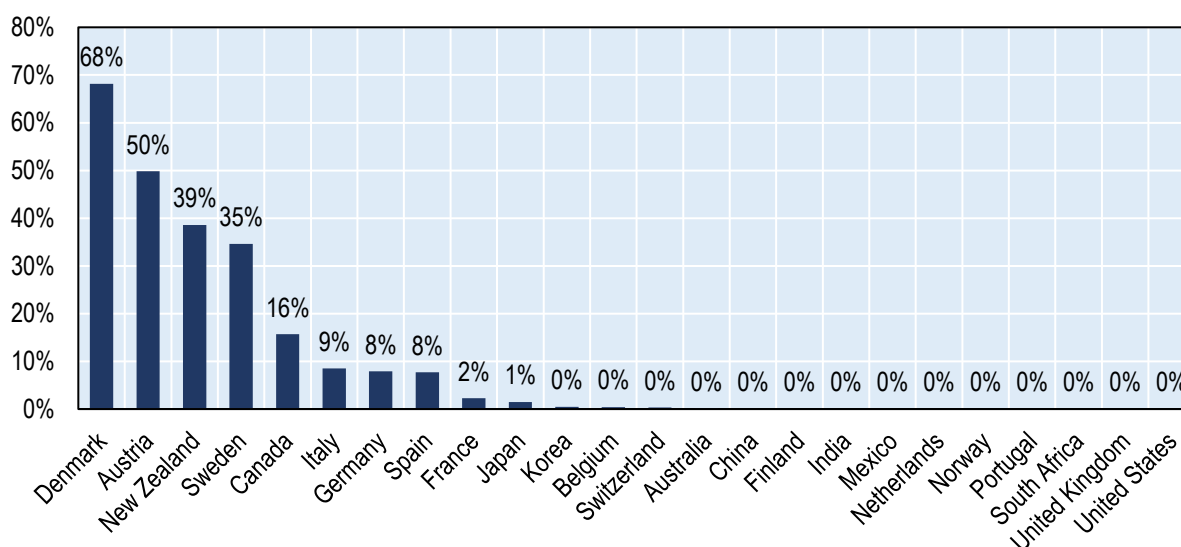


Notes: The dark blue bars represent the share of the total amount issued in each year, considering all countries. The grey line represents the average of the yearly shares since 2000.

Source: LSEG, own calculations.

The data mentioned so far comprise the whole period covered by the dataset. For instance, Denmark issued only a handful of bonds at the beginning of the 2000s, but nowadays, according to the LSEG and SNA data, Danish SNGs do not carry any liabilities in bonds. The plot in Figure 30 shows the shares of bonds outstanding (active at the date of extraction). New Zealand stands out with the highest share (77%) of foreign currency bonds. Also, with relevant shares appear Sweden (17%), Austria (13%) and Canada (9%). Germany, with 2%, and Spain, with 1%, have a lower share, and the others do not show any exposure. It is important to notice that these ratios relate only to marketable bonds, so a high share here does not directly mean that the country’s SNGs are highly exposed to foreign currency liabilities.

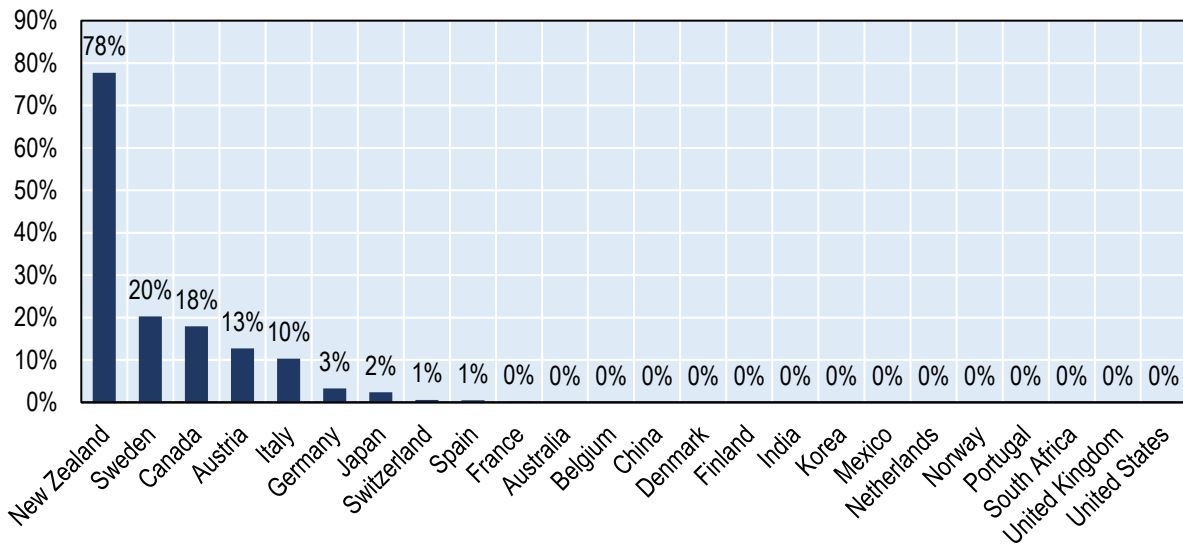
Figure 29. Share of foreign currency bonds issued since 2000



Notes: Share of total amount issued by SNGs in each country since 2000. Includes bonds that already matured. Exchange rate converted to US dollars at the time of data extraction (16/10/2023).

Source: LSEG, own calculations.

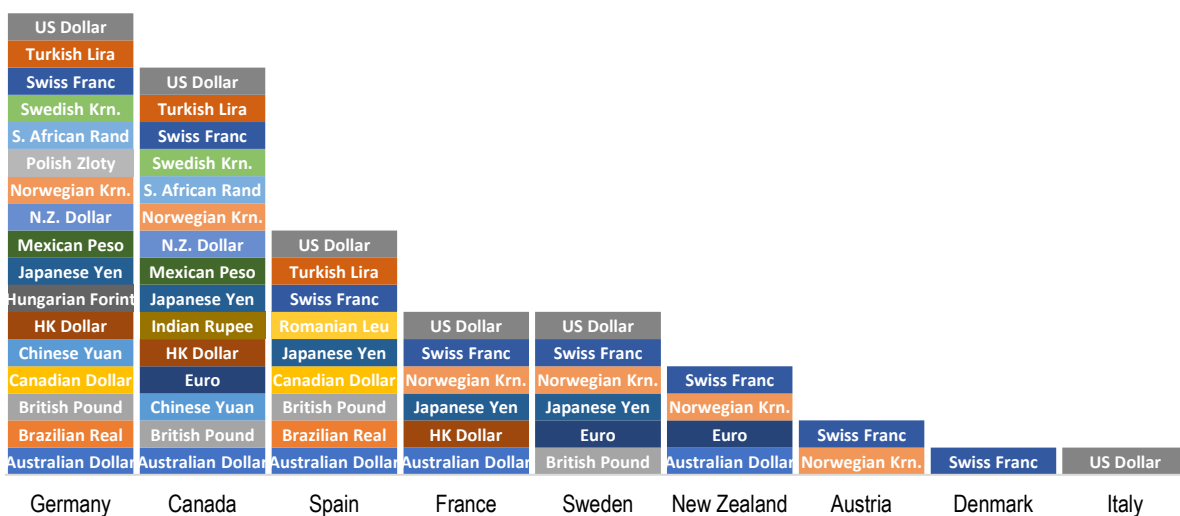
Figure 30. Share of bonds outstanding in foreign currency



Notes: Share of total amount outstanding by SNGs in each country at the time of data extraction (16/10/2023).
 Source: LSEG, own calculations.

In some countries, even though the share of the amount issued is low, SNGs do diversify a lot, issuing in dozens of different foreign currencies. German and Canadian SNGs, for example, have issued in, respectively, 17 and 15 different currencies. The graph in Figure 31 shows a list of foreign currencies in which SNGs issued bonds in each country. It is common for emerging or developing countries to issue in strong foreign currencies like the US Dollar or the Euro, both because there would be no market for a small country currency bond, but also because in many cases the interest rates in strong currencies are lower. It would be interesting to understand the reasons that lead low interest rate, developed countries' SNGs to issue in high interest rate currencies like the Brazilian Real, the Turkish Lira, or the Mexican Peso.

Figure 31. Foreign currencies accessed by SNGs



Notes: Foreign currencies for which there is at least one issue of a SNG bond since 2000 across different countries.
 Source: LSEG, own calculations.

Annex D. Measures of revenues and debt ratios

Different measures of SNG's revenues and debt ratios are more suitable depending on country institutions and the purpose of the analysis

Since intergovernmental fiscal relations include significant transfers and sharing of revenues across governments, both in the same and across levels, the construction of aggregate revenue data for each level of government is not always straightforward. Moreover, since the values might be sizeable, the choices made on how to consider these intergovernmental transfers greatly affect the numbers.

The following definitions facilitate understanding and clearly identify two important different cases, and are analogous to the concepts of “spent by” and “funded by” for expenditures (Dougherty and Montes, 2023):

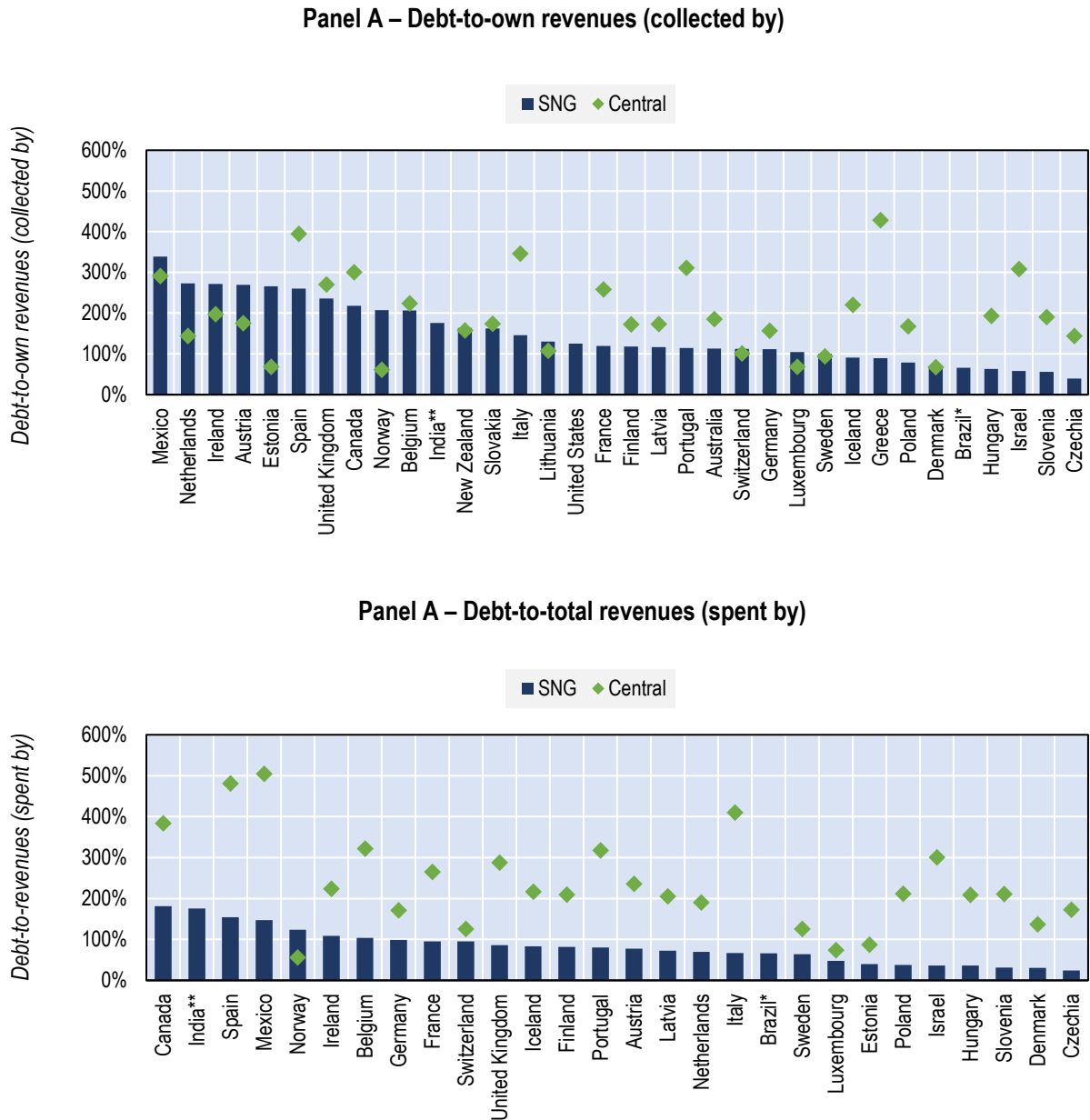
- Revenues “collected by” SNGs or consolidated “*own revenues*”: encompass revenues directly collected by the SNG administrations, including local/state/regional taxes, fees and other revenues. This concept does not include, nor does it discount, transfers received from or paid to other governments in the same or different levels.
- Revenues “spent by” SNGs or consolidated “*total revenues*”: encompass all own revenues (“collected by”) and includes net transfers received from other levels of government, minus transfers paid to other levels of government. All types of intergovernmental transfers are considered, independent of whether they are mandatory revenue-sharing receipts or discretionary grants.

Apart from a few specific country cases flagged in the text, for which data are not available in the OECD Fiscal Decentralisation database, in this paper all values, figures, and plots that relate to SNG revenues are based on the measure of consolidated *own revenues* (“collected by”), with the exception of Section 3.4. As can be inferred from the definitions above, the values might, therefore, differ substantially from other public data sources, in particular, from countries’ official figures, for which it is not uncommon to use the concept of consolidated *total SNG revenues* (“spent by”).

Figure 32 compares how the SNG debt-to-revenue ratios differ if we use one or the other concept of revenues. Panel A shows debt-to-revenue ratios using the “collected by” concept, that is, considering only own revenues, and Panel B shows debt-to-revenue ratios using the “spent by” concept, including transfers. Since SNGs in all countries in the sample are net receivers of transfers, the plot in Panel A shows much higher debt ratios for SNGs than the ratios shown in Panel B.

The default “collected by” measure captures long-term fiscal capacity. However, to gain insights into fiscal sustainability and the risk of SNG indebtedness, it is important to consider countries’ institutions, specifically how much of the transfer revenues can be considered certain and thus do not depend on central government discretion. With that information, one or the other measure might be more appropriate.

Figure 32. Two measures of SNG debt-to-revenues ratios



Notes: Debt, composed by “Total liabilities excluding insurance technical reserves”, in relation to:

Panel A: Own revenues (“collected by”), composed by “Consolidated government revenue” (does not include transfers). Data for 2022 except for Israel, Mexico, New Zealand and United States, with data for 2021.

Panel B: Total revenues (“spent by”), composed by “Consolidated government revenue” + “Intergovernmental transfer revenue” – “Intergovernmental transfer expenditure”. Data for 2022.

Sources: OECD Fiscal Decentralisation database, *IMF Article IV, **RBI.

‡Dougherty, S. and A. Montes (2023), “Consolidated expenditure by government function: an extension of the Fiscal Decentralisation database”, Background document for the Network on Fiscal Relations across Levels of Government, <http://oe.cd/SbyFN>