



**Market-Based Climate Financing Instruments
for Subnational Governments**

by

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Abstract

The issuance of the first labeled green bond by the World Bank in 2008 sparked a revolution in the capital markets that has created a \$2 trillion plus thematic bond market, leveraging investor interest in environmental, social and governance criteria in investment decisions and support for sustainable investments. The COVID-19 pandemic has further highlighted to investors the importance of addressing key social and environmental vulnerabilities and help build resilience for future shocks. This investor demand presents significant opportunities for local governments as they face growing pressure to implement decarbonization and resilience strategies for large-scale infrastructure and the provision of essential public services. In this context, this chapter provides a description of financing instruments to finance climate-smart and resilient infrastructure, beyond the banking system and central government on-lending, focusing on green bonds, transition bonds (sustainability-linked bonds), and catastrophe bonds. The paper presents a brief history of these non-traditional market-based financing instruments, highlights cases where local governments have adopted these instruments, including the motivation and rationale, examines challenges related to knowledge gaps, financial risks and debt sustainability, and concludes with key recommendations for local governments interested in leveraging alternative options for financing energy-efficient buildings, low-carbon sanitation and water, green urban transport, etc.

1. INTRODUCTION

The COVID-19 pandemic has highlighted the importance of addressing key social and environmental vulnerabilities to build resilience for future shocks. The UN-Habitat expects over two-thirds of the world's population to be living in cities by 2030, exerting pressure on aging infrastructure and creating demand for new products and services. Cities, where most economic activity occurs, are already responsible for ~70% of total GHG emissions. Cities are also vulnerable to the impacts of climate change (United Nations, 2019).

In many countries the responsibility for urban infrastructure investments and operations are decentralized to subnational governments, including states, provinces, municipalities, districts, etc. These subnational actors have to play a key role in implementing the Nationally Determined Contributions (NDCs) to reduce greenhouse gas emissions, as well as building resilience to climate change.

Local governments' climate investment efforts are mainly focused on leveraging public finance (direct lending from central government budgets or concessional and non-concessional loans from international financial institutions and multilateral development banks (MDBs), and tax revenues) and lending from state-owned or national banks and commercial banks. But capital markets are increasingly recognized as important components of the climate finance architecture, offering long-term financing for climate smart and resilient infrastructure and essential public services.

In developed markets most subnational governments raise debt directly, placing bonds domestically in local currency. S&P Global Ratings expects global bond issuance by local and regional governments to average US\$2 trillion per year in 2022-2023 (S&P Global Ratings, 2022). While most subnational borrowers in emerging markets do not have the autonomy or authority necessary to make decisions about accessing financing or have the capacity or the credit strength to borrow from the capital markets, a range of middle-income countries and low-income countries issue bonds in the domestic market on a regular basis. Some have also issued in the international capital markets. Despite restrictions, many have the capacity to increase borrowing and thus finance much needed infrastructure development (S&P Global Ratings, 2022). In 2021, the Municipality of Shenzhen (China), Province of Guangdong (China) and Provincia de Buenos Aires (Argentina) have issued bonds in the international markets. These subnationals can take advantage of a wide range of established mechanisms to access funding earmarked for green investments. Green bonds, transition bonds (sustainability-linked bonds), environmental impact bonds, catastrophe bonds are seen by investors as securities that generate both environmental and financial return. Investor demand for these types of instruments present significant

opportunities for public sector borrowers to achieve climate goals and make cities inclusive, safe, resilient, and sustainable (SDG 11).

This chapter aims to describe financing instruments for climate-smart and resilient infrastructure beyond the banking system and central government transfers, focusing primarily on green bonds, transition bonds, and alternative financing instruments such as environmental impact bonds and catastrophe bonds. It presents a brief history of these non-traditional market-based financing instruments, highlights cases where local governments have adopted these instruments, including the motivation and rationale, examines challenges related to knowledge gaps, financial risks and debt sustainability, and concludes with key recommendations for local governments interested in leveraging alternative options for financing energy-efficient buildings, low-carbon sanitation and water, green urban transport, etc.

While examining these options, it is important to note that no single financing product will close the climate financing gap at the subnational level, nor are all these products suitable for all subnationals. Rather, as can be seen from the solutions described in this chapter, subnationals will have to use a combination of tools depending on the context and take steps over a number of years to build the capacity to use them strategically and opportunistically.

1. TRADITIONAL SOURCES OF CLIMATE FINANCING

Climate finance refers to local, national, or international financing that is drawn from public, private and alternative sources to support mitigation and adaptation actions that will address climate change (United Nations Framework Convention on Climate Change, n.d.). Before diving into capital market-based climate finance instruments, it is important to provide a brief overview of the traditional forms of climate-related financing available to subnationals. The main sources of climate finance for subnationals include central government transfers and international organizations (MDBs and bilateral banks).

MDBs are important sources of climate financing for developing countries. According to the 2020 Joint Report on Multilateral Development Banks' Climate Finance, major MDBs committed US\$38 billion of climate finance to low- and middle-income economies in 2020 (African Development Bank, et al, 2021). MDBs typically lend to sub-nationals at concessional and non-concessional rates through national governments who then lend the resources to sub-nationals. The multilaterals may also provide financing directly to subnational governments with a sovereign guarantee. For instance, the vast majority of the World Bank's lending to Brazil is to sub-nationals (110 out of a

total of 126 loans, representing US\$14.7 billion out of a total of US\$15.3 billion, as of April 2022) with a sovereign guarantee (see box 1).

Box 1: World Bank climate-related loan to a sub-national in Brazil

First Amazonas Fiscal and Environmental Sustainability Programmatic Development Policy Loan

The Brazilian state of Amazonas hosts one quarter of the entire Amazon basin and has the largest (1.5 million km²) forest carbon stock of any subnational jurisdiction in the world. On December 11, 2020, the World Bank Board of Directors approved a US\$200 million loan for the Amazonas to strengthen monitoring and early warning plans, and fight deforestation and forest fires. By reducing deforestation, the state will be able to decrease greenhouse gas emissions equivalent to about 11% of Brazil's Paris Agreement goal.

Source: The World Bank

Multilaterals also provide loans to subnational governments without sovereign guarantees. For instance, the World Bank Group provides loans to subnationals without sovereign guarantees through its private sector arm, International Finance Corporation (IFC) (The World Bank Group, n.d.). These loans finance essential infrastructure investments in water and wastewater, transportation, solid waste management, etc. at commercial terms. The European Bank for Reconstruction and Development provides lending without sovereign guarantees to local governments to finance the delivery of urban services in water and wastewater, public transport, urban roads and lighting, solid waste management, district heating, and energy efficiency (The European Bank for Reconstruction and Development, n.d.).

In addition to the above, MDBs channel through climate finance from a variety of climate funds created by international organizations such as the United Nations. These include the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF) managed by the Global Environment Facility (GEF), the Adaptation Fund, the Green Climate Fund (GCF), and the Climate Investment Funds (CIFs). The GCF, which allocates half of its resources to adaptation, has established an impact equity fund for sub-nationals to provide equity investments for climate projects (Green Climate Fund, 2022).

The CIFs provide grants, loans, equity and guarantees at concessional terms to sovereigns, sub-sovereigns and private entities. CIF's programs fall under two trust funds, the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF). CIF's new Smart Cities Program is expected to provide highly concessional financing to cities in developing countries for investments in energy, transport, buildings, water and waste systems (Duarte, 2020).

These funds usually co-finance projects (blended finance structures) with MDBs and development finance institutions. The preferential rates at which they lend bring down the overall cost of projects.

2. HISTORY OF MARKET-BASED CLIMATE FINANCE INSTRUMENTS

In 2006, the International Finance Facility for Immunisation Company (IFFIm) issued a US\$1 billion bond to accelerate funding for the GAVI Alliance to immunize more than 500 million children before 2015. The World Bank, as treasury manager for IFFIm, introduced the bond to the market. Proceeds were used to scale up GAVI Alliance, boost vaccine use, and improve health systems (IFFIm, 2006). This bond is often seen as a precursor to today's well-recognized "thematic bonds". In 2007, the European Investment Bank issued a climate-awareness bond to finance renewable energy and energy-efficiency projects. A structured product, the 5-year bond offered a return linked to an equity index, the FTSE4 Good Environmental Leaders Europe 40 Index (European Investment Bank, n.d.) In 2008, the World Bank introduced the first labeled green bond to the market, establishing eligibility criteria and governance structure in a "Green Bond Framework," a second opinion from the Center for International Climate Research (Cicero) in Oslo, and commitment to report annually the allocation of proceeds and expected impact (see box 2).

These bonds catalyzed the interest of issuers and investors at a time when the financial markets were becoming aware of global environmental and social challenges that impact the value of their investments and facing pressure to contribute to climate action and sustainable development goals. The green bond addressed this change in investor behavior and was recognized as a model product that could align issuer and investor interest and help mobilize more funds towards climate activities (Reichelt, 2010).

Box 2: First green bond in the world

The World Bank issued the first labeled green bond in the world in 2008. The product was created in response to a specific request from Scandinavian investors who were looking to hedge climate change-related risks in their investment portfolios and support climate-friendly investment. The investors were interested in a clear and transparent governance process for the identification and selection of projects, management of environmental and social risks and a disclosure of expected environmental and social impact of supported projects. The bank Skandinaviska Enskilda Banken (SEB) worked with the World Bank to design a new financial instrument with the above criteria, which became the first labeled green bond (World Bank, 2008a). This green bond helped spark the interest in use-of-proceeds bonds with a “purpose” (World Bank, 2019a).

Source: The World Bank

3. THEMATIC BONDS SUPPORTING CLIMATE ACTION

Thematic bonds are fixed income securities that aim to meet environmental and social objectives and commit funds to programs, projects or assets that are deemed environmentally and/or socially beneficial and are labeled as such (Ferrarini, 2022). Currently, the thematic bond market includes green bonds, blue bonds, social bonds, sustainability bonds, and sustainability-linked bonds (also known as transition bonds). A green bond is a debt security issued to raise capital to support climate and/or other-environment-related projects. Social bonds fund designated social projects. Sustainability bonds fund a mix of environmental and social projects.

All of these bond types follow international standards developed by the International Capital Markets Association (ICMA) in coordination with a variety of market actors (International Capital Markets Association, 2021). Before issuance, issuers are expected to obtain an independent review of the types of projects the bond will support and the governance processes the issuer will adopt to identify the eligible project criteria, select projects, track the allocation of bond proceeds and report the environmental and social impact of projects supported. Establishing good governance processes ensure the credibility of the bond, promote transparency about the use of bond proceeds, and are key to maintaining the integrity of the market and retaining investor interest in these types of bonds. These efforts take time and resources and contribute to the cost of a transaction compared to a plain vanilla bond. However, the end result is beneficial as the issuer is able to attract a wider investors base, often attracting foreign investors to the domestic market, and frequently pricing slightly better than plain vanilla bonds

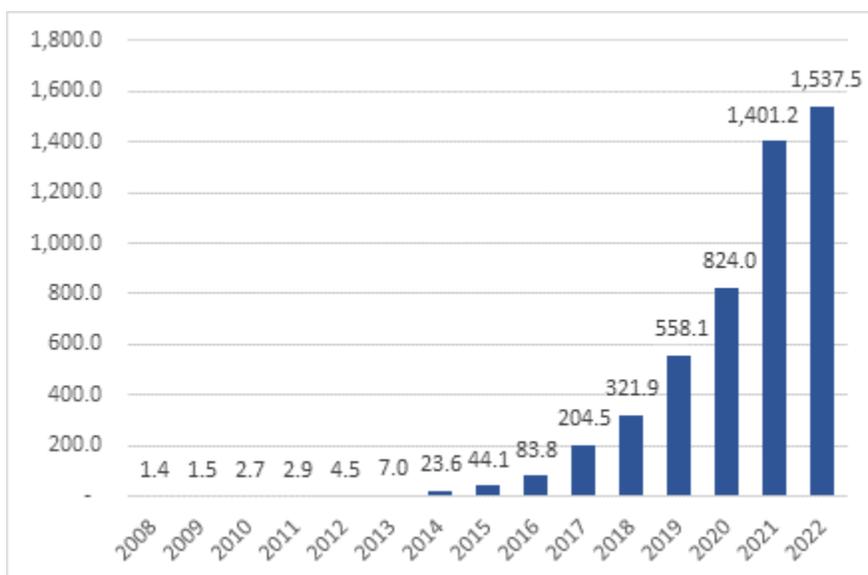
due to the supply-demand mismatch. A green bond issued by the City of Johannesburg was 150% oversubscribed and priced 185 basis points (1.85%) above a comparable government bond (Joburg Newsroom, 2018).

Another type of thematic bond gaining interest from issuers and investors is the sustainability-linked bond (SLB), a type of bond signaling the issuer's commitment for transitioning towards the net-zero and other environmental targets. While green, social, and sustainability bonds are "use of proceeds" bonds (where the proceeds fund specific types of projects), sustainability-linked bonds do not fund specific green projects. Instead, the issuer makes commitments towards achieving sustainability-related performance targets and identifies related key performance indicators (KPIs) that address its environmental, social, and/or governance challenges. The targets are benchmarked against the issuer's performance over time or to peers, or by reference to science-based scenarios, or absolute levels (e.g., carbon budgets), or to official country/regional/international targets (Paris Agreement on Climate Change and net-zero goals, Sustainable Development Goals (SDGs), etc. The financial and/or structural characteristics of sustainability-linked bonds vary depending on whether the issuer achieves predefined sustainability objectives (International Capital Markets Association, 2021). The issuer is penalized if it fails to meet pre-agreed environmental or social targets through pre-agreed increases in the coupon or principal of the bond. Helsingborg (Sweden) issued the first sustainability-linked bond issued by a city on March 7, 2022 (NASDAQ, 2022). The bond returns are tied to Helsingborg's ambition to achieve net-zero greenhouse gas emissions by 2035.

4. GROWTH OF THE GREEN BOND MARKET

As of April 2022, the total value of bonds that are associated with a thematic label is US\$2.4 trillion, out of which green bonds are approximately US\$1.5 trillion (see Figure 1). Although a tiny fraction of the US\$132 trillion global fixed income market, green bond issuances have grown tremendously, reaching a record of over US\$577 billion in 2021, a sizeable increase from US\$265 billion in 2020 and US\$1 billion in 2010. The markets expect the global supply of green bonds to increase to US\$800 billion in 2022 (1.4 times that of 2021).

Figure 1: **Cumulative amount issued in green bonds (US\$ billion), 2008-2022**



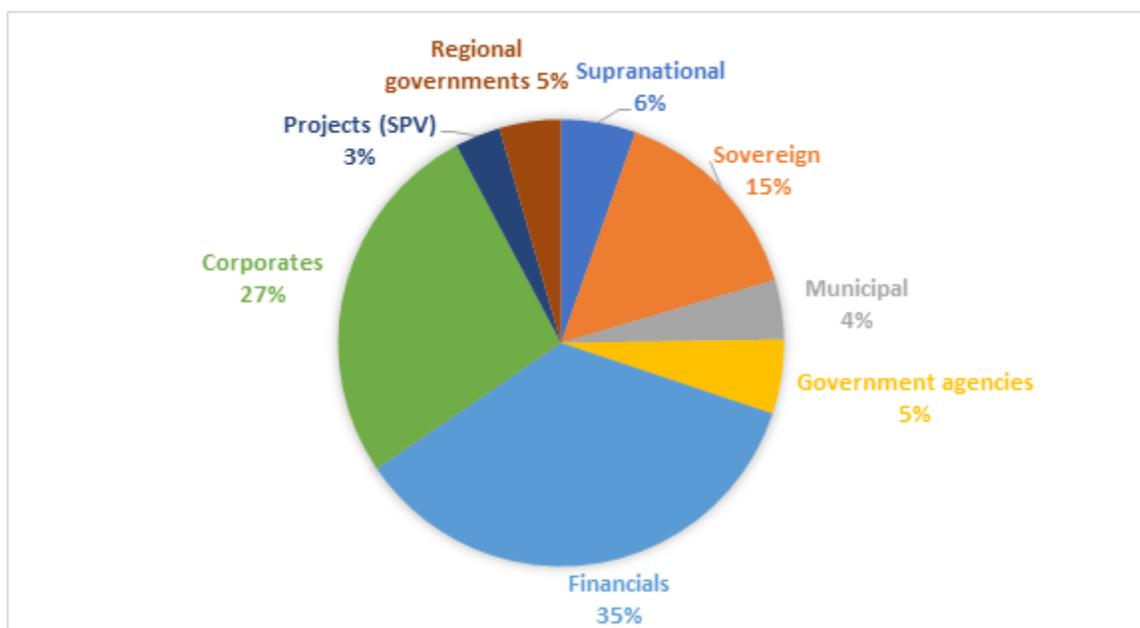
Although MDB issuances kickstarted it, the market is currently dominated by the financial sector, followed by corporates. Sovereign issuers entered the market in 2016 when the Government of Poland issued the first sovereign green bond. Fiji issued the first emerging market sovereign green bond in 2017 with technical assistance from the World Bank Group. As of April 2022, more than 20 sovereign issuers have issued green bonds including emerging markets such as Chile, Colombia, Egypt, Fiji, Indonesia, Nigeria.

The state government of the Commonwealth of Massachusetts issued the first municipal green bond (US\$100 million) in 2013, which was followed by the City of Gothenburg green bond (SEK 500 million) the same year. According to Bloomberg, 786 issuers in the US have issued Green Municipal Bonds for a total of US\$104 billion, as of April 2022, which is not surprising given the large, liquid subnational securities markets in the US.¹ Other local governments that have issued green bond include the cities of Ottawa, Toronto and Vancouver (Canada), Ville de Paris (France), Nagar Nizam Ghaziabad (India), Reykjavik (Iceland), Fukuoka and Kawasaki (Japan), Oslo (Norway), Johannesburg and Cape town (South Africa), and Canton of Basel-City (Switzerland). These issuances offer valuable lessons to other subnational borrowers (see Box 3).

¹ US Municipal bond issuers include not just states and local governments, but also utilities, agencies, school districts, and trust funds, etc.

Despite the potential for attracting investors and helping close financing gaps for climate challenges confronting subnational governments, green bonds issued by states, municipalities or counties represented only a small share (4%) of the total green bond market in 2021.

Figure 2: Green bonds issued in 2021



Source: Bloomberg

Box 3: Examples of subnational green bond transactions

City of Oslo green bond

In December 2015, Oslo issued a SEK1.5 billion (US\$172.49 million or EUR 158 million) green bond with a maturity of 8.75 years and a coupon of 2.35%. Oslo's inaugural green bond was also the first from a municipal to be listed on the Oslo Børs. Eligible project categories include energy efficiency and sustainable housing projects; water management and water cleaning facilities; environmental transportation services; and environmental projects (including reducing the number of vehicles in the city center). Environmental research firm CICERO provided a second opinion on Oslo's green bond framework, awarding it its highest rating ("dark green"). The proceeds of the bond funded the following: i) "Midgardsormen," a major sewage network project, ii) expansion of the Bekkelaget Sewage Treatment Plant, iii) the construction of the new metro depot at Avløs, and iv) Teglverket Primary School, which was constructed to generate 43% lower greenhouse gas emissions than the reference value.

Source: <https://www.environmental-finance.com/content/news/city-of-oslo-issues-first-green-bond.html> and [letter](#)

City of Cape Town green bond

In July 2017, the City of Cape Town issued its first green bond (R1 billion). The response from the market was overwhelmingly positive as twenty-nine investors made offers totaling R4.3 billion for the ZAR1 billion bond. The bond eventually sold at 133 basis points above the R186 government bond. The green bond was certified by the Climate Bonds Initiative and awarded a GB1 rating by the ratings agency Moody's. The projects supported are a mix of adaptation and mitigation initiatives aligned with the city's Climate Change Strategy, including

- procurement of electric buses
- energy efficiency in buildings
- water management initiatives (which includes water meter installations and replacements, water pressure management, and upgrade of reservoirs)
- sewerage effluent treatment
- rehabilitation and protection of coastal structures

Source: <https://www.capetown.gov.za/media-and-news/Green%20pays%20City>

5. ALTERNATIVE CLIMATE FINANCING INSTRUMENTS

Other innovative financing mechanisms include social financing models such as environmental impact bonds (EIB). These bonds use the “pay-for-success” or outcome-based structure of social impact bonds (SIBs) to finance green infrastructure solutions. EIBs can take various forms, including loans, and different structures based on the needs of the issuer, the investor and the outcome payer. For instance, an EIB can be structured such that the capital is paid back with interest to the investor(s) over a set schedule, over and above which the issuer (or another interested stakeholder) agrees to make an additional payment (“outcome payment”) to the investor if the project is determined to have performed as specified at the end of the evaluation period. In other structures, the investor may be willing to share the risk that the project will not reach its targeted objective and be willing to make an agreed risk sharing payment to the issuer, or direct all or a share of the bond principal to service improvement solutions. EIBs can also be structured like the US\$150 million Wildlife Conservation Bond issued by the World Bank in March 2022 to grow the population of endangered black rhinos in South Africa (see box 4). This innovative structure could be replicated to finance climate-related activities.

EIBs are negotiated directly between the impact investor, the issuer and prospective outcome payer and involve the participation of financial intermediaries or advisors, service providers and partners, independent evaluators and third-party verification services who assess and confirm whether outcomes are met. EIBs have been used in the United States by the District of Columbia Water and Sewer Authority (see box 4) (Chesapeake Bay Foundation, n.d.).

These are complex highly structured financing instruments that need legal agreements beyond traditional investment documentation. As such, they remain niche financial instruments that are not likely to be used widely but can complement traditional financing by attracting non-traditional impact investors, donors or philanthropic investors interested in a specific outcome for a specific type of project. Subnationals that do not have a good credit rating or for whom borrowing is difficult may find such instruments useful.

Box 4: Examples of outcome-based impact bonds

World Bank Wildlife Conservation Bond

The World Bank's innovative Wildlife Conservation Bond is an innovative approach to raise funds to grow the population of endangered black rhinos and help close the biodiversity financing gap in South Africa. In this structure, the World Bank's lending arm for middle income countries, the International Bank for Reconstruction and Development (IBRD), issued a principal-protected outcome-based bond to institutional investors and high net worth individuals. Investors will not receive coupons on the bond. Instead, the IBRD will make payments to finance conservation activities at two parks in South Africa, namely the Addo Elephant National Park and the Great Fish River Nature Reserve. IBRD has a triple-A credit rating, thus, investors will receive their principal investment back when the bond matures in five years, together with a potential success payment linked to the growth in the black rhino population in the two protected areas. The success payment is paid by IBRD with funds provided by a performance-based grant from the GEF.

This structure offers an alternative approach to mobilizing much-needed private capital for global public goods and may be particularly attractive to jurisdictions and entities that need to finance projects with measurable metrics for determining success, without increasing their debt burden.

Source: World Bank

District of Columbia Water and Sewer Authority Environmental Impact Bond

In October 2016, the District of Columbia Water and Sewer Authority (DC Water) issued a privately placed US\$25 million municipal bond structured as an EIB to fund the construction of green infrastructure for the DC Clean Rivers Project. The bond was sold to investors Goldman Sachs and Calvert Foundation. Throughout the term of the bond, investors will receive a semi-annual coupon payment of 3.43%. When the bond matures, investors will receive a payment based on the success of the project in reducing stormwater runoff based on the following criteria:

- i) Better than Expected Runoff Reduction >41.3% Investors will receive an additional Outcome Payment of US\$3.3 million.
- ii) Expected Runoff reduction between 18.6% and 41.3% No contingent payment to investors.
- iii) Worse than Expected Runoff Reduction <18.6% Investors owe a Risk Share Payment to DC Water of US\$3.3 million

The project reduced stormwater runoff by almost 20% from previous levels. Thus there was no performance payment by DC Water or by investors.

Source: Harvard Kennedy School ([dc water environmental impact bond.pdf \(harvard.edu\)](#)); [dcwater.com \(Environmental Impact Bond | DCWater.com\)](#)

6. CATASTROPHE RISK FINANCING TO SUPPORT RESILIENCE

Financing for climate change mitigation has to be complemented by investments in resilience that enhance society and the economy's capacities to deal with shocks. Because of the dual impact of climate change and increasing urban density on coasts and flood plains, natural disaster related losses are increasing across the world. Each year, extreme natural disasters force 26 million people into poverty and reduce global annual consumption by US\$520 billion (Hallegatte, 2017). In low and middle-income countries, natural disasters can cause US\$18 billion in damage repairs to the transport and power generation sectors alone. While governments are working harder to prepare for the economic and human impact of these storms, the increasing effects of climate change are making these threats more frequent and intense.

A range of financial products, from loans to contingent financing to insurance, can be used to mitigate the financial impact of natural disasters. The selection of financial products to manage natural disaster-related risks depends on the type of risk (s) faced and the frequency and severity of the events and should be considered as part of a disaster risk financing strategy. For instance, a local government vulnerable to natural disasters could arrange a line of credit in advance that would be drawn down in the event of a disaster. The credit contract between the lender and the local government could specify that the loan will only be disbursed in the event of a disaster. The World Bank's Development Policy Loan (DPL) with Catastrophe Risk Deferred Drawdown Option is designed this way (World Bank Treasury, 2021).

Market-based financial instruments such as catastrophe (cat) bonds cut across the themes of climate finance and climate risk management and can help governments meet financial needs in the event of a natural or weather-related disaster. Cat bonds work in a similar manner to insurance, paying out when an event meets certain pre-defined criteria (e.g., a specified earthquake magnitude). Typically, cat bonds are sponsored by insurance and reinsurance companies, though cat bonds have also been sponsored by governments and corporates.

In a typical cat bond structure, the sponsoring entity enters into an insurance contract with a special purpose vehicle ("SPV") that issues the bonds to investors. The SPV invests the proceeds of the bond issuance in highly rated securities that are held in a collateral trust and transfers the return on this collateral, together with the insurance premiums received from the sponsor, to the investors as periodic coupons on the bonds. If a specified natural disaster occurs during the term of the bond, some or all of the assets held as collateral are liquidated and that money is paid to the sponsor as a pay-out under its insurance contract with the SPV. If no specified event occurs, the collateral assets are liquidated on the maturity date of the bonds and the money is paid to the

investors. In other words, investors risk losing some or all of the principal if a natural disaster occurs and in exchange receive a coupon that reflects the insurance premium for such risk.

These capital market instruments represent around 15 percent of the total volume of global catastrophe reinsurance and can be used to insure cities and municipalities against weather-related events. The first successful cat bond was issued by Hannover Re in 1994 for US\$85 million. The owner of Tokyo Disneyland (Oriental Land Company) issued the first cat bond by a nonfinancial firm in 1999 to cover earthquake losses in the Tokyo region. The Mutual Transportation Assurance Co. (a subsidiary of the New York Metropolitan Transportation Authority) issued three cat bonds to cover the costs of damage from storms or hurricanes in 2013, 2017 and 2020 (Artemis, 2020).

As of the end of 2021, the outstanding cat bond market reached US\$33.8 billion, with new issuances reaching US\$12.8 billion in 2021. The use of cat bonds in developing countries is extremely rare and the cat bond market is dominated by US risk. However, the World Bank is a unique issuer of cat bonds for the benefit of World Bank member countries, effectively standing between countries and markets. Since 2009, the World Bank has transferred US\$3.6 billion of disaster risk from developing countries to capital markets through cat bond transactions. This has included transactions covering hurricane, earthquake, and tsunami risk for Colombia, Chile, Mexico, Peru, Philippines, Jamaica, and the Caribbean Catastrophe Risk Insurance Facility and pandemic risk for the International Development Association. The most recent of these was a cat bond issued by the World Bank in July 2021 that provides Jamaica with US\$185 million of insurance cover for three hurricane seasons.

When the World Bank issues a cat bond it enters into an insurance agreement with the client in which the World Bank agrees to provide a pay-out to the client upon the occurrence of a specified event. In exchange, the client agrees to make periodic insurance premium payments to the World Bank. Simultaneously with the execution of that insurance agreement, the World Bank issues a cat bond to investors with terms that mirror those of the insurance agreement. The cat bond provides a hedge to the World Bank for its obligations under the insurance agreement. If the World Bank is required to make a pay-out to the client under the insurance agreement, it deducts the same amount from the principal amount of the bond. The World Bank uses the insurance premium it receives from the client to pay a portion of the bond coupon. There is no requirement for an SPV or a collateral trust since the World Bank makes use of its existing bond issuance infrastructure and the bonds are issued by IBRD which is a AAA rated entity.

The World Bank can issue such bonds for local governments. Although complex and time-consuming to prepare and design, cat bonds can be a useful tool in providing local governments with rapid liquidity post-disaster. The World Bank intermediated a reinsurance transaction for local governments in the Philippines through the national government in 2017 and 2018 (see box 5).

Box 5: World Bank Reinsurance transaction for local governments

6.

The Philippines is among the most disaster-prone countries in the world. In 2013, Typhoon Yolanda (also known as Typhoon Haiyan) resulted in the loss of 6,300 lives and caused an estimated US\$12.9 billion in damages, or about 4.7% of the country's GDP. In 2017, the Philippines transferred typhoon and earthquake risk through the World Bank to the international reinsurance market in local currency. The policy provided coverage of maximum PHP10.4 billion (US\$206 million) in the first year, and PHP20.5 billion (US\$406 million) in the second year, split across two components: (i) coverage for 25 provincial governments—Local Government Units (LGUs)— against emergency losses from major typhoons; and (ii) coverage for National Government Agencies (NGAs) against emergency losses from major typhoons and earthquakes for national government assets (based on losses in the 25 selected provinces).

The main policy holder was the national government (which paid the premium on behalf of the local governments) due to the local governments' inability to pay premiums and lack of familiarity with the instrument. Over two years, the bond made three payouts for a total of approximately US\$28 million, triggered by typhoon and earthquake events. All payouts were made from the international markets to the World Bank, through the government-owned insurance company Government Service Insurance System (GSIS), to the Bureau of Treasury. The program was the result of six years of technical assistance and advisory support from the World Bank.

Source: World Bank (<https://openknowledge.worldbank.org/bitstream/handle/10986/36013/The-Philippines-Parametric-Catastrophe-Risk-Insurance-Program-Pilot-Lessons-Learned.pdf?sequence=1&isAllowed=y>)

CHALLENGES AND OPPORTUNITIES

Some fundamental issues constrain the scale up of market-based instruments by subnationals for climate-smart urban infrastructure. As mentioned before, not all countries allow subnationals to raise financing. Market-based financial instruments at the state and municipal level may result in exposure to various types of financial risks such as refinancing, interest rate, currency, and operational risks. Mismanaged subnational debt and unsustainable debt structures have the potential to increase risks of subnational fiscal insolvency and can create

significant contingent liabilities for central/federal governments and threaten the financial stability of a country (The World Bank, 2008). During the 1990s there were widespread subnational debt crises in countries such as Argentina, Brazil, Mexico and Russia. While more autonomy may be desired to allow subnationals to finance climate actions and environmental priorities, it has to take place within a strong regulatory framework for subnational borrowing and financial discipline, including clear rules specifying the type and purpose of borrowing, the procedural steps for contracting debt, and any limitations on borrowing.

Second, most subnationals issue in the domestic market, rather the international markets, which allows them to avoid currency risk that they are usually not well-positioned to manage. However, many local markets are small in scale and lack liquidity. Developing domestic financial markets and mobilizing private financing for local investment is therefore key to helping subnationals access the financing they require.

Third, subnational governments in developing countries suffer from significant knowledge gap. Most are not aware of these financial instruments and their value propositions or the process for issuing these bonds. All of this results in a mismatch between the need for cities to bear the responsibility for tackling climate mitigation and adaptation challenges and their ability to access long-term financing.

The encouraging news is that there is increasing pressure on international financial institutions and multilateral development banks to help borrowers mobilize private sector capital in accordance with sound debt management strategies. There are many collaborative efforts nationally, regionally and globally to promote shared understanding of challenges and good practices. As a result, subnational governments have significant opportunities to exchange knowledge and insights.

7. CONCLUSION

While the challenges outlined above can appear to be daunting, subnationals can gradually build their capacity to use and deploy new and innovative models of finance and investments tailored to their specific context. These market-based financial instruments are not suitable for every situation. Nonetheless, they offer an opportunity for many subnational governments to unlock larger investments that can help them implement decarbonization strategies and resilient infrastructure. An increasing number of investors—who may react differently to market conditions from traditional investors—are looking to finance projects that aim to achieve environmental and social sustainability. Given the opportunity to attract and expand this investor base, local governments should include thematic bonds and catastrophe risk insurance as part of a wide range of funding and risk management

alternatives. At the same time, they should keep in mind that these instruments are complex and resource-intensive and some will contribute to levels of debt. Plans to issue such bonds should be considered in conjunction with a sound analysis of the pros and cons of different financing options and potential risks and returns, as with any other financial instrument.

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