

Fiscal Sustainability and Natural Disaster Risks in the ECCU

Eastern Caribbean Currency Union

Sophia Chen, Spencer Siegel, and Camilo E. Tovar

SIP/2025/068

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ABSTRACT: ECCU countries are highly vulnerable to recurring and increasingly severe natural disasters. Evidence suggests that severe natural disaster have negative impacts on fiscal balances and debt in the region. This underscores the need for comprehensive disaster resilience strategies to mitigate immediate economic losses, finance post-disaster needs, and safeguard fiscal sustainability.

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SELECTED ISSUES PAPERS

Fiscal Sustainability and Natural Disaster Risks in the ECCU

Eastern Caribbean Currency Union

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¹ The authors would like to thank Ana Corbacho, Christoph Duenwald, Sami Naceur, and participants at the IMF Caribbean I Division seminar for helpful suggestions.



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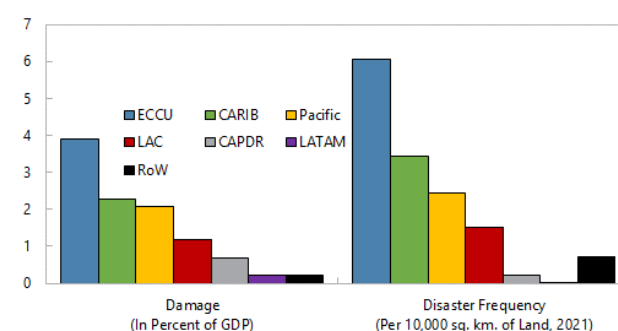
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FISCAL SUSTAINABILITY AND NATURAL DISASTER RISKS IN THE ECCU¹

ECCU countries are highly vulnerable to recurring and increasingly severe natural disasters (NDs). Evidence suggests that severe NDs have negative impacts on fiscal balances and debt in the region. This underscores the need for comprehensive disaster resilience strategies to mitigate immediate economic losses, finance post-disaster needs, and safeguard fiscal sustainability.

1. ECCU member states are highly vulnerable to NDs. These economies experience one of the highest frequencies of such events relative to their geographic size (right-hand side panel in Figure 1). Data from the International Disasters Database ([EM-DAT](#)) covering the period from 1980 to 2023 shows that the region has sustained substantial economic losses from NDs, averaging 4 percent of GDP annually (left-hand side panel in Figure 1).² The size of these losses is significantly higher than for the entire Caribbean and the Pacific, where ND losses average 2 percent of GDP per year.³ These statistics, while not capturing human losses, underscore the unique challenges ECCU member states face in building resilience to NDs.

Figure 1. Economic Impacts of Natural Disasters
(Average Annual, 1980–2023)



Sources: EM-DAT, World Bank, World Economic Outlook, and IMF staff calculations.
Note: Rest of the World is defined as non-Pacific and non-Western Hemisphere countries.

2. Losses from NDs have been intensifying and compounding over time. Since 1990, the Caribbean has experienced devastating damages. Extreme events, such as hurricanes Luis (1995), Georges (1998), Ivan (2004), Erika (2015), Irma (2017), Maria (2017), and the volcanic eruption of La Soufrière (2021), have each caused losses exceeding 5 percent of GDP. In some instances, these losses have exceeded the size of the economy, like Hurricane Maria in Dominica (225 percent of GDP). Recently, initial reports estimated that Hurricane Beryl (2024) caused damages of about 16 percent of GDP in Grenada and 20 percent of GDP in St. Vincent and the Grenadines.⁴ These events inflict severe economic losses and a prolonged recovery (Figure 2). With the projected increase in

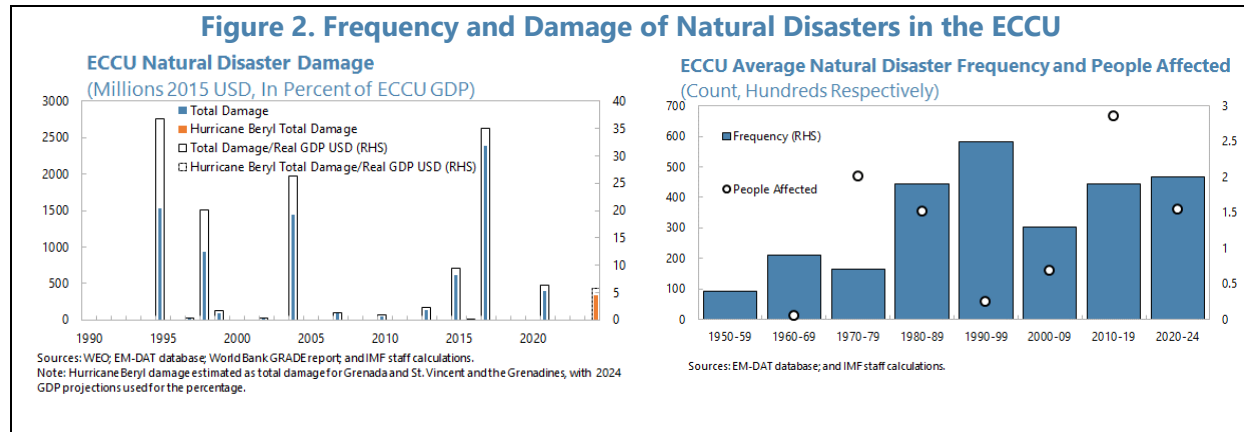
¹ Prepared by Sophia Chen, Spencer Siegel, and Camilo E. Tovar.

² The International Disaster Database ([EM-DAT](#)) compiles data on the occurrence and impacts of mass disasters worldwide. The data is sourced from United Nations agencies, non-governmental organizations, reinsurance companies, research institutes, and press agencies, and is distributed by the Centre for Research on the Epidemiology of Disasters (CRED). In this data, “loss” refers to the [direct or indirect](#), immediate [economic damage](#) and destruction caused by the disaster, including damage for property and infrastructure.

³ ECCU countries are geographically located in the Atlantic hurricane belt, making them directly exposed to frequent tropical storms and hurricanes. Moreover, several countries are subject to potential volcanic eruptions.

⁴ Calculated based on reported damages in World Bank GRADE reports for [Grenada](#) and [St. Vincent and the Grenadines](#), and projected 2024 GDP figures.

the frequency and intensity of severe tropical cyclones across the globe (Categories 4 and 5),⁵ coupled with costly recovery processes, the adverse effects of NDs are likely to increase over time. This underscores the potential for escalating NDs-related losses to the region.



3. Extreme NDs can undermine fiscal sustainability. Two complementary quantitative approaches are employed to examine how NDs affect the fiscal position in the ECCU countries over the period 1990-2023. The first is an unconditional event-case analysis of 18 severe ND-occurring years,⁶ and the second is an econometric analysis using local projections (Jordà, 2005).⁷ The latter controls for pre-ND fiscal and debt dynamics, which is important because countries tend to have different fiscal trajectories in the absence of NDs. Countries with stronger pre-existing fiscal positions may also display greater fiscal space to respond effectively after a ND. Results show that:

- **Event case.** Within three years of an ND, gross public debt increases by an average of 7 percentage points of GDP, and the primary balance deteriorates by 2 percentage points of GDP—or 2.6 percent of GDP, excluding citizenship-by-investment (CBI) revenue (Figure 3, bottom charts). However, there is no statistically significant evidence of a change in average real GDP growth over the three-year window of the analysis (Figure 3, top-right chart). These results suggest that the negative impact of the ND on economic activity is offset by the positive impact of reconstruction.
- **Local projections.** Gross public debt increases by 7 percentage points of GDP over a three-year period following the ND, and the primary balance response (with and without CBI revenue) is

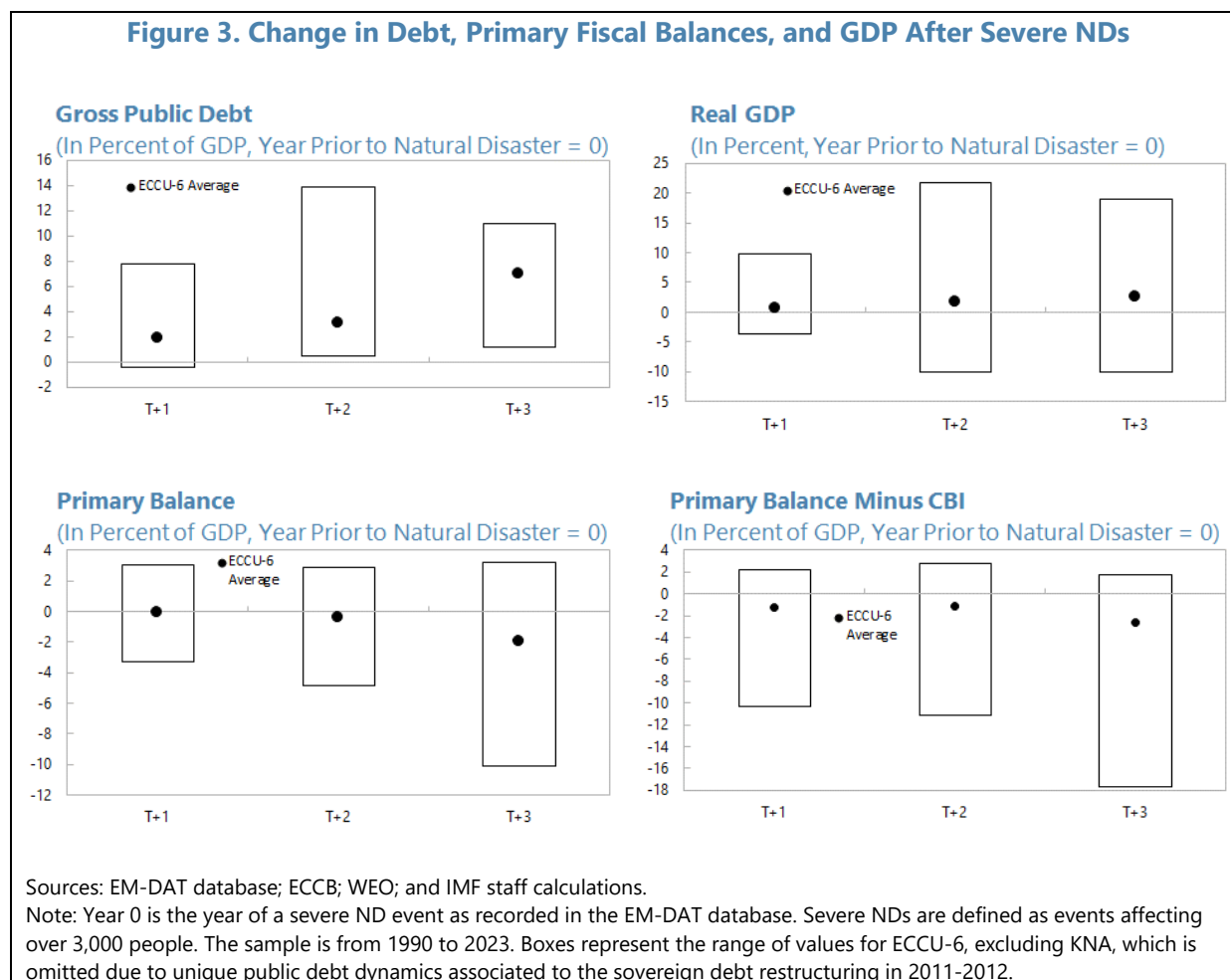
⁵ For an overview of current research on global warming and hurricanes see <https://www.gfdl.noaa.gov/global-warming-and-hurricanes/>.

⁶ The analysis defines a severe ND event as those affecting at least 3,000 people, where “affecting” is defined as “requiring immediate assistance due to the disaster”.

⁷ The regression takes the form $y_{i,t+h} = \alpha^h + \sum_{k=0}^2 \theta_k^h D_{i,t-k} + \sum_{k=0}^2 \Gamma_k^h X_{i,t-k} + v_i + \tau_t + u_{i,t}^h$, where i and t index country and year respectively. The superscript $h = 1, \dots, 3$ denotes the horizon being considered. The dependent variable is primary balance or gross public debt (both in percent of GDP) or real GDP. D is a dummy variable for natural disasters. X is a vector of controls including primary balance and gross public debt (both in percent of GDP) and real GDP. v_i is country fixed effects. τ_t is time fixed effects. $u_{i,t}^h$ is the error term. See Jordà, Òscar. 2005. “Estimation and Inference of Impulse Responses by Local Projections”, *American Economic Review*, 95 (1): 161-182.

negative and significant, reaching a 5-percentage point drop in GDP after three years (Figure 4). The output response to an ND shock is negative but lacks statistical significance (Figure 4, top-right chart). As with the event case analysis, the muted output response may reflect lower production capacity due to ND destruction, offset by post-ND reconstruction.⁸

In sum, these results confirm that severe NDs negatively impact fiscal balances, leading to higher debt.



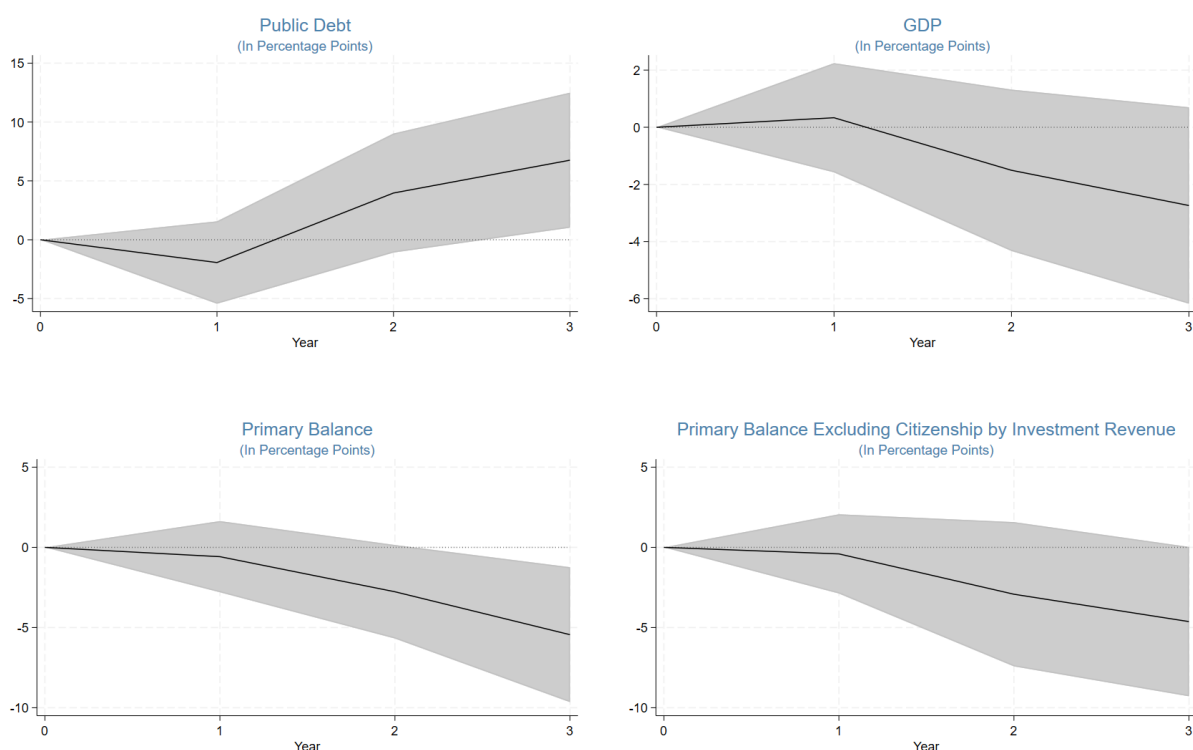
4. The detrimental impact of NDs on the fiscal position reinforces the urgent need for comprehensive ND resilience strategies to ensure long-term fiscal stability. A multilayered risk approach to limit the fiscal impact of NDs requires a strategy that prioritizes building:⁹

⁸ Recent studies for a broader sample of countries and defining natural disasters as those that exceed 1 percent of GDP in damages, show that natural disasters may be contractionary in the year of the event (1.3 percent) and that the subsequent recovery does not fully offset the initial decline (0.8 percent), thus implying a permanent loss in the level of output. See [H. Nguyen, A. Feng, M. Garcia-Escribano, 2025, "Understanding the Macroeconomic Effects of Natural Disasters," IMF Working Paper WP/25/46.](#)

⁹ Also see "Building ex-ante resilience to Natural Disasters" in IMF (2019), Eastern Caribbean Currency Union: Selected Issues Paper, [IMF Country Report No. 19/63](#), Volume 2019: Issue 063. February.

- **Structural resilience** through targeted investments in resilient infrastructure, land-use planning, building codes, and robust targeted social safety nets to protect vulnerable populations before, during, and after NDs.
- **Financial resilience** by establishing fiscal buffers (e.g., dedicated contingency funds¹⁰), utilizing parametric insurance (e.g., the Caribbean Catastrophe Risk Insurance Facility (CCRIF)¹¹), and securing contingent financing options (e.g., catastrophe bonds and sovereign bonds with natural disaster clauses). These measures ensure timely access to resources for recovery and reconstruction in the wake of a disaster.¹²

Figure 4. Local Projection Results



Sources: EM-DAT database; ECCB; WEO; and IMF staff calculations.

Note: Year 0 is the year of a severe ND event according to the EM-DAT database. Severe NDs are defined as events affecting more than 3,000 people in total. The sample is from 1990 to 2023. Grey area show 90 percent confidence interval based on robust standard errors.

¹⁰ Some countries have established these funds, such as St. Lucia's under the National Emergency Management Organization ([NEMO](#)), Grenada's under the National Disaster Management Agency ([NadMA](#)), Dominica's [Disaster Management Fund](#), or Antigua and Barbuda's operating under the National Office of Disaster Services ([NODS](#)).

¹¹ CCRIF paid over 3 percent of GDP to Grenada following Hurricane Beryl.

¹² For a broader discussion see, for instance, the accompanying Selected Issues Paper, "Property Insurance Challenges in the ECCU"; IMF (2021), "[Dominica: Disaster Resilience Strategy](#)," IMF Country Report No. 21/182; IMF (2022), "[Grenada: Disaster Resilience Strategy](#)," IMF Country Report No. 22/80; and The World Bank's [Managing Disaster Funds for Response and Recovery](#).

5. For the ECCU, enhancing ND resilience is essential for immediate recovery and for long-term economic stability and fiscal sustainability. A robust, multilayered resilience strategy is crucial to prepare for the inevitable impacts of NDs, safeguard fiscal health, and ensure a sustainable future. Policy coordination and information sharing between countries, including through regional bodies such as the Organization of Eastern Caribbean States and the Caribbean Disaster Emergency Management Agency, can boost disaster resilience and response. For example, implementing regional infrastructure standards for hurricane-resistant buildings, investing in microgrids and renewable energy to reduce dependence on fragile electricity networks (see Selected Issues Paper “Powering the Future: Energy Transition Strategies for the ECCU”), and jointly improving early warning systems, could be highly impactful. With rising disaster frequency and intensity, proactive measures are paramount for building resilience.

References

- IMF (International Monetary Fund). 2019. "Building Ex-Ante Resilience to Natural Disasters." In *Eastern Caribbean Currency Union: Selected Issues Paper*, IMF Country Report No. 19/63, Vol. 2019, Issue 063. February. International Monetary Fund.
- IMF. 2021. *Dominica: Disaster Resilience Strategy*. IMF Country Report No. 21/182. Washington, DC: International Monetary Fund.
- IMF. 2022. *Grenada: Disaster Resilience Strategy*. IMF Country Report No. 22/80. Washington, DC: International Monetary Fund.
- Jordà, Òscar. 2005. "Estimation and Inference of Impulse Responses by Local Projections", *American Economic Review*, 95 (1): 161-182.
- Nguyen, Ha Minh, Alan Feng, and Mercedes Garcia-Escribano. 2025. *Understanding the Macroeconomic Effects of Natural Disasters*. IMF Working Paper WP/25/46. International Monetary Fund.
- World Bank. 2024. *Global Rapid Post-Disaster Damage Estimation (GRADE) Report: Hurricane Beryl 2024, Grenada (Report as of August 1, 2024)*. Washington, DC: World Bank.
- World Bank. 2024. *Global Rapid Post-Disaster Damage Estimation (GRADE) Report: Hurricane Beryl 2024, Saint Vincent and the Grenadines (Report as of July 26, 2024)*. Washington, DC: World Bank.
- World Bank. *Managing Disaster Funds for Response and Recovery*. Washington, DC: World Bank.