

Resolving Sovereign Debt Overhang in Emerging Market Economies: A Fiscal Space Quantification Framework Under Stochastic Interest Rate Shocks

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Abstract. Sovereign debt overhang remains a structurally destabilizing force in emerging market economies (EMEs), particularly under conditions of tightening global monetary policy and persistent current account deficits. This study develops a stochastic dynamic fiscal space quantification framework that integrates interest rate shock propagation, debt sustainability thresholds, and primary balance adjustment paths. Employing a panel dataset of 47 EMEs spanning 2005–2023, combined with a Bayesian Vector Autoregression (BVAR) model and Monte Carlo debt trajectory simulations, the analysis identifies nonlinear tipping points at which debt servicing costs crowd out productive public investment. Empirical results confirm that fiscal consolidation alone is insufficient without concurrent exchange rate stabilization mechanisms and concessional refinancing facilities. The framework offers a replicable policy tool for multilateral institutions and finance ministries to calibrate debt restructuring interventions with greater temporal precision.

Keywords: sovereign debt overhang, fiscal space quantification, emerging market economies, debt sustainability analysis, stochastic interest rate shocks, Bayesian Vector Autoregression, debt restructuring, primary balance adjustment, crowding-out effect

Introduction

Sovereign debt overhang — defined as the condition in which a government's outstanding debt stock is sufficiently large to deter both domestic and foreign investment by raising expectations of future distortionary taxation or fiscal adjustment — has re-emerged as one of the most consequential macroeconomic challenges of the 2024–2026 global economic landscape. Following the extraordinary fiscal expansions necessitated by the COVID-19

pandemic, the energy price dislocations associated with geopolitical conflict, and the subsequent monetary tightening cycles initiated by major central banks, a substantial cohort of emerging market economies now finds itself navigating an acute sovereign financing dilemma. The IMF's 2024 Fiscal Monitor estimates that approximately 60 percent of low-income countries and nearly 25 percent of middle-income emerging economies are assessed to be at high risk of or already in debt distress, figures that underscore the systemic urgency of developing analytically robust, operationally deployable debt management frameworks. The theoretical underpinnings of sovereign debt overhang originate with Krugman (1988) and Sachs (1989), whose seminal contributions established the debt Laffer curve as a conceptual mechanism illustrating the inverse relationship between debt face value and expected repayment. Subsequent literature has enriched this foundation through incorporation of rollover risk (Calvo, 1988), sudden stop dynamics (Calvo et al., 2004), and endogenous fiscal policy responses to external financing shocks (Arellano, 2008). However, a persistent gap remains in the operationalization of these theoretical constructs into quantitative policy tools capable of accommodating the stochastic volatility of global interest rate environments — a gap rendered especially critical in the current era of elevated-for-longer monetary policy stances across G10 economies. Existing debt sustainability analysis (DSA) methodologies, as currently employed by the IMF and World Bank, rely predominantly on deterministic baseline projections supplemented by standardized stress tests. These approaches, while procedurally transparent, systematically underestimate the probability and magnitude of nonlinear threshold effects, particularly the crowding-out of capital expenditure once debt servicing obligations breach critical proportions of government revenue. The present study directly addresses this limitation by constructing a stochastic fiscal space quantification framework that endogenizes interest rate shock distributions derived from term structure models, allowing for Monte Carlo simulation of debt trajectory fan charts across heterogeneous EME institutional environments. This paper proceeds as follows. Section 2 reviews the theoretical and empirical literature on sovereign debt overhang, fiscal space measurement, and interest rate pass-through mechanisms in EMEs. Section 3 details the econometric methodology, including the specification of the BVAR model, the stochastic interest rate shock calibration, and the Monte Carlo simulation architecture. Section 4 presents the empirical results, with particular emphasis on identified nonlinear tipping points and cross-country heterogeneity in fiscal adjustment capacity. Section 5 discusses policy implications for multilateral creditors, national finance ministries, and debt restructuring negotiators. Section 6 concludes with recommendations for future research directions and framework extensions to incorporate climate-related fiscal risks.

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