Endogenous Threshold Cointegration with Regime-Dependent Fiscal Multipliers: A Nonlinear State-Space Decomposition Framework for Heterogeneous Panel Economies

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Abstract. This study develops a novel nonlinear state-space decomposition framework integrating endogenous threshold cointegration with regime-dependent fiscal multiplier estimation across heterogeneous panel economies. Existing linear approximations inadequately capture structural breaks and asymmetric transmission mechanisms embedded in fiscal policy cycles. Employing a panel smooth transition regression (PSTR) model augmented with cross-sectional dependence corrections and common correlated effects (CCE) estimators, we analyze 42 OECD and emerging-market economies over 1995–2023. Results confirm the existence of dual fiscal regimes governed by public debt thresholds near 72% of GDP, with expenditure multipliers exhibiting pronounced counter-cyclical asymmetry. High-debt regimes yield multipliers significantly below unity, while low-debt regimes sustain above-unity multipliers. These findings carry direct implications for sovereign fiscal consolidation design and macroprudential coordination under post-pandemic budgetary stress environments.

Keywords: endogenous threshold cointegration, fiscal multiplier heterogeneity, panel smooth transition regression, nonlinear state-space decomposition, regime-dependent fiscal policy, cross-sectional dependence, common correlated effects estimator, sovereign debt threshold, macroprudential fiscal coordination

Introduction

The quantification of fiscal multipliers remains one of the most contested and consequential empirical challenges in modern macroeconomics, particularly as governments worldwide navigate the compounded legacies of pandemic-era fiscal expansions, surging sovereign debt burdens, and tightening monetary conditions projected through the 2024–2026 horizon. The central difficulty lies not merely in measurement, but in the inherent nonlinearity of fiscal transmission: the same unit of government expenditure may generate substantially different macroeconomic outcomes depending on the prevailing debt regime, the phase of the business cycle, the degree of monetary accommodation, and the structural characteristics of the economy in question. Linear panel models, which have historically dominated the empirical fiscal literature, impose symmetry and parameter constancy assumptions that are fundamentally at odds with these dynamics, yielding multiplier estimates that conflate regime-specific effects and obscure policy-relevant heterogeneity. The theoretical motivation for regime-dependent fiscal multipliers is well-grounded in both New Keynesian and post-Keynesian frameworks. In low-debt, expansionary environments, government expenditure stimulates aggregate demand through standard Keynesian channels, with limited crowding-out of private investment and relatively anchored inflation expectations. Conversely, in high-debt regimes, Ricardian equivalence effects intensify, sovereign risk premia widen, and the confidence channel operates in reverse, compressing the effective multiplier well below unity and potentially inverting it under extreme fiscal stress. These mechanisms, however, are not binary but continuous and smooth, suggesting that threshold-based smooth transition regression architectures offer a more epistemologically faithful representation of fiscal dynamics than simple regime-switching models with sharp discontinuities. Despite growing recognition of fiscal nonlinearity in the post-2008 literature, existing contributions suffer from two persistent methodological shortcomings. First, the majority of threshold cointegration studies treat the threshold parameter as exogenously specified or calibrated from prior literature, introducing specification bias that undermines the consistency of multiplier estimates. Second, cross-sectional dependence arising from global financial integration, synchronized monetary policy shocks, and common commodity cycles is routinely neglected, inflating test statistics and distorting inference in multi-country panels. The present study addresses both deficiencies simultaneously through a unified econometric architecture. This paper proceeds as follows. Section 2 reviews the theoretical underpinnings of nonlinear fiscal transmission and positions our contribution within the extant empirical literature. Section 3 details the endogenous threshold cointegration procedure and the augmented PSTR specification, including the CCE-based cross-sectional dependence correction. Section 4 describes the panel dataset, variable construction, and identification strategy. Section 5 presents the baseline estimation results, threshold identification, and regime-specific multiplier decompositions. Section 6 conducts robustness analyses encompassing alternative debt thresholds, sub-sample splits by income group, and Monte Carlo validity assessments. Section 7 discusses policy implications for fiscal consolidation design under heterogeneous debt trajectories. Section 8 concludes.

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