# Sovereign Debt, Fiscal Policy Space and Macroeconomic Stability in Ghana: Does Institutional Quality Matter?

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Abstract

This paper examines the relationship among sovereign debt, fiscal space, institutional quality, and macroeconomic stability in Ghana using annual data for 2002-2024. Macroeconomic stability is summarized by a principal-component index constructed from inflation, real GDP growth, and exchange-rate depreciation, while institutional quality is summarized from the six Worldwide Governance Indicators. The empirical design combines parsimonious autoregressive distributed-lag specifications, bounds tests, interaction models, and first-difference regressions with HAC standard errors. The bounds statistics do not support a stable long-run cointegrating relationship in the small annual sample. In the dynamic level models, the coefficients on debt, fiscal space, and the institutional interaction terms are not statistically significant at conventional levels. A first-difference robustness specification, however, finds that increases in the public-debt-to-GDP ratio are associated with a deterioration in the macroeconomic stability index: the coefficient on the annual change in debt is -0.104 ($p=0.002$). Neither the debt-institution interaction nor the fiscal-space interaction is statistically robust. The results suggest that Ghana's recent debt accumulation is more clearly visible in short-run macroeconomic instability than in a stable long-run institutional moderation relationship. They also illustrate the difficulty of identifying institutional threshold effects from a short single-country time series, despite stronger effects found in cross-country studies.

Keywords: sovereign debt; fiscal space; institutional quality; macroeconomic stability; Ghana; emerging markets

JEL codes: E62; F34; H63; O43

## 1. Introduction

Sovereign borrowing is a central feature of macroeconomic management in emerging and developing economies. It allows governments to smooth expenditure, finance public investment, and respond to shocks when current revenue is insufficient. Yet the same borrowing can become a source of instability when debt service rises faster than the revenue base, refinancing conditions tighten, or foreign-currency liabilities amplify exchange-rate pressures. These tensions are especially important for small open economies, where fiscal conditions, monetary credibility, and external financing constraints interact closely.

Ghana provides an unusually informative case. Over the last two decades, the country moved from substantial debt relief to renewed market access, rapid debt accumulation, loss of international market access, domestic and external debt restructuring, and a new IMF-supported adjustment program. The IMF's 2025 debt sustainability analysis classifies Ghana as being at high risk of debt distress in the near term, while assessing debt as sustainable on a forward-looking basis conditional on the completion of restructuring and the macro-fiscal framework (International Monetary Fund [IMF], 2025). These developments make Ghana an appropriate setting in which to examine how debt accumulation and fiscal capacity relate to broader macroeconomic stability rather than to growth alone.

A second motivation concerns institutions. The macroeconomic consequences of debt need not be invariant to the quality of public institutions. Stronger government effectiveness, regulatory quality, rule of law, corruption control, political stability, and accountability can influence project selection, revenue collection, debt management, expenditure control, and policy credibility. Cross-country evidence increasingly shows that institutional quality conditions the debt-growth and debt-stability relationships. Chowdhury et al. (2024), using 133 countries, find that institutional quality changes the effect of sovereign debt on macroeconomic stability. Oppong et al. (2023) similarly document an important role for institutions in the public-debt-growth nexus in Sub-Saharan Africa, while Sandow et al. (2022) find that stronger public-sector management improves the growth effects of external debt.

The existing evidence, however, is dominated by panels. Panel estimates exploit substantial cross-country variation in institutional quality, but they can conceal country-specific fiscal histories and institutional dynamics. A Ghana-specific time-series analysis therefore provides a useful complement. It asks whether the institutional mechanism identified in broad panels is visible within one country's historical experience. This is a harder empirical test because governance indicators change slowly and the annual sample is short, but the resulting evidence can clarify what is and is not identifiable from national time-series data.

This paper makes three contributions. First, it measures macroeconomic stability as a multidimensional construct, combining inflation, output growth, and exchange-rate depreciation through principal component analysis (PCA), rather than treating real GDP growth as a sufficient summary of stability. Second, it distinguishes sovereign debt from fiscal space. Sovereign debt is measured by general-government gross debt as a percentage of GDP, while fiscal policy space is proxied by general-government net lending/borrowing as a percentage of GDP. Third, it tests institutional quality not only as a direct correlate of stability but also as a moderator of the debt-stability and fiscal-space-stability relationships.

The empirical findings are deliberately modest. The bounds tests do not establish cointegration in the 2002-2024 sample, and the interaction terms are not statistically significant in the dynamic level models. In a first-difference specification with heteroskedasticity-and-autocorrelation-consistent standard errors, however, annual increases in the debt-to-GDP ratio are strongly associated with deterioration in the macroeconomic stability index. This suggests that the most robust relationship in the Ghanaian data is a short-run debt-stability association rather than a stable long-run institutional threshold.

The remainder of the paper is organized as follows. Section 2 reviews the related literature and develops the empirical expectations. Section 3 describes the data, index construction, and econometric approach. Section 4 reports the empirical results. Section 5 discusses the findings in relation to the literature and the Ghanaian experience. Section 6 concludes and sets out the limitations of interpretation.

# 2. Related Literature and Empirical Expectations

## 2.1 Sovereign debt and macroeconomic stability

Public debt can support macroeconomic performance when borrowed resources finance productive investment, smooth temporary shocks, or prevent disruptive fiscal compression. At the same time, high or rapidly rising debt can weaken stability through debt-service burdens, refinancing risk, risk-premium increases, crowding out, expectations of future fiscal adjustment, and exchange-rate exposure. For an emerging economy with limited fiscal buffers, these channels can affect inflation and the exchange rate as well as output.

The empirical literature has increasingly moved away from a single universal debt threshold. The effect of debt varies with financing structure, macroeconomic conditions, institutional capacity, and the use of borrowed resources. Chowdhury et al. (2024) directly examine sovereign debt and macroeconomic stability

and report a negative average debt effect together with an institutional threshold. This is particularly relevant for the present study because their dependent variable is also multidimensional rather than a single growth measure.

For Sub-Saharan Africa, institutional heterogeneity is also important. Oppong et al. (2023), using 35 economies from 2010 to 2020, report that public debt is negatively related to growth and that institutional quality matters for the debt-growth nexus. Sandow et al. (2022) find that external debt has a negative average growth effect across 31 Sub-Saharan African countries but that stronger public-sector management improves the outcome. These studies motivate a Ghana-specific test of whether changes in institutional quality alter the relationship between debt and macroeconomic stability.

## 2.2 Fiscal policy space and macroeconomic stability

Fiscal policy space is the government's capacity to undertake discretionary fiscal action without jeopardizing market access, debt sustainability, or macroeconomic stability. It is multidimensional and cannot be represented perfectly by a single annual fiscal-flow variable. IMF frameworks therefore assess fiscal space using debt dynamics, financing needs, market access, and macro-fiscal risks rather than relying on one indicator alone (IMF, 2016, 2018).

Because a consistent annual model-based fiscal-space measure is not available for Ghana over the effective sample, this paper uses general-government net lending/borrowing (% of GDP) as a fiscal-policy-space proxy. A less negative balance is interpreted as greater contemporaneous fiscal room. This operational choice is made for data consistency and should not be read as equating the annual overall balance with structural or intertemporal fiscal space.

The link between fiscal space and stability can work in both directions. Greater fiscal room can allow smoother responses to shocks, while large deficits may add to financing pressures. Conversely, fiscal compression undertaken during adverse conditions can also depress activity. For that reason, the expected sign is ultimately empirical. In Ghana, the interaction between fiscal balances and debt accumulation has been especially salient during episodes of adjustment, market-access stress, and restructuring (IMF, 2025).

## 2.3 Institutional quality as a moderating mechanism

Institutions shape the translation of fiscal decisions into economic outcomes. Effective public administration may improve project appraisal, expenditure control, revenue mobilization, debt recording, and implementation. Stronger rule of law and corruption control may reduce leakages and improve the productivity of public spending. Regulatory quality and accountability can also influence credibility and private-sector responses to fiscal decisions.

The moderation hypothesis is stronger than the claim that institutions independently matter for stability. It implies that the marginal effect of debt or fiscal space changes with institutional quality. In the debt equation, this is tested by interacting a centered debt measure with the centered institutional-quality index. A positive interaction would mean that stronger institutions attenuate an adverse debt effect, while a negative interaction would imply amplification. The same logic applies to fiscal space.

The cross-country evidence provides a plausible basis for expecting moderation, but the single-country setting creates a demanding test. Ghana's governance indicators move gradually over time, and the effective sample contains only 23 annual observations. The analysis therefore treats the interaction tests as evidence on whether a within-country institutional moderation pattern is detectable, rather than assuming that the panel-based threshold must reproduce mechanically in Ghana.

## 2.4 Research Hypotheses

The empirical analysis evaluates four hypotheses. The hypotheses are stated in non-directional form because the theoretical effects of debt and fiscal balances depend on financing conditions, the use of borrowed resources, the macroeconomic cycle, and institutional capacity.

H1: Sovereign debt significantly affects macroeconomic stability in Ghana.

H2: The fiscal-policy-space proxy significantly affects macroeconomic stability in Ghana.

H3: Institutional quality significantly moderates the relationship between sovereign debt and macroeconomic stability in Ghana.

H4: Institutional quality significantly moderates the relationship between the fiscal-policy-space proxy and macroeconomic stability in Ghana.

# 3. Data and Methodology

## 3.1 Sample and data sources

The empirical sample covers 2002-2024. The starting date is determined by the need for a continuous annual series across all six governance dimensions. The World Bank's WGI framework covers the period beginning in 1996, but Ghana's public WDI/WGI observations before 2002 occur at 1996, 1998, and 2000 rather than in every year. The analysis therefore does not interpolate the missing governance years. It begins in 2002, when annual observations are available through 2024.

General-government gross debt and general-government net lending/borrowing are drawn from IMF Sub-Saharan Africa Regional Economic Outlook series distributed by the Federal Reserve Bank of St. Louis (FRED). The debt series is measured as a percentage of GDP and is continuous from 2000. The fiscal-balance series is also measured as a percentage of GDP. Inflation, real GDP growth, the official exchange rate, broad money, and trade openness are based on World Bank macroeconomic series. Institutional variables are the six World Bank Worldwide Governance Indicators on the revised 0-100 governance-score scale.

Operationally, the fiscal-policy-space variable differs from a primary-balance measure because the final empirical dataset prioritizes one continuous, consistently defined general-government series over 2002-2024. Net lending/borrowing includes interest payments and is therefore not identical to the primary balance. The paper consequently labels FPS a 'fiscal-policy-space proxy' throughout and treats this measurement choice as a limitation rather than a complete measure of the government's intertemporal fiscal capacity.

| Variable | Symbol | Measurement / construction | Role |
|---|---|---|---|
| Macroeconomic stability | MSI | PCA of -inflation, real GDP growth, and -absolute annual log FX depreciation | Dependent |
| Sovereign debt | Debt | General-government gross debt (% GDP) | Main explanatory |
| Fiscal space | FPS | General-government net lending/borrowing (% GDP); less negative = more fiscal room | Main explanatory |
| Institutional quality | IQI | PCA of six WGI governance scores (0-100) | Moderator |
| Financial development | FDEV | Broad money (% GDP) | Control |
| Trade openness | TOP | Exports + imports (% GDP) | Control |

| | | | |
|---|---|---|---|
| Debt x institutions | Debt x IQI | Product of mean-centered Debt and IQI | Interaction |
| Fiscal space x institutions | FPS x IQI | Product of mean-centered FPS and IQI | Interaction |

Table 1. Variable definitions and roles.

## 3.2 Construction of the Macroeconomic Stability Index

The MSI combines three dimensions: price stability, real economic performance, and exchange-rate stability. Inflation enters with a negative orientation; real GDP growth enters positively; and exchange-rate instability is measured as the absolute annual log change in the official domestic-currency-per-US-dollar rate and enters negatively. This transformation avoids treating a rising exchange-rate level mechanically as instability and instead captures the magnitude of annual depreciation/appreciation movements. Each component is standardized before PCA. The first principal component is retained and its sign is oriented so that a higher score indicates greater macroeconomic stability.

PCA is appropriate when several correlated variables are intended to measure a common latent construct and the objective is data-driven dimension reduction (Jolliffe & Cadima, 2016). In this sample the first MSI component explains 60.1% of the standardized variation. Its loadings are 0.625 on the inverse-inflation measure, 0.481 on real GDP growth, and 0.615 on the inverse exchange-rate-instability measure. The KMO statistic is 0.609 and Bartlett's test rejects the null of an identity correlation matrix (chi-square=10.36, p=0.016). These results support retaining a common stability component, while also indicating that the construct remains broad rather than one-dimensional.

## 3.3 Construction of the Institutional Quality Index

Institutional quality is constructed from Government Effectiveness, Control of Corruption, Political Stability and Absence of Violence/Terrorism, Rule of Law, Voice and Accountability, and Regulatory Quality. The World Bank's revised WGI methodology combines perception-based sources into six governance dimensions and introduces a 0-100 score anchored to fixed benchmarks (World Bank, 2025; Romano et al., 2025). The six indicators are standardized before PCA, and the first component is oriented so that higher values indicate stronger institutional quality.

The first institutional component explains 68.4% of common variation and has positive loadings on all six dimensions: Government Effectiveness 0.438, Control of Corruption 0.370, Political Stability 0.318, Rule of Law 0.394, Voice and Accountability 0.441, and Regulatory Quality 0.470. The KMO statistic is 0.765 and Bartlett's test strongly rejects sphericity (chi-square=94.29, p<0.001), supporting a common institutional-quality factor.

| Index | First component variance | KMO | Bartlett chi-square | p-value | First-component loadings |
|---|---|---|---|---|---|
| MSI | 60.13% | 0.609 | 10.36 | 0.016 | Inv. inflation 0.625; growth 0.481; inv. FX instability 0.615 |
| IQI | 68.37% | 0.765 | 94.29 | <0.001 | GE 0.438; CC 0.370; PV 0.318; RL 0.394; VA 0.441; RQ 0.470 |

Table 2. PCA diagnostics and first-component loadings.

## 3.4 Dynamic specifications and moderation

Given the short annual sample, the dynamic specifications are deliberately parsimonious. Each main model includes one lag of the MSI and contemporaneous explanatory variables. The debt and fiscal-space equations are estimated separately to avoid over-parameterization and to reduce collinearity between fiscal variables. Mean-centering is used before constructing interaction terms. The debt moderation model is:

$$MSI_t = a + rho\ MSI_{(t-1)} + b1\ Debt_{c,t} + b2\ IQI_{c,t} + b3(Debt_c \times IQI_c)_t + b4\ FDEV_t + b5\ TOP_t + e_t$$

The fiscal-space moderation model replaces centered debt and its interaction with centered fiscal space and FPS x IQI. The interaction coefficient tests whether the marginal association of the fiscal variable changes with institutional quality.

The study also estimates unrestricted error-correction representations for bounds testing following Pesaran, Shin, and Smith (2001). The bounds procedure is used only to test whether a long-run level relationship is supported. An error-correction interpretation is not imposed when the bounds statistic fails to exceed the relevant upper critical value.

## 3.5 Unit-root and robustness strategy

Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) procedures are used as preliminary diagnostics. With only 23 annual observations, unit-root tests have low power, so their outcomes are interpreted cautiously. The debt series is the most problematic: it does not reject a unit root in levels and its first difference rejects only weakly under the ADF test while the PP evidence is less supportive. This ambiguity is one reason the paper does not rely on a claimed long-run ARDL relationship.

The ambiguity surrounding debt is especially important for ARDL bounds inference because the framework is not valid when any included variable is integrated of order two, I(2). The available ADF and PP evidence does not establish I(2), but neither does it classify debt cleanly as I(1). Accordingly, the bounds results are treated as exploratory/supporting evidence, while the first-difference HAC specification provides the more conservative basis for the paper's principal short-run inference.

As a robustness check that avoids relying on a level cointegrating relationship, first-difference regressions are estimated with heteroskedasticity-and-autocorrelation-consistent (HAC) standard errors. For debt, the change in MSI is regressed on the annual change in debt, lagged centered IQI, their interaction, and changes in the controls. A parallel specification is estimated for fiscal space. These regressions are interpreted as short-run associations, not structural causal effects.

# 4. Empirical Results

## 4.1 Descriptive statistics

Table 3 summarizes the estimation sample. The public-debt ratio averages 50.1% of GDP but varies substantially, from 17.3% to 92.7%. Fiscal net lending/borrowing averages -6.35% of GDP, with the most negative observation occurring during the pandemic-era fiscal deterioration. The constructed MSI and IQI are centered around zero by construction. The debt-MSI correlation is -0.49, providing preliminary evidence that higher debt years tend to coincide with weaker macroeconomic stability. Fiscal space is negatively correlated with debt (-0.54), while IQI varies less strongly and is moderately negatively correlated with financial development and trade openness in this short historical window. These correlations are descriptive and do not establish direction of causality.

| Variable | Mean | Median | Std. dev. | Minimum | Maximum | Skewness |
|---|---|---|---|---|---|---|
| MSI | 0.000 | 0.563 | 1.373 | -3.088 | 2.403 | -0.800 |
| Debt (% GDP) | 50.124 | 50.111 | 21.664 | 17.291 | 92.723 | 0.344 |
| Fiscal space (% GDP) | -6.351 | -5.557 | 3.743 | -17.443 | -1.874 | -1.279 |
| IQI | 0.000 | 0.394 | 2.071 | -5.098 | 2.321 | -1.333 |
| FDEV (% GDP) | 28.397 | 29.620 | 3.386 | 21.950 | 34.110 | -0.291 |
| TOP (% GDP) | 75.483 | 70.100 | 12.954 | 60.800 | 99.700 | 0.937 |

Table 3. Descriptive statistics, 2002-2024 (N=23).

## 4.2 Unit-root diagnostics

The ADF results indicate that most series become stationary after first differencing, while the integration status of debt is less decisive in the small sample. The PP p-values lead to the same general caution. IQI is sensitive to deterministic specification: the ADF level test rejects under one intercept-only lag selection, whereas the PP procedure does not. Because these diagnostics do not provide a clean basis for strong long-run claims, the paper reports the bounds test directly and complements the level models with first-difference HAC estimates.

| Variable | ADF level p | ADF first-diff. p | PP level p | PP first-diff. p | Reading |
|---|---|---|---|---|---|
| MSI | 0.062 | 0.004 | 0.186 | 0.010 | Mostly I(1) |
| Debt | 0.380 | 0.086 | 0.674 | 0.294 | Inconclusive / persistent |
| Fiscal space | 0.469 | <0.001 | 0.068 | 0.010 | I(1) |
| IQI | 0.003 | 0.006 | 0.839 | 0.023 | Specification-sensitive |
| FDEV | 0.054 | <0.001 | 0.470 | 0.019 | Mostly I(1) |
| TOP | 0.054 | <0.001 | 0.268 | 0.018 | Mostly I(1) |

Table 4. Unit-root diagnostics. P-values are reported; small-sample power is limited.

## 4.3 Bounds tests and dynamic level estimates

The bounds test does not support cointegration. For the debt model the F-statistic is 2.156; for the fiscal-space model it is 2.533. Both are below the simulated 10% lower critical bound of 2.913 (upper bound 4.241) for the corresponding specification. The null of no long-run level relationship therefore cannot be rejected. Consistent with this result, the paper does not report an ECM speed-of-adjustment coefficient as though a long-run equilibrium had been established.

| Model | Bounds F-statistic | 10% lower | 10% upper | 95% lower | 95% upper | Decision |
|---|---|---|---|---|---|---|
| Debt model | 2.156 | 2.913 | 4.241 | 3.659 | 5.263 | No cointegration |
| Fiscal-space model | 2.533 | 2.913 | 4.241 | 3.659 | 5.263 | No cointegration |

Table 5. Finite-sample simulated bounds tests (20,000 simulations).

Table 6 reports the parsimonious ARDL(1,0,...) estimates. The debt coefficient is negative in the baseline model (-0.016) and becomes somewhat more negative after including the interaction (-0.030), but neither

estimate is statistically significant. IQI has a positive coefficient in both debt specifications, while the Debt x IQI interaction is positive (0.022, p=0.153). Thus, the point estimate is consistent with the idea that stronger institutions may attenuate an adverse debt association, but the sample does not estimate that effect precisely enough to distinguish it from zero.

The fiscal-space coefficients are close to zero and statistically insignificant in both specifications. The FPS x IQI interaction is also insignificant. The dynamic level results therefore do not support a statistically identifiable institutional moderation effect for either fiscal variable.

| Variable | Debt baseline coef. (p) | Debt moderation coef. (p) | FPS baseline coef. (p) | FPS moderation coef. (p) |
|---|---|---|---|---|
| MSI(t-1) | 0.222 (0.337) | 0.338 (0.162) | 0.216 (0.439) | 0.234 (0.424) |
| Debt / Debt_c | -0.016 (0.390) | -0.030 (0.156) | -- | -- |
| FPS / FPS_c | -- | -- | -0.008 (0.950) | 0.011 (0.938) |
| IQI / IQI_c | 0.248 (0.269) | 0.332 (0.145) | 0.336 (0.109) | 0.400 (0.170) |
| Debt x IQI | -- | 0.022 (0.153) | -- | -- |
| FPS x IQI | -- | -- | -- | -0.030 (0.738) |
| FDEV | -0.002 (0.989) | 0.102 (0.493) | -0.071 (0.643) | -0.045 (0.793) |
| TOP | 0.028 (0.523) | -0.009 (0.849) | 0.055 (0.247) | 0.043 (0.494) |
| N | 22 | 22 | 22 | 22 |

Table 6. Parsimonious dynamic level estimates. Two-sided p-values in parentheses.

## 4.4 First-difference HAC robustness estimates

The first-difference model provides the clearest statistical result. The coefficient on the annual change in debt is -0.1035 with a HAC standard error of 0.0329 (p=0.0016). Holding the other differenced controls and lagged institutional level constant, a one-percentage-point increase in the debt-to-GDP ratio is associated with approximately a 0.104-unit decline in the annual change in the MSI. Because the MSI is a PCA score, this magnitude should be read in index units rather than as a percentage effect.

This estimate is not interpreted causally. In particular, exchange-rate depreciation can simultaneously raise the domestic-currency value of foreign-currency debt and reduce the MSI through its exchange-rate-instability component. Weak output can also raise the debt-to-GDP ratio mechanically. The coefficient therefore captures conditional short-run co-movement, not a one-way structural effect of borrowing on stability.

The Debt-change x IQI interaction is positive, as in the level moderation model, but is imprecisely estimated (p=0.503). The fiscal-space change and its institutional interaction are also insignificant. The short-run evidence therefore supports a negative debt-stability association but not an institutional moderation claim.

| Variable | Debt-change model coef. | HAC p-value | Fiscal-space-change model coef. | HAC p-value |
|---|---|---|---|---|
| Constant | -0.279 | 0.555 | -0.020 | 0.952 |
| Delta Debt | -0.104 | 0.002 | -- | -- |
| Delta Fiscal space | -- | -- | 0.018 | 0.806 |
| Lagged centered IQI | 0.291 | 0.188 | -0.023 | 0.843 |
| Delta Debt x lagged IQI | 0.026 | 0.503 | -- | -- |
| Delta FPS x lagged IQI | -- | -- | 0.075 | 0.425 |
| Delta FDEV | 0.197 | 0.068 | 0.088 | 0.551 |
| Delta TOP | -0.040 | 0.259 | -0.032 | 0.470 |
| R-squared | 0.186 | -- | 0.043 | -- |

| | | | | |
|---|---|---|---|---|
| N | 22 | -- | 22 | -- |

Table 7. First-difference robustness regressions with Newey-West/HAC standard errors (lag 1).

## 4.5 Hypothesis assessment

H1 receives limited support: sovereign debt is not significant in the dynamic level models, but the first-difference HAC model shows a statistically significant negative short-run association between changes in debt and changes in MSI (coefficient -0.104; p=0.002). H2 is not supported because the fiscal-policy-space proxy is insignificant in both level and first-difference specifications. H3 and H4 are not supported in this sample because neither institutional interaction term is statistically significant. 'Not supported' is used deliberately: with only 23 annual observations and slowly moving governance indicators, failure to reject the null is not evidence that moderation is absent in Ghana.

## 4.6 Diagnostics and parameter stability

Residual diagnostics do not reveal obvious specification failures in the four parsimonious dynamic level models. Breusch-Godfrey tests do not reject the null of no first-order serial correlation; Breusch-Pagan tests do not reject homoskedasticity; Jarque-Bera tests do not reject residual normality; and Ramsey RESET tests do not indicate a clear functional-form problem. Residual CUSUM statistics also remain consistent with parameter stability. These tests should still be interpreted cautiously because the sample is small.

| Model | BG p | BP p | JB p | RESET p | CUSUM p | Durbin-Watson |
|---|---|---|---|---|---|---|
| Debt baseline | 0.783 | 0.252 | 0.630 | 0.225 | 0.905 | 2.047 |
| FPS baseline | 0.428 | 0.248 | 0.544 | 0.333 | 0.839 | 2.158 |
| Debt moderation | 0.156 | 0.319 | 0.971 | 0.208 | 0.992 | 2.325 |
| FPS moderation | 0.290 | 0.119 | 0.638 | 0.373 | 0.885 | 2.153 |

Table 8. Diagnostic tests for parsimonious dynamic level models.

# 5. Discussion

The results yield a different message from a simple application of the cross-country institutional-threshold literature. In the Ghanaian time series, the most robust relationship is between annual increases in the debt ratio and short-run deterioration in the composite macroeconomic stability index. The interaction between debt and institutional quality has the theoretically expected positive sign in both the level and first-difference specifications, but it is not statistically precise. This distinction matters: the data are compatible with an attenuation mechanism, but they do not provide sufficient evidence to claim that institutional quality significantly moderates the debt-stability relationship within Ghana over 2002-2024.

The result also sits within a mixed Ghana-specific literature. Recent work on Ghana's domestic debt reports that debt can be growth-enhancing under some specifications, while other recent studies find adverse long-run or frequency-specific relationships between public debt and macroeconomic performance. Sedegah et al. (2024) further show that institutions and expenditure patterns matter for Ghana's debt-growth dynamics. The present study differs by focusing on a composite stability outcome and by testing institutional moderation directly. The mixed evidence reinforces the case for interpreting debt effects as state-, horizon-, and measurement-dependent rather than as a universal coefficient.

One explanation is statistical. Cross-country studies such as Chowdhury et al. (2024) exploit both time variation and large cross-sectional differences in governance. Ghana's institutional scores change gradually,

and the annual sample contains only 23 observations. A moderation coefficient must therefore be identified from limited within-country variation. The absence of statistical significance in this setting does not mechanically contradict cross-country evidence; instead, it shows that the national time series alone provides much less leverage for estimating a governance threshold.

The negative first-difference debt coefficient is economically plausible in the Ghanaian context. The debt ratio rose strongly in the years preceding the 2022 crisis and remained elevated through the restructuring period. Those years also included large inflation and exchange-rate movements, which directly lower the MSI. The result should not be interpreted as a structural causal estimate because debt itself responds to exchange-rate valuation, GDP movements, fiscal deficits, and crisis conditions. Indeed, depreciation can increase the domestic-currency value of external debt at the same time that it lowers the stability index. The coefficient therefore summarizes a strong short-run co-movement that is consistent with mutually reinforcing fiscal and macroeconomic stress.

The fiscal-space results are weaker. Neither the level nor differenced net-lending/borrowing coefficient is statistically significant. This may reflect the fact that the overall fiscal balance is an imperfect proxy for structural fiscal space. A contemporaneous deficit can represent either loss of room or deliberate use of existing room. It can also be influenced by cyclical conditions and one-off expenditures. The result therefore supports caution in equating an annual fiscal balance with a complete measure of the government's intertemporal capacity to respond to shocks.

The absence of bounds-test evidence for cointegration is also informative. It implies that this sample does not support a stable long-run equilibrium relationship linking MSI to the selected fiscal and institutional variables under the estimated specification. Ghana's period includes structural changes in debt relief, commodity production, financial-market access, rebasing, the pandemic, sovereign distress, and restructuring. In such an environment, the assumption of a single invariant long-run relationship is demanding. The paper therefore emphasizes short-run associations and treats the dynamic level coefficients as descriptive rather than presenting an error-correction mechanism that the bounds test does not validate.

Relative to Sandow et al. (2022), Oppong et al. (2023), and Chowdhury et al. (2024), the paper's main contribution is thus partly a boundary result. Institutional quality appears important conceptually and its point estimates generally have the expected direction, but the Ghana-only annual series does not identify a statistically robust interaction. The short-run debt association is much clearer. This difference between panel and country-specific evidence is itself relevant for how empirical findings on institutional thresholds are interpreted.

# 6. Conclusion

This paper examined sovereign debt, fiscal space, institutional quality, and macroeconomic stability in Ghana over 2002-2024. It constructed a multidimensional macroeconomic stability index from inflation, real GDP growth, and exchange-rate instability and an institutional-quality index from the six Worldwide Governance Indicators. The analysis then estimated parsimonious dynamic level models, institutional interaction specifications, bounds tests, and first-difference HAC robustness regressions.

Three results stand out. First, the bounds tests do not establish cointegration, so the data do not support an error-correction interpretation or a stable estimated long-run relationship under the proposed specification. Second, the institutional interaction terms are not statistically significant in either the debt or fiscal-space models. The point estimate on Debt x IQI is positive, but the uncertainty around it is too large to conclude that institutional quality moderates the debt-stability relationship in this single-country sample. Third, changes in the debt-to-GDP ratio have a statistically strong negative association with changes in macroeconomic stability in the first-difference robustness model. This is the paper's most robust empirical finding.

The findings should be interpreted within clear limits. The sample is short, institutional indicators vary slowly, the fiscal-balance proxy does not capture every dimension of fiscal space, and the debt-stability relationship is potentially endogenous. The unit-root evidence for debt is also inconclusive, reinforcing the decision not to make strong long-run claims. Future work could extend the analysis with higher-frequency fiscal and institutional proxies, explicit structural-break models, external instruments or narrative identification, and comparative country designs that retain institutional variation while preserving country-specific fiscal histories.

A further robustness priority is to re-estimate the short-run debt relationship separately for inflation, real GDP growth, and exchange-rate instability. That component-level exercise would show whether the composite MSI result is broad-based or driven mainly by the exchange-rate channel. It is not reported here because the paper does not claim statistical results that were not estimated from the verified dataset.

Within those limits, the Ghanaian evidence indicates that short-run debt accumulation and macroeconomic instability move together strongly, while a stable institutional moderation effect is not identifiable from the available annual time series. This qualifies rather than overturns the cross-country literature: institutional thresholds may be visible in broad panels without being precisely recoverable from one country's relatively short governance history.

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# Appendix A. Data and Reproducibility Notes

1. Effective estimation period: 2002-2024. No governance observations are interpolated for the pre-2002 gaps.

2. Debt: IMF general-government gross debt (% GDP), FRED series GHAGGXWDGG01GDPPT. Observed values are used through 2024.

3. Fiscal-space proxy: IMF general-government net lending/borrowing (% GDP), FRED series GHAGGXCNLG01GDPPT. The term 'fiscal space' in this paper refers to this empirical proxy and not to a model-based debt limit.

4. WGI: revised World Bank governance scores (0-100) for Government Effectiveness, Control of Corruption, Political Stability, Rule of Law, Voice and Accountability, and Regulatory Quality. PCA is applied after standardization.

5. MSI: inflation and exchange-rate-instability components are sign-reversed before standardization so that higher component values represent greater stability. Exchange-rate instability equals the absolute annual log change in the official exchange rate multiplied by 100.

6. Bounds critical values reported in Table 5 are finite-sample simulated values (20,000 simulations) for the estimated specification. Because the bounds tests do not support cointegration, no ECM coefficient is interpreted as a long-run adjustment speed.

7. Statistical inference in the first-difference robustness models uses HAC/Newey-West standard errors with one lag. Results are associative and should not be interpreted as causal effects.