

Role of Institutional Quality in Mediating Debt and Macroeconomic Stability: A Study of Developing Countries

Ezza Alan Rahman¹, Risna Triandhari^{2*}, Raden Parianom³

^{1,2}Faculty of Economics and Business, Universitas Indonesia, Indonesia

²Centre of Islamic Economics and Business, Universitas Indonesia, Indonesia

³Faculty of Economics and Business, Universitas Pembangunan Nasional Veteran Jakarta, Indonesia

Email: ¹ezza_alan@ui.ac.id; ²risnatrindhari@ui.ac.id; ³radenparianom@upnvj.ac.id

^{*}Corresponding Author

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Abstract

Research Originality: This study identifies a specific institutional quality threshold at which the effect of government debt on macroeconomic stability in developing countries shifts from negative to positive.

Research Objectives: It examines this threshold effect across 47 developing countries from 2002 to 2023.

Research Method: The analysis uses panel fixed-effects and dynamic panel threshold regression models, with macroeconomic stability as the dependent variable, government debt as the key independent variable, and institutional quality as both an independent and threshold variable.

Empirical Results: Government debt negatively affects macroeconomic stability; however, once institutional quality exceeds the threshold of 40.74, the relationship reverses, and government debt contributes positively. This threshold exceeds those reported in prior studies, reflecting the inclusion of the 2008–2009 and 2020–2021 crisis periods as control variables.

Implications: Developing countries should treat institutional strengthening as a fiscal prerequisite. Once institutional quality crosses the threshold, governments can use debt as a productive instrument of stabilization rather than a source of vulnerability.

Keywords:

institutional quality, macroeconomic stability, dynamic panel threshold regression, fiscal sustainability

How to Cite:

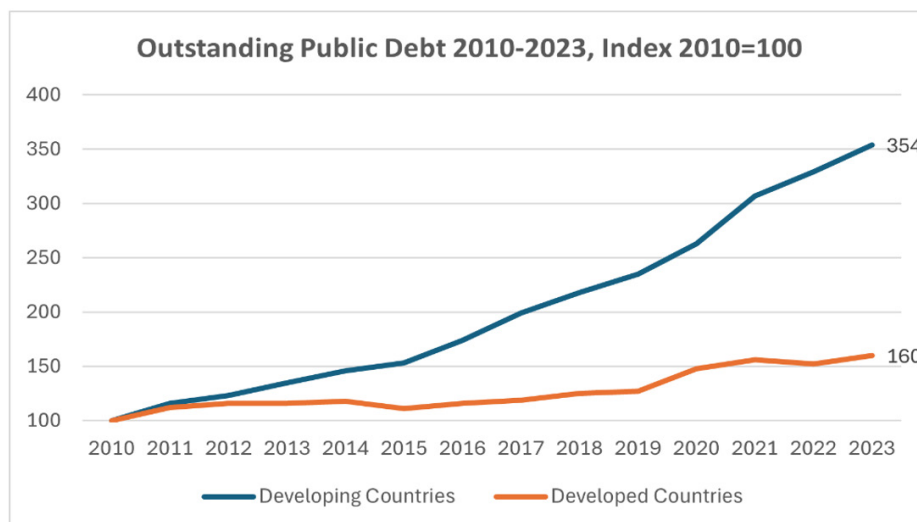
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INTRODUCTION

Macroeconomic stability is a prerequisite for sustainable economic growth. Without such stability, economic activity is very vulnerable to external shocks and systemic crises that could threaten long-term development trajectories (Ehigiamusoe & Samsurijan, 2021). Government debt is one of the most important fiscal policy instruments. It provides an alternative source of financing for countries facing budget deficits (Sumba et al., 2024). It can increase domestic investment, stimulate capital formation, and finance infrastructure development (Gómez-Puig & Sosvilla-Rivero, 2018).

The relationship between government debt and macroeconomic stability has grown increasingly complex. Global public debt has nearly doubled over the past decade, from \$51 trillion in 2010 to \$97 trillion in 2023 (UNCTAD, 2024). The rise in public debt has been particularly dramatic in developing countries, where public debt increased approximately 3.5 times over the same period, more than double the growth rate of developed countries. Figure 1 shows that this difference reflects a structural dependence on borrowing to finance development expenditure, price changes, and recurrent budget deficits. The financial burden is severe: in 2023, at least 54 developing countries allocated at least 10% of government revenue to interest payments, far exceeding their investment in climate action at only 2.1% of GDP (UNCTAD, 2024).

Figure 1. Developing and developed countries' outstanding public debt (in index 2010 = 100)



In this sense, debt is a double-edged sword. In the short run, it can boost aggregate demand and the production of goods and services. However, excessive debt accumulation may undermine investor confidence and trigger capital outflows, thereby threatening macroeconomic stability. Government debt is an important source of financing for investment, infrastructure development, and job creation, particularly when domestic revenues are insufficient to meet development needs (Gómez-Puig & Sosvilla-Rivero, 2018; Sumba et al., 2024). Simultaneously, sustained economic growth depends on

macroeconomic stability, and effective public debt management plays a crucial role in achieving this objective, as well-managed debt can promote domestic investment, capital formation, infrastructure development, economic activity, social protection, and long-term economic growth (Oyadeyi et al., 2023). However, excessive debt can erode investor confidence, crowd out private investment, and ultimately hinder long-term economic growth (Keyser & Paczos, 2023). Moreover, excessive indebtedness leads to several broader macroeconomic consequences. It hampers fiscal space (Mondal & Maitra, 2020), distorts capital formation (Tourinho & Sangoi, 2017), raises inflationary pressures (Aimola & Odhiambo, 2021), reduces the effectiveness of monetary policy transmission (Caramp & Feilich, 2024), and amplifies macroeconomic volatility (Chowdhury et al., 2024).

Nevertheless, empirical evidence on the impact of government debt remains inconclusive. While some studies emphasize its role in supporting economic growth and macroeconomic resilience (Bal & Rath, 2017), others highlight its adverse effects on fiscal sustainability and economic stability (Keyser & Paczos, 2023). These contrasting findings suggest that the relationship between government debt and macroeconomic stability is more complex than previously assumed. Variations in institutional quality, fiscal capacity, and governance effectiveness may help explain why the economic consequences of government debt differ across countries.

The quality of public institutions appears to be an important determinant of how debt affects macroeconomic outcomes. Collectively, political stability, government effectiveness, regulatory quality, the rule of law, control of corruption, and public accountability determine governments' capacity to manage public resources responsibly. Strong institutions allow the effective use of borrowed capital for productive investment while ensuring transparent and accountable fiscal risk management (Wang et al., 2022). Conversely, weak institutional structures create environments that promote rent-seeking, public fund embezzlement, and inefficient resource allocation (Owusu-Nantwi & Owusu-Nantwi, 2021). Sani et al. (2019) found that institutional quality is critical in improving the effectiveness of debt management in sub-Saharan Africa. In contrast, Nguyen and Luong (2021) showed that stronger institutions make fiscal policy more effective in transition economies. A substantial governance gap persists between developing and industrialized countries: developing countries record an average institutional quality score of 36.84, compared to 76.13 for industrialized countries (Worldwide Governance Indicators, 2024), a disparity that has significant implications for debt management and economic stability.

Scholarly attention to this nexus has grown considerably in recent years, yet significant gaps remain. Chowdhury et al. (2024) studied the effects of sovereign debt on economic stability using data from 133 countries. They found that institutional quality can transform a negative debt-stability relationship into a positive one. However, the broad sample masks country-specific dynamics, particularly those of developing economies. Sumba et al. (2024) confirmed the adverse effect of public debt on macroeconomic stability but limited their assessment to inflation and economic growth, overlooking the multidimensional nature of macroeconomic conditions. Wang et al. (2021) further showed

that institutional quality moderates the debt-growth relationship; however, they did not examine whether a critical governance threshold exists at which this moderating effect becomes meaningful. A common shortcoming across these studies is treating institutional quality as a linear moderator rather than as a variable with a critical turning point beyond which its effect on the debt-stability relationship changes substantially.

This study fills the gap and contributes to the literature in several important ways. Unlike previous studies that primarily treat institutional quality as a linear moderator, this study uses a dynamic panel threshold regression model to identify a specific institutional quality threshold at which the impact of government debt on macroeconomic stability shifts from negative to positive. Second, the analysis exclusively focuses on developing countries, whose fiscal and institutional characteristics differ substantially from those of advanced economies and are often obscured in global samples. Third, this study measures macroeconomic stability by constructing a composite index based on inflation, exchange rates, interest rates, budget deficits, and unemployment, providing a broader assessment of macroeconomic conditions. Finally, the estimated threshold value offers a practical governance benchmark for policymakers seeking to ensure that government borrowing contributes to economic stability rather than amplifying macroeconomic vulnerabilities.

METHODS

This study uses a balanced panel dataset covering 47 developing countries from 2002 to 2023. The sample reflects the distribution of average central government debt-to-GDP ratios across developing countries. To ensure consistency and completeness across all variables and countries included in the sample, the analysis is limited to 2023. Extending the dataset to more recent years would substantially reduce country coverage and compromise the balanced panel structure of the dynamic panel threshold estimation. This study employs a dynamic panel threshold regression model to assess the threshold effect of institutional quality on the relationship between government debt and macroeconomic stability, identifying nonlinear effects by determining whether the impact of government debt varies across different levels of institutional quality in developing countries. This study employs dynamic panel methods to account for the persistence of macroeconomic stability over time. Macroeconomic stability, as the dependent variable, is expected to be correlated with its lagged values, reflecting a dynamic adjustment process rather than a purely static relationship (Sumba et al., 2024).

This methodological framework is essential for analyzing potential nonlinearities in institutional quality that could ensure government debt benefits macroeconomic stability. Government debt may exert contrasting effects on macroeconomic stability, either stimulating economic growth or heightening vulnerability to economic crises. Institutional quality plays a critical role in ensuring that government debt is allocated efficiently and directed toward productive economic purposes. The primary aim is to identify the specific institutional quality threshold at which government debt begins to exert a positive effect on macroeconomic stability.

This study employs two models: a fixed-effect panel regression model and a dynamic threshold regression model. The first model serves as the baseline model and investigates the relationship between institutional quality, government debt, and macroeconomic stability. The fixed-effect estimator controls for unobservable heterogeneity at both the country and time levels. The second model identifies the threshold effect of institutional quality on the relationship between government debt and macroeconomic stability.

The first empirical model is specified as follows:

$$\text{Macroeconomic Stability}_{it} = \beta_0 + \beta_1 \text{Government Debt}_{it} + \beta_2 \text{IQ}_{it} + \beta_3 X_{it} + \varepsilon_{it}$$

The second empirical model for the threshold analysis is specified as follows:

$$\text{Macroeconomic Stability}_{it} = \alpha_i + \delta x'_{it} + k (\text{IQ}_{it} - \gamma) + 1\{\text{IQ}_{it} > \gamma\} + \varepsilon_{it}$$

Macroeconomic stability acts as the dependent variable in both models. Government debt and institutional quality (IQ) serve as the independent variables. In the first model, X denotes control variables, and in the second model, x represents explanatory variables, including the lagged dependent, independent, and control variables. Here, k is the coefficient of the threshold effect, and γ denotes the threshold value.

Table 1. List of variables

Variables	Description	Source
MacroStability	Macroeconomic stability is measured using principal component analysis (PCA) of five indicators: inflation, exchange rate, interest rate, budget deficit, and unemployment rate. Values range between 0 and 100, with higher values representing higher macroeconomic stability and vice versa.	World Bank
GovDebt	Percentage (%) of central government debt to GDP	International Monetary Fund (IMF)
IQ or Institutional Quality	Institutional quality is calculated by averaging 6 Worldwide Governance Indicators (WGI), political stability, control of corruption, regulatory quality, rule of law, government effectiveness, and voice and accountability. Values range from 0 to 100, with higher values representing higher institutional quality.	World Bank
DomCredit	Domestic credit to the private sector (% of GDP)	World Bank
TaxRev	Tax revenue (percentage of GDP)	World Bank
GCF	Gross capital formation (% of GDP)	World Bank
Trade	Trade (% of GDP)	World Bank
GDPGrowth	Annual GDP growth (%)	World Bank
Crisis08_09	Dummy variable for the global financial crisis. Value 1 for years affected by the 2008–2009 crisis, 0 otherwise.	International Monetary Fund
Covid20_21	Dummy variable for COVID-19 pandemic shock. Value 1 for the years 2020–2021, 0 otherwise.	World Bank

Source: World Bank (2025) and International Monetary Fund (2025)

The dependent variable, macroeconomic stability, is constructed as a composite index of inflation, exchange rate, budget deficit, interest rate, and unemployment rate (Chowdhury et al., 2024). To build this index, we conducted Principal Component Analysis (PCA) to reduce dimensionality and extract the most representative component. We retained the first principal component as the composite index, as it captures the largest proportion of the variables' total variance. We performed PCA by standardizing the variables, calculating the covariance matrix, eigenvalues, and eigenvectors, and transforming the data. After PCA, we normalized the variables to scale the index from 0 to 100, so a higher value indicates greater macroeconomic stability. The key independent variables are central government debt, represented by the central government debt-to-GDP ratio, and institutional quality (IQ), created by a ranking average of six Worldwide Governance Indicators (WGI), including government effectiveness, political stability, rule of law, regulatory quality, control of corruption, and voice and accountability.

The control variables in this study allow us to account for several economic factors that may influence the relationship between government debt, institutional quality, and macroeconomic stability. Domestic credit is an important control variable because excessive credit growth could trigger financial instability and significant economic downturns (Khan, 2022). Tax revenue is also a crucial control variable because many countries rely heavily on it, and increasing the share of direct taxes can positively affect macroeconomic stability (Lyulyov et al., 2021). The trade variable is included as a control variable because it reflects countries' economic interconnection. A country's economic condition is significantly influenced by the economic performance of its trading partners through international trade. Gross Capital Formation (GCF) and economic growth are also included as control variables to capture the overall pace of economic development and to separate their influence from government debt and institutional quality. Lastly, the 2008–2009 global financial crisis and the COVID-19 pandemic in 2020–2021 are added as control variables. Table 1 presents the complete list of dependent, independent, and control variables, along with their descriptions and data sources.

RESULTS AND DISCUSSION

This section presents the study's empirical findings. The results indicate that government debt generally negatively affects developing countries' macroeconomic stability. However, institutional quality plays a significant moderating role: the relationship between government debt and macroeconomic stability becomes positive once institutional quality reaches a specific threshold. These findings suggest that the effectiveness of government debt depends not only on its magnitude but also on the quality of institutions responsible for managing and allocating borrowed resources. Table 2 presents the descriptive statistics of all variables across 1,034 observations.

Macroeconomic stability has a mean of 85.68 and a standard deviation of 7.57, indicating stable macroeconomic conditions across the sample countries during the observation period. Government debt averages 49.39% of GDP, suggesting a considerable

reliance on public borrowing among developing countries. The mean score for institutional quality was 38.79, reflecting the governance challenges that continue to characterize many developing economies. Furthermore, the negative minimum value of GDP growth indicates that several countries experienced periods of economic contraction, highlighting the sample's diverse macroeconomic conditions. Overall, the descriptive statistics suggest substantial variation in both fiscal and institutional conditions, providing a suitable basis for examining how institutional quality shapes the relationship between government debt and macroeconomic stability.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
MacroStability	1034	85.68	7.57	0	100
GovDebt	1034	49.39	33.05	3.22	357.68
IQ	1034	38.79	15.18	7.38	75.55
DomCredit	1034	40.21	27.87	4.17	164.07
TaxRev	1034	15.59	5.53	4.99	39.98
GCF	1034	25.68	8.88	1.22	69.44
Trade	1034	78.80	33.94	22.67	210.37
GDPGrowth	1034	3.98	4.79	-32.9	37.50
Crisis08_09	1034	0.09	0.28	0	1
Covid20_21	1034	0.09	0.28	0	1

Source: Author's calculation results from Stata (2025)

Table 3. Government Debt and Macroeconomic Stability Trends in Institutional Quality Rankings

Institutional quality ranking	Average Government Debt to GDP	Average Macroeconomic Stability
IQ < 25	53.27	81.97
25 < IQ < 35	46.16	86.99
35 < IQ < 45	41.71	86.87
IQ > 45	55.24	86.17

Source: Author's Calculation Results from Stata (2025)

Table 3 reveals a distinct pattern across different institutional quality rankings. In general, government debt tends to decline as institutional quality improves, suggesting that better governance is associated with more prudent fiscal management and greater public finance accountability. Interestingly, when institutional quality exceeds rank 45, the average debt ratio begins to rise again while macroeconomic conditions remain stable. This pattern suggests that countries with stronger institutions can manage public borrowing more effectively, allowing them to sustain higher debt levels without generating macroeconomic instability. Strong governance may improve debt allocation efficiency,

strengthen fiscal oversight, and enhance policy credibility, thereby reducing the risks commonly associated with debt accumulation. These preliminary findings provide initial support for the hypothesis that institutional quality influences how government debt affects macroeconomic stability and may play a critical role in shaping the debt–stability relationship.

Figure 2. Heteroscedasticity and Autocorrelation

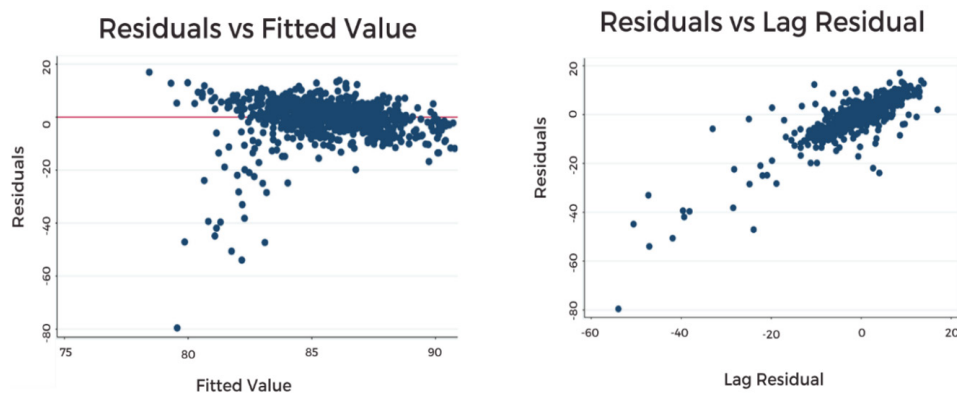


Table 4. Panel Fixed-Effect Regression Estimation

Variable	Coefficient	Standard Error	P> t
GovDebt	-0.044**	0.020	0.040
IQ	0.083**	0.036	0.033
DomCredit	-0.034	0.028	0.236
TaxRev	0.490***	0.157	0.005
GCF	0.076*	0.037	0.056
Trade	-0.119***	0.032	0.001
GDPGrowth	0.050	0.057	0.391
Crisis08_09	-0.826	0.789	0.307
Covid20_21	-0.673	0.484	0.179
Cons	85.72***	2.43	0.000
Observations	1034	Prob > F	0.015
R2	0.1338	Total Countries	47

Source: Author's Calculation Results from Stata (2025)

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Diagnostic tests were conducted to check multicollinearity, autocorrelation, and heteroscedasticity before the regression analysis. The average Variance Inflation Factor (VIF) is 1.37, well below the threshold of 10, indicating no multicollinearity problem. However, the Wooldridge test shows significant autocorrelation, while the Breusch-Pagan/Cook-Weisberg test indicates significant heteroscedasticity. Figure 2 also shows uneven residual patterns and non-random lagged residuals. Therefore, this study uses Driscoll-

Kraay standard errors, which are robust to autocorrelation and heteroscedasticity (Koluman & Kaplan, 2025).

Table 5. Dynamic Panel Threshold Regression Estimation

Variable	IQ < 40.74	IQ > 40.74
	Before	After
L.MacroStability	0.351*** (0.111)	-0.808** (0.387)
GovDebt	-0.106*** (0.024)	0.243** (0.099)
DomCredit	-0.114 (0.105)	-0.256 (0.229)
TaxRev	0.879** (0.391)	-0.317 (0.719)
GCF	0.143 (0.250)	-0.296 (0.213)
Trade	-0.109 (0.072)	-0.261*** (0.068)
GDPGrowth	-0.076 (0.100)	0.332 (0.121)
Crisis08_09	0.163 (0.518)	-0.070 (1.32)
Covid20_21	-2.13 (0.597)	-0.781 (1.17)
IQ	-0.697** (0.393)	0.332 (0.438)
Constant		92.66 (23.51)
Y	40.74*** LT P-Value 0.00	
Total Countries	47 Total Years 22	

Source: Author's Calculation Results from Stata (2025)

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively. Standard errors are reported in parentheses.

Table 4 reports the panel fixed-effects regression results, with an R-squared of 0.1338. Government debt has a significant negative effect on macroeconomic stability, suggesting that high debt can increase fiscal vulnerability and weaken economic management under weak governance. This finding is consistent with Shah et al. (2024) and Sumba et al. (2024). However, this study further suggests that weak institutions may worsen the effects of debt by reducing the efficiency of debt use and fiscal management. In contrast, institutional quality has a significant positive effect on macroeconomic stability, consistent with Li et al. (2019) and Dorofeev (2022), who found that stronger institutions improve resource allocation and government policy.

Table 5 shows a nonlinear relationship between government debt and macroeconomic stability, with institutional quality as the threshold variable. The linearity test rejects a

linear relationship. The threshold value of 40.74 is statistically significant. Below this level, government debt negatively affects macroeconomic stability, reflecting weak governance, inefficient spending, and limited policy credibility. Above 40.74, the effect becomes positive, suggesting that stronger institutions improve the productive use of debt and strengthen fiscal risk management.

Chowdhury et al. (2024) also found a threshold effect of institutional quality, but the threshold in this study (40.74) is higher than their estimate of 28.73. This difference may result from differences in model specification, including controls for the 2008–2009 Global Financial Crisis and the 2020–2021 COVID-19 pandemic. The findings suggest that government debt may require stronger institutions to maintain macroeconomic stability during periods of uncertainty. Institutional quality also has a dual role. Below the threshold, it negatively affects macroeconomic stability, but above the threshold, its effect becomes positive. This supports Yildiz et al.'s (2025) view that weak institutions increase uncertainty through inconsistent policy implementation. However, this study shows that institutional quality not only directly affects stability but also changes the impact of government debt on stability, highlighting its broader role in shaping macroeconomic outcomes.

CONCLUSION

Using fixed-effects and dynamic panel threshold regression models, the results indicate that government debt is negatively associated with macroeconomic stability, while institutional quality has a positive direct effect. The threshold estimation reveals a significant non-linear relationship, whereby government debt continues to undermine macroeconomic stability when institutional quality remains below 40.74. However, it contributes positively to stability once this threshold is exceeded. These findings suggest that institutional capacity is a prerequisite for transforming government debt from a source of fiscal vulnerability into a productive instrument for supporting macroeconomic stability. Furthermore, the estimated threshold exceeds that reported by Chowdhury et al. (2024), potentially reflecting differences in sample composition and the inclusion of the 2008–2009 Global Financial Crisis and the 2020–2021 COVID-19 pandemic as control variables.

The findings have several important policy implications. Rather than focusing solely on debt reduction, governments should prioritize strengthening institutional capacity by improving transparency, public financial management, governance effectiveness, and anti-corruption measures. The threshold value of 40.74 also provides a practical benchmark for policymakers seeking to ensure that public borrowing positively contributes to macroeconomic stability. Given that the sampled developing countries' average institutional quality remains below this threshold, governance reform should be considered a strategic fiscal priority. At the same time, countries operating below the threshold should exercise greater caution in expanding government debt and consider complementary financing mechanisms, including tax reform-based domestic revenue mobilization. This study has

several limitations. The analysis is constrained by data availability and is limited to the period 2002–2023. In addition, despite potentially substantial regional differences in institutional dynamics, the study treats developing countries as a single group. Future research could extend the analysis to more recent periods, investigate region-specific threshold effects, and incorporate additional variables, such as FDI and financial development, to further explore IQ's fiscal–macroeconomic role.

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