Short-Run Adjustments and Long-Run Drivers of Public Debt in Malaysia: Evidence from an ARDL Approach

Nur Qashrina Najwa Fazali[1], Abd Hadi Mustaffa[2]

[1]Faculty of Business Management and Professional Studies, Management and Science University, Selangor, Malaysia

[2]Faculty of Business and Management, Universiti Teknologi MARA, Melaka, Malaysia

DOI: https://doi.org/10.47772/IJRISS.2026.1015EC0067

Received: 23 May 2026; Accepted: 28 June 2026; Published: 29 June 2026

ABSTRACT

Malaysia's persistent rise in public debt raises a deeper empirical question than whether debt has become large: which macroeconomic conditions explain its short-run movement and long-run sustainability? This study examines the economic determinants of public debt in Malaysia by analyzing annual data from 1974 to 2023 using the Autoregressive Distributed Lag (ARDL) approach. Public debt is modelled against domestic savings, globalization, government expenditure, inflation, interest rates, and trade to distinguish temporary fiscal adjustment effects from structural debt determinants. The findings indicate that domestic savings, globalization, government expenditure, inflation, and interest rates significantly influence public debt in the short run, suggesting that Malaysia's debt position is sensitive to immediate financing conditions, external integration, fiscal intervention, and monetary-price dynamics. In the long run, only domestic savings and trade remain significant, indicating that sustained debt reduction depends more on internal resource mobilization and external-sector strength than on short-term macroeconomic adjustments. The study contributes to the public debt literature by reframing Malaysia's debt dynamics as a time-horizon problem rather than a single-channel fiscal issue. Theoretically, the findings connect Keynesian short-run adjustment mechanisms with the Two-Gap Model and Classical fiscal sustainability logic, showing that the determinants of public debt differ across temporal horizons. The results imply that durable debt management in Malaysia requires policies that strengthen domestic savings capacity, improve trade competitiveness, and reduce reliance on short-term fiscal or monetary responses.

Keywords: Public debt, fiscal sustainability, domestic savings, trade openness, ARDL model

INTRODUCTION

The policy debate on public debt is often framed as if debt becomes dangerous only after a country crosses a visible threshold. Yet the most influential empirical claim in this debate illustrates why such simplicity is misleading. Reinhart & Rogoff (2010) using a historical dataset of 44 countries and more than 3,700 annual observations, argued that growth weakens sharply when public debt exceeds 90% of GDP. The finding shaped fiscal debates because it appeared to convert debt sustainability into a clear numerical boundary. However, Herndon et al. (2014) later showed that the result was sensitive to coding errors, selective data exclusion, and weighting choices, while subsequent studies found that debt-growth relationships vary across countries, methods, and debt regimes (D'Andrea, 2025; Ibañez Martín et al., 2024). The unresolved issue is therefore not whether public debt matters, but whether public debt should be understood through static thresholds or through the macroeconomic conditions that cause debt to accumulate differently over time.

Malaysia illustrates this problem clearly. As shown in Figure 1, Malaysia's national government debt has followed a strong upward trajectory from March 1978 to June 2024, indicating that public debt accumulation is not a short-lived fiscal episode but a long-term structural development. Figure 2 further shows that Malaysia's government debt as a percentage of GDP has also remained elevated in recent years, particularly after the COVID-19 period. Together, these figures suggest that Malaysia's public debt problem cannot be interpreted only through the size of debt stock. The more analytically important question is why debt continues to rise

despite Malaysia's relatively open economy, trade orientation, domestic financial development, and repeated fiscal policy adjustments. This creates the central puzzle of the study: Malaysia's debt trajectory appears to reflect not only government borrowing behaviour, but also deeper interactions between domestic savings, globalization, fiscal expenditure, inflation, interest-rate conditions, and trade performance.

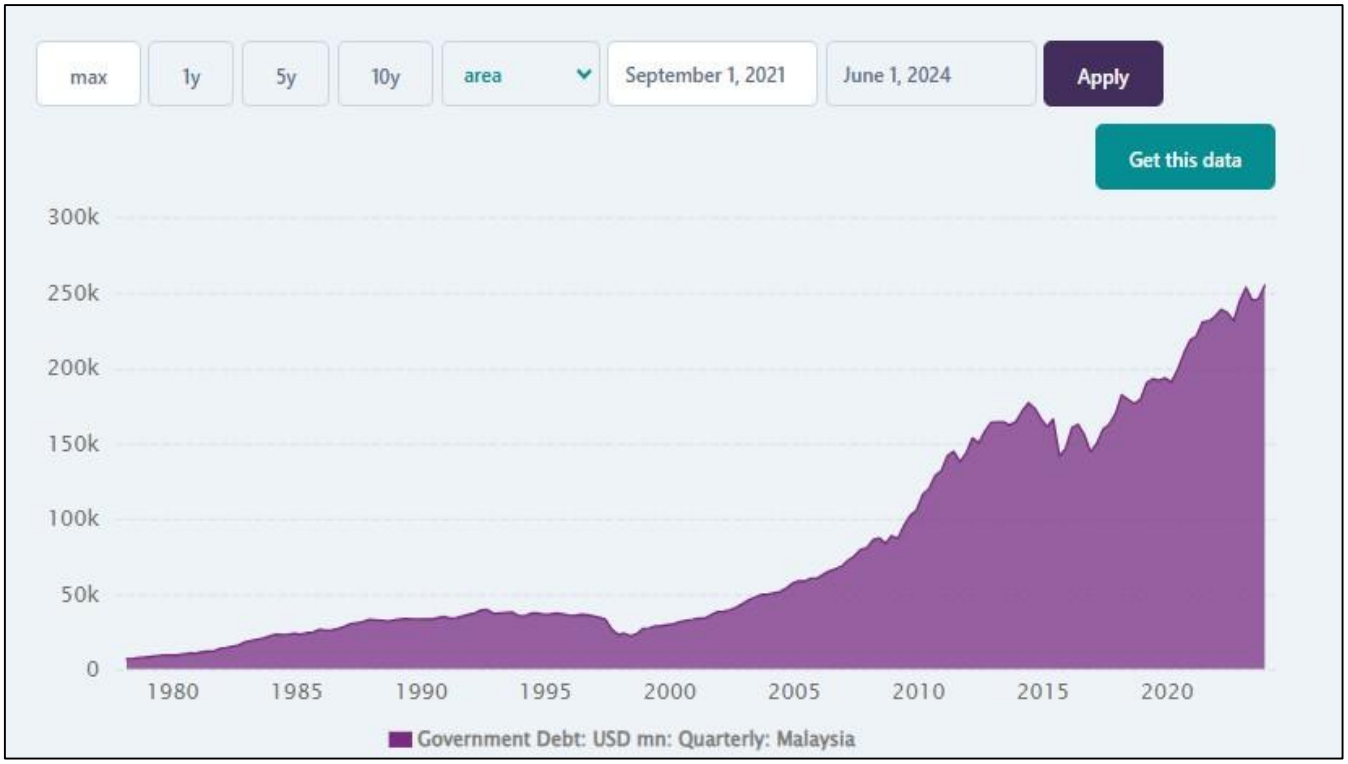

Figure 1: Malaysia's National Government Debt from March 1978 to June 2024 (source: CEIC Data)

Figure 2: Malaysia's Government Debt: % of GDP from Dec 2010 to Jun 2024 (source: CEIC Data)

This distinction is particularly relevant for emerging and open economies, where public debt is not only a fiscal

outcome but also a reflection of development financing, domestic resource mobilization, external exposure, and policy adjustment. Public debt may support public investment and macroeconomic stabilization when used productively, yet it may also create debt-servicing pressure, crowd out private investment, and reduce fiscal flexibility when accumulation outpaces revenue and growth capacity (Mahmood et al., 2025; Wang, 2026). The empirical literature has therefore moved away from treating debt as a uniformly harmful stock variable and toward a more conditional interpretation in which debt effects depend on institutions, economic structure, financing conditions, and time horizon (Shi et al., 2025). However, this shift has been stronger in studies examining the consequences of debt than in studies explaining the determinants of debt.

The determinant side of the public debt literature remains less conceptually settled. Some studies emphasize fiscal variables such as government expenditure and deficits, while others identify macroeconomic conditions such as growth, interest rates, inflation, trade openness, external balances, and investment as central to debt dynamics (Osuma & Nzimande, 2024; Yahaya, 2026). These variables are rarely neutral. Inflation may temporarily reduce the real burden of nominal debt, but persistent inflation can raise risk premia and borrowing costs. Interest rates may discipline borrowing in the short run, but higher debt-servicing costs can weaken fiscal space over time. Trade openness may strengthen revenue capacity through growth and external competitiveness, yet it may also expose economies to external shocks. Globalization can expand financing access and investment opportunities, but financial integration may also increase governments' equilibrium debt choices by altering risk sharing and borrowing conditions (Betz & Pond, 2025). The same determinant may therefore have different meanings depending on whether the analysis is concerned with immediate adjustment or long-run sustainability.

Malaysia provides a useful setting for examining this issue because its public debt dynamics are embedded in an economy that combines strong trade orientation, sustained globalization, development-oriented public expenditure, and evolving domestic financing capacity. The upward movement shown in Figure 1 points to the persistence of nominal debt accumulation, while the debt-to-GDP movement shown in Figure 2 indicates that the fiscal burden has remained significant even when measured relative to national output. This dual pattern is important because a rising debt stock may reflect scale effects in a growing economy, but a persistently elevated debt-to-GDP ratio raises a different concern: whether the economy's structural capacity is sufficient to absorb and manage debt over time. Unlike advanced economies, where debt debates often focus on ageing, welfare commitments, or monetary sovereignty, Malaysia's debt position is linked to the broader policy problem of financing development while maintaining fiscal sustainability. Unlike low-income economies, Malaysia has deeper domestic financial markets and stronger external-sector capacity, making the savings-debt and trade-debt channels particularly relevant.

The theoretical foundation of this study reflects this multi-channel logic. The Two-Gap model suggests that public borrowing may arise when domestic savings and foreign exchange capacity are insufficient to finance development needs (Xiaolei, 2025). In this framework, domestic savings and trade are not merely control variables; they represent structural financing capacity. Keynesian economics, by contrast, provides a short-run stabilization logic in which government expenditure may support output, demand, and fiscal adjustment, especially during periods of economic weakness (Blanchard & Perotti, 2002). Classical and Ricardian perspectives offer a countervailing interpretation: public borrowing may imply future tax liabilities and may weaken fiscal discipline when debt accumulation is not matched by productive capacity (Barro, 1974). Taken together, these theories imply that the determinants of public debt should not be assumed to operate uniformly across time. Some variables may explain short-run debt movements, while others may determine long-run sustainability.

Existing empirical work provides important foundations but leaves three gaps. First, much of the public debt debate focuses on the effect of debt on growth rather than the macroeconomic determinants that generate debt accumulation. This creates an analytical imbalance: the literature is more advanced in asking what debt does than in asking why debt evolves as it does. Second, studies that examine debt determinants often estimate average effects without sufficiently distinguishing between short-run adjustment and long-run equilibrium. These risks treating variables such as inflation, interest rates, government expenditure, savings, and trade as if their effects are temporally stable. Third, globalization and trade are often treated as overlapping indicators of openness, although they capture different mechanisms. Trade reflects real-sector external engagement, while globalization, especially when measured through a composite index, includes broader economic, social,

political, de facto, and de jure dimensions (Gygli et al., 2019). Separating these channels is essential for understanding whether Malaysia's debt is driven by structural trade capacity or by broader global integration pressures.

This study addresses these gaps by examining the short-run and long-run determinants of public debt in Malaysia using the Autoregressive Distributed Lag (ARDL) approach. ARDL is appropriate because it allows the estimation of level relationships among variables with mixed integration orders, provided none is integrated at I(2), and it enables the separation of short-run dynamics from long-run relationships (Pesaran et al., 2001). The study focuses on six macroeconomic determinants: domestic savings, globalization, government expenditure, inflation, interest rate, and trade. This variable selection allows the analysis to connect fiscal behaviour, domestic financing capacity, monetary conditions, and external-sector structure within a single empirical framework.

The contribution of the study is threefold. First, it reframes Malaysia's public debt as a time-horizon problem rather than a single-equation fiscal problem. This is non-obvious because variables that influence debt in the short run may not be the same variables that shape debt sustainability in the long run. Second, it clarifies the distinct roles of domestic savings and trade as structural determinants, thereby extending the Two-Gap logic into a contemporary public-debt setting. Third, it separates globalization from trade, allowing the study to examine whether debt dynamics are shaped by broad global integration or by the more specific fiscal capacity generated through trade. These contributions matter because they move the analysis from "which variables affect debt?" toward "which variables matter temporarily, which matter structurally, and why?"

Accordingly, this study asks: What are the key economic determinants that influence public debt in Malaysia? To answer this question, the study applies ARDL estimation to annual Malaysian data from 1974 to 2023, examining both short-run and long-run relationships between public debt and its selected macroeconomic determinants. The remainder of the paper is organized as follows. The next section reviews the theoretical and empirical literature on public debt determinants. The methodology section explains the data, variable measurement, model specification, and ARDL estimation procedure. The results section presents the short-run and long-run findings, followed by a conclusion that discusses theoretical implications, policy relevance, limitations, and future research directions.

LITERATURE REVIEW

Underpinning theory

The Two-Gap Model (Xiaolei, 2025), elucidates the interplay between domestic savings and foreign capital in fostering economic growth, with a particular focus on developing nations like Malaysia. These countries frequently encounter a savings and trade gap, characterized by a shortfall in domestic savings insufficient for investment and a trade deficit where export revenues do not sufficiently cover import costs. Consequently, international transfers, encompassing foreign capital and foreign exchange, are essential to bridge these gaps. However, when there is a scarcity of foreign capital, such as through foreign direct investments (FDI), the government may turn to borrowing to fill the budgetary void. This model assumed that the deficit observed in emerging economies is a necessary condition for achieving long-term economic growth, which, in turn, leads to an accumulation of foreign debt.

Keynesian Economics Theory, rooted in the principles of John Maynard Keynes, views that an increase in government spending can stimulate economic activity and spending (Gordon, 1990). This theory suggests that higher government spending, coupled with reduced taxes, can enhance demand, thereby increasing national production or income. Keynesian economics places a strong emphasis on regular governmental intervention to elevate aggregate demand, employment, and output through the means of government borrowing. It is believed that an increase in government debt, resulting from deficit-financed fiscal policies, can boost income, money demand, and exchange rate. However, this theory overlooks the challenges associated with funding budget deficits through taxation or borrowing.

Classical economic theory (Lowe, 1954) tends to view public debt negatively, perceiving government borrowing as inefficient, detrimental to economic prosperity, and morally questionable. However, there are exceptions that

recognize the value of productive government spending. Nonetheless, classical economists typically argue that public debt impedes economic growth by diminishing financial discipline and discouraging private investment and foreign investors. Moreover, the classical theory posits that the economy is self-regulating, equipped with mechanisms that bring it back to its natural real GDP or production level.

Review of Empirical Studies

Recent empirical literature increasingly conceptualizes public debt as a multidimensional macroeconomic phenomenon shaped by fiscal behavior, institutional quality, financial openness, and structural economic conditions rather than merely as an outcome of government borrowing. Contemporary debates no longer focus solely on whether debt is harmful, but instead on the conditions under which debt promotes or constrains long-run economic sustainability. This shift emerged partly from the continuing debate surrounding the debt-growth nexus following the influential work of scholars, who argued that excessive debt levels weaken economic growth once critical thresholds are exceeded (Ibañez Martín et al., 2024; Ndoricimpa, 2020). However, subsequent empirical reassessments challenged the existence of a universal debt threshold, emphasizing that the effects of debt vary substantially across countries, institutional settings, and stages of development (Dawood et al., 2026). More recent evidence from developing economies further supports the argument that debt-growth relationships are nonlinear and conditional rather than uniformly negative (Khémiri & Noubbigh, 2021).

A major stream of empirical research examines how domestic macroeconomic structures influence public debt accumulation in both short-run and long-run contexts. Studies increasingly show that weak domestic savings and inadequate fiscal revenues often intensify reliance on external borrowing, particularly in developing economies facing persistent investment-financing gaps (Manasseh et al., 2022). Omotosho (2024) demonstrated that expansionary fiscal policy without sufficient domestic resource mobilization contributes to persistent debt accumulation, while Yahaya (2026) linked macroeconomic instability and public debt persistence in Nigeria to weak fiscal coordination and external financing dependence. Similarly, Shi et al. (2025) found that institutional quality significantly moderates the relationship between public debt and sustainable growth, suggesting that debt sustainability depends not only on debt size but also on governance effectiveness and fiscal management capacity. These findings collectively indicate that public debt is closely associated with structural economic resilience rather than temporary fiscal imbalances alone.

Another dominant research stream concerns globalization, trade openness, and financial integration. Recent literature suggests that globalization generates both stabilizing and destabilizing effects on public debt dynamics. On one hand, greater integration into global markets may increase foreign investment inflows, improve export competitiveness, and temporarily ease fiscal pressures. On the other hand, excessive dependence on external capital may heighten exposure to exchange rate volatility, capital reversals, and external debt vulnerability. The multidimensional globalization framework developed through the KOF Globalization Index by Gygli et al. (2019) remains highly influential in explaining how economic openness reshapes fiscal and financial exposure across countries. More recent evidence from Sub-Saharan Africa indicates that trade openness and external debt exhibit complex interactions, where borrowing may initially support growth-enhancing trade expansion but eventually generate repayment pressures when export capacity weakens (Osuma & Nzimande, 2024). These findings are particularly relevant for Malaysia due to its highly open and trade-dependent economic structure.

Government expenditure also remains central within contemporary empirical discussions on public debt. Post-pandemic fiscal expansions reinforced the argument that government borrowing can function as a short-run stabilization mechanism during economic disruptions (Bonam et al., 2024). Nonetheless, empirical findings increasingly distinguish between productive and non-productive expenditure. Borrowing directed toward infrastructure, education, and technological development is generally associated with stronger long-run fiscal sustainability, whereas persistent recurrent expenditure tends to intensify debt burdens (Ye & Guo, 2025). Betz & Pond (2025) further argued that governments simultaneously operate as borrowers and regulators within financial systems, implying that fiscal expansion cannot be separated from broader institutional and market governance considerations. Meanwhile, contemporary debt-growth literature increasingly emphasizes threshold and regime-dependent effects rather than linear relationships, reflecting growing skepticism toward generalized conclusions regarding optimal debt levels.

Monetary conditions constitute another important determinant of debt sustainability. Recent empirical evidence consistently demonstrates that inflation and interest rates exert both direct and indirect effects on debt accumulation through borrowing costs, refinancing conditions, and investor confidence (Budianto, 2025). Although moderate inflation may temporarily reduce the real burden of outstanding debt, persistent inflation often leads to monetary tightening and rising debt servicing obligations. This issue becomes particularly significant in emerging economies where external debt exposure amplifies vulnerability to interest rate fluctuations and exchange rate instability. Accordingly, the literature increasingly supports the importance of distinguishing between short-run macroeconomic adjustments and long-run equilibrium debt sustainability.

Despite substantial empirical development, important gaps remain unresolved. Existing literature frequently investigates debt-growth relationships in isolation without integrating broader macroeconomic determinants within a unified analytical framework. Furthermore, empirical findings remain fragmented regarding how government expenditure, globalization, trade openness, inflation, and monetary conditions jointly shape public debt dynamics across different time horizons. Country-specific evidence for Malaysia also remains comparatively limited despite the country's exposure to global trade, capital mobility, and post-pandemic fiscal pressures. Methodologically, many previous studies rely on static estimation techniques that inadequately capture dynamic adjustments between variables. Therefore, the Autoregressive Distributed Lag (ARDL) approach offers a more suitable framework because it simultaneously estimates short-run dynamics and long-run equilibrium relationships. In this context, the present study contributes by examining the short-run adjustments and long-run drivers of public debt in Malaysia through a dynamic macroeconomic framework grounded in recent empirical evidence.

METHODOLOGY

Data collection and source

This study examines the effects of selected macroeconomic determinants on Malaysia's public debt using annual data from 1974 to 2023. The data were obtained from publicly available secondary sources, namely the World Bank Development Indicators (WDI) and the KOF Swiss Economic Institute. Public debt (PD) is measured by central government debt, total (% of GDP). The explanatory variables are domestic savings (DOMSAV), measured by gross domestic savings (current US$); globalization (GLOB), measured by the KOF Globalization Index; government expenditure (GEXP), measured by final consumption expenditure (constant 2015 US$); inflation (INF), measured by the GDP deflator (annual %); interest rate (IR), measured by the lending-deposit interest rate spread (%); and trade (TRADE), measured by trade (% of GDP). Before estimating the Autoregressive Distributed Lag (ARDL) bounds model, the variables were transformed into natural logarithmic form.

Table 1: variable description and data source

Variables	Descriptions	Measurement Units	Source
PD	Public debt	Central government debt, total (%of GDP)	WDI
DOMSAV	Domestic savings	Gross domestic savings (current US$)	WDI
GLOB	Globalization	Globalization Index	KOF
GOVEXP	Government expenditure	Final consumption expenditure (constant 2015 US$)	WDI
INF	Inflation	Inflation, GDP deflator (annual %)	WDI
IR	Interest rate	Interest rate spread (lending rate minus deposit rate, %)	WDI
TRADE	Trade	Trade (% of GDP)	WDI

Model specification

Following Pesaran et al. (2001), the ARDL approach is employed to estimate the short-run and long-run effects of domestic savings, globalization, government expenditure, inflation, interest rates, and trade on Malaysia's public debt. The functional relationship between public debt and its selected macroeconomic determinants is specified as follows:

$$PD_t = \mathrm{f}(DOMSAV_t,\ GLOB_t, GEXP_t, INF_t, IR_t, TRADE_t) \quad (1)$$

The functional form in Equation (1) is expanded into the following linear econometric model:

$$PD_t = \mathrm{B0} + \mathrm{B1}DOMSAV_t + \mathrm{B2}GLOB_t + \mathrm{B3}\,GEXP_t + \mathrm{B4}\,INF_t + \mathrm{B5}\,IR_t + \mathrm{B6}\,TRADE_t + \varepsilon_t (2)$$

After transforming the variables into natural logarithmic form, the estimated model is specified as follows:

$$LnPD_t = \beta_0 + \beta_1 * LnDOMSAV_t + \beta_2 * LnGLOB_t + \beta_3 * LnGEXP_t + \beta_4 * LnINF_t + \beta_5 * LnIR_t + \beta_6 * LnTRADE_t + \varepsilon_t \quad (3)$$

where (LnPD_t) denotes public debt, (LnDOMSAV_t) denotes domestic savings, (LnGLOB_t) denotes globalization, (LnGEXP_t) denotes government expenditure, (LnINF_t) denotes inflation, (LnIR_t) denotes interest rate, and (LnTRADE_t) denotes trade. (\beta_0) represents the constant term, (\beta_1) to (\beta_6) are the estimated coefficients, (\varepsilon_t) is the error term, and (t) denotes the annual period from 1974 to 2023.

Unit Root Test

To avoid spurious inference in time-series estimation, the stationarity properties of all variables were examined using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests (Dickey & Fuller, 1979; Phillips, 1987). The null hypothesis assumes the presence of a unit root. Stationarity is confirmed when the test statistic is more negative than the relevant critical value, with the decision assessed using MacKinnon (1996) critical values. The standard ADF specification is expressed as:

$$\Delta y_t = \mu + \beta_1 + (\theta - 1) + \Delta Y_{t=1} + \sum \delta_i \Delta Y_{t-i} + \varepsilon_t \quad (4)$$

where Δ is the first-difference operator, μ is the constant, βt captures the deterministic time trend, yt−1 is the lagged dependent variable, δi represents the coefficient of lagged differences, and εt is the white-noise error term.

ARDL Model and Error Correct Representation

The ARDL bounds test is used to determine whether the variables share a long-run cointegrating relationship. When cointegration is established, the error-correction representation captures both short-run dynamics and the speed at which deviations from long-run equilibrium are corrected. This follows Engle & Granger (1987) argument that an error-correction model is appropriate when variables are cointegrated.

The long-run ARDL specification is presented in Equation (5), while the short-run error-correction model is expressed in Equation (6). In these equations, PDt represents public debt, ECMt−1 is the lagged error-correction term derived from the long-run relationship, ϑ measures the speed of adjustment toward equilibrium, Δ is the first-difference operator, β0 to β7 are coefficients to be estimated, n denotes the selected optimal lag length, and i indexes the variables included in the model. The inclusion of lagged dependent and independent variables allows the model to capture dynamic adjustment in Malaysia's public debt over time.

$$\Delta LnPD_t = \beta_0 + \sum_{i=2}^{n} \beta_1 * \Delta LnPD_{t-1} + \sum_{i=1}^{n} \beta_2 * \Delta LnDOMSAV_{t-1} + \sum_{i=1}^{n} \beta_3 * \Delta LnGLOB_{t-1} + \sum_{i=1}^{n} \beta_4 * \Delta LnGEXP_{t-1} + \sum_{i=1}^{n} \beta_5 * \Delta LnINF_{t-1} + \sum_{i=1}^{n} \beta_6 * \Delta LnIR_{t-1} + \sum_{i=1}^{n} \beta_7 * \Delta LnTRADE_{t-1} + \varepsilon_t \quad (5)$$

The short-run model, estimated with ECM, is formulated as in Equation (6):

$$\Delta LnPD_t = \beta_0 + \sum_{i=2}^{n} \beta_1 * \Delta LnPD_{t-1} + \sum_{i=1}^{n} \beta_2 * \Delta LnDOMSAV_{t-1} + \sum_{i=1}^{n} \beta_3 * \Delta LnGLOB_{t-1} + \sum_{i=1}^{n} \beta_4 * \Delta LnGEXP_{t-1} + \sum_{i=1}^{n} \beta_5 * \Delta LnINF_{t-1} + \sum_{i=1}^{n} \beta_6 * \Delta LnIR_{t-1} + \sum_{i=1}^{n} \beta_7 * \Delta LnTRADE_{t-1} + \varepsilon_t + \vartheta ECM_{t-1} + \varepsilon_t \quad (6)$$

RESULTS AND ANALYSIS

Descriptive Results

Table 2 presents the descriptive statistics for public debt and the selected macroeconomic variables in Malaysia from 1974 to 2023. Public debt records an average value of 58.947, with a standard deviation of 14.562, indicating that Malaysia's debt level varied meaningfully over the study period. This variation suggests that public debt has not remained static but has moved alongside changes in the country's fiscal and macroeconomic environment.

Table 2: Descriptive Statistics

Variables	Observe	Mean	St. Dev	Minimum	Maximum
Public Debt (PD)	50	58.947	14.562	39.8	79.536
Domestic Saving (DOMSAV)	50	51.240	41.900	2.222	125.000
Globalization (GLOB)	50	64.063	13.177	40.995	81.059
Government Expenditure (GEXP)	50	10.270	6.901	2.97	17.380
Inflation (INF)	50	5.248	3.376	0.045	12.726
Interest Rate (IR)	50	3.174	1.232	1.431	7.3625
Trade (TRADE)	50	147.253	38.894	90.645	220.406

Source: authors' estimation

Domestic savings and government expenditure also show notable dispersion, suggesting changes in Malaysia's domestic financing capacity and fiscal spending patterns across the sample period. However, the reported minimum and maximum values for DOMSAV and GEXP appear inconsistent, as the minimum values are higher than the maximum values. Therefore, these two variables should be verified before drawing firm conclusions from their descriptive range. Until corrected, the interpretation should focus on the mean and standard deviation rather than the reported minimum–maximum spread.

Globalization records a relatively high mean value, reflecting Malaysia's strong integration with the global economy. Nevertheless, descriptive statistics alone cannot confirm whether globalization increased consistently over time; such a conclusion would require trend-based evidence. Inflation and interest rates show moderate variation, indicating changes in price and monetary conditions throughout the period. Trade records a high mean value relative to the other variables, which is consistent with Malaysia's position as an open and trade-oriented economy.

Overall, the descriptive statistics provide an initial profile of Malaysia's public debt and its macroeconomic environment. The results justify the need for time-series estimation because the variables show variation over the study period, but they should not be interpreted as evidence of causality. The causal and dynamic relationships are more appropriately examined through the ARDL short-run and long-run estimations.

Unit Root Test for Stationarity

Before estimating the ARDL model, the stationarity properties of all variables were examined using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. This step is necessary because the ARDL bounds testing approach is suitable when the variables are integrated at I(0), I(1), or a combination of both, but not when any variable is integrated at I(2). The null hypothesis for both tests assumes the presence of a unit root, while rejection of the null hypothesis indicates that the series is stationary. The results in Table 3 show that the variables do not share a uniform order of integration. Some variables are stationary at level, while others become stationary after first differencing. Therefore, the evidence indicates that the variables are integrated at I(0), I(1), or a mixed order of I(0) and I(1). Importantly, none of the variables is found to be integrated at I(2), which confirms the appropriateness of using the ARDL approach for the subsequent short-run and long-run estimations. This finding also supports further examination of the long-run relationship among public debt, domestic savings, globalization, government expenditure, inflation, interest rate, and trade.

Table 3: Unit root test via Augmented Dickey-fuller (ADF) and Philips-Perron (PP)

ADF		**Phillips-Perron**				
T-STAT		**At level**			**First Difference**	
Variables	**At level**	**First difference**	**Z(p)**	**Z(t)**	**Z(p)**	**Z(t)**
PD	-0.9218	0.0000***	0.2919	-0.9715	0.0001***	-4.3299
DOMSAV	0.9951	0.0000***	0.9313	1.1328	0.0000***	-7.2450
GLOB	6.9076	0.1838	1.0000	4.3201	0.0055***	-2.8350
GEXP	6.0506	0.6820	1.0000	12.9240	0.0458**	-1.9881
INF	-2.0456	0.0000***	0.0360	-2.0941**	0.0000***	-11.1260
IR	-1.2086	0.0003***	0.2063	-1.2039	0.0000***	-5.8772
TRADE	-0.03109	0.0000***	0.7065	0.0894	0.0000***	-4.9901

Short run estimation

The short-term estimation findings from the ARDL model, which encompasses 50 data points from 1974 to 2023, several crucial factors significantly affect public debt in Malaysia. Domestic savings (DLnDOMSAV) exhibit a positive and significant influence in the short term, demonstrated by a coefficient of 0.1633 and a p-value of 0.0229. This indicates that, in the short run, an increase in domestic savings correlates with a rise in public debt, likely because the government opts to use domestic resources for financing expenditures instead of depending on foreign loans.

Globalization (DLnGLOB) also reveals a positive and significant effect, with a coefficient of 0.8271 and a p-value of 0.0436. This suggests that elevated levels of globalization, possibly driven by greater trade openness and foreign direct investment (FDI), are associated with an increase in public debt in the short term. This could be indicative of the costs tied to integrating into the global market or investments made in infrastructure to facilitate international commerce.

On the other hand, government expenditure (DLnGEXP) and inflation (DLnINF) exert negative and significant influences. The coefficient for government expenditure stands at -0.9110 ($p = 0.0081$), suggesting that increased spending in the short run is linked to a decrease in public debt, potentially due to productive or growth-promoting expenditures that enhance revenue. Inflation also shows a negative effect (-0.0136, $p = 0.0397$), which aligns with the notion that moderate inflation can diminish the real value of existing debt.

Interest rates (DLnIR) present a strong negative and significant connection with public debt in the short run (coefficient = -0.2798, $p < 0.0001$). This may indicate that rising interest rates deter borrowing or elevating debt servicing costs, resulting in fiscal tightening and reduced debt accumulation.

Nonetheless, trade performance (DLnTRADE) does not show a statistically significant association with public debt in the short run ($p = 0.7252$), indicating that changes in trade do not have an immediate effect on debt levels. This could be attributed to the delayed impact of trade balances on fiscal policy or the influence of other

overriding factors in the short term.

In conclusion, the short-run dynamics highlight that domestic savings, globalization, government expenditure, inflation, and interest rates significantly affect Malaysia's public debt, although their influences differ in nature. Trade, however, seems to lack an immediate effect, underscoring the intricacies of short-term fiscal interactions in an open economy like Malaysia.

Table 4: Estimated Short-run coefficient from ARDL (50 observation from 1974 to 2023)

DLnPD	Coefficient	Std. Error	T-statistic	Prob	Results	Impact
DLnDOMSAV (-1)	0.1633	0.0668	2.4471	0.0229	Significant	Positive
DLnGLOB	0.8271	0.0453	2.1028	0.0436	Significant	Positive
DLnGEXP (-1))	-0.9110	0.3131	-2.9093	0.0081	Significant	Negative
DLnINF (-3))	-0.0136	0.0062	-2.1867	0.0397	Significant	Negative
DlnIR (-1))	-0.2798	0.0625	-4.4751	0.0002	Significant	Negative
DLnTRADE	0.3167	0.8621	1.1728	0.7252	Not significant	-

*P>|z| values are based on a 5% significant level. The dependent variable is Public Debt. ARDL (3,3,0,3,4,4,0) selected by Akaike information criteria (Source: Author's Estimation)

Long run estimation

The long-run ARDL estimation results based on Table 5 indicate several significant relationships between selected macroeconomic indicators and Malaysia's public debt from 1974 to 2023. Domestic saving (LnDOMSAV) exhibits a significant and negative effect on public debt (LnPD), indicated by a coefficient of -0.2739 (p = 0.0004). A 1% increase in domestic saving results in a 0.27% decrease in public debt, highlighting the importance of national saving behaviour in reducing the country's reliance on external or internal borrowing. This supports the notion that stronger savings mobilization contributes to healthier fiscal positions and reduced debt burdens over the long run.

Trade (LnTRADE) also demonstrates a significant and negative impact on public debt, as evidenced by a coefficient of -0.3117 (p = 0.0002). This implies that a 1% increase in trade activity is associated with a 0.31% decrease in public debt. The result underscores the role of international trade in promoting economic growth and generating government revenue, thereby reducing the need for public borrowing. This finding affirms the long-term benefits of trade liberalization and export-oriented growth strategies in enhancing fiscal sustainability.

Table 5: Estimated Long-run coefficient from ARDL (50 observation from 1974 to 2023)

LnPD	Coefficient	Std. Error	T-statistic	Prob	Results	Impact
LnDOMSAV	-0.273925	0.065354	-4.191400	0.0004	Significant	Negative
LnGLOB	-0.082043	0.397054	-0.206631	0.8382	Not significant	-
LnGEXP	-0.178748	0.193717	-0.922728	0.3662	Not significant	-
LnINF	0.002137	0.006848	0.312016	0.7580	Not significant	-
LnIR	-0.076128	0.052553	-1.448599	0.1616	Not significant	-
LnTRADE	-0.311692	0.068938	-4.521320	0.0002	Significant	Negative

*P>|z| values are based on a 5% significant level. The dependent variable is Public Debt. ARDL (3,3,0,3,4,4,0) selected by Akaike information criteria (Source: Author's Estimation)

Conversely, other variables such as globalization (LnGLOB), government expenditure (LnGEXP), inflation (LnINF), and interest rate (LnIR) are statistically insignificant in explaining public debt in the long run. For instance, globalization yields a coefficient of -0.0820 (p = 0.8382), while government expenditure registers a coefficient of -0.1787 (p = 0.3662), indicating no meaningful long-term impact. Similarly, inflation and interest rates, with coefficients of 0.0021 (p = 0.7580) and -0.0761 (p = 0.1616) respectively, do not exhibit significant

relationships. These findings suggest that while these macroeconomic factors may influence short-term fiscal dynamics, their effects on long-term public debt accumulation are limited or absorbed by other structural and policy-related factors.

Residual Diagnostics Check

Table 6 reports the model fit and preliminary residual diagnostic indicators for the ARDL model. The R-square value of 0.8808 indicates that the model explains approximately 88.08% of the variation in Malaysia's public debt. The adjusted R-square value of 0.7562 remains reasonably high after accounting for the number of predictors, suggesting that the selected variables provide meaningful explanatory power for the dependent variable.

The Durbin-Watson statistic of 2.4964 is reasonably close to the benchmark value of 2, suggesting no strong indication of first-order serial correlation. However, this interpretation should be made cautiously because the Durbin-Watson statistic alone is not sufficient to confirm the absence of serial correlation in an ARDL model. A Breusch-Godfrey serial correlation LM test would provide stronger diagnostic evidence.

Table 6: Diagnostic Tests

R-square	0.8808
Adjusted R-Square	0.7562
Durbin-Watson statistics	2.4964

Several residual and stability diagnostic tests were conducted to ensure the reliability of the ARDL estimation, These tests are necessary because coefficient significance alone is insufficient to confirm that the estimated model is statistically well specified. The Breusch-Godfrey LM test was used to examine whether the residuals are free from serial correlation, particularly because dynamic time-series models may be affected by autocorrelated errors (Breusch, 1978).

The Breusch-Pagan-Godfrey test was applied to assess heteroskedasticity, as non-constant error variance may affect the efficiency of the estimated coefficients (Breusch & Pagan, 1979). Residual normality was evaluated using the Jarque-Bera test, which is commonly used to assess whether the residuals follow a normal distribution (Jarque & Bera, 1980). In addition, the CUSUM test was employed to examine the stability of the estimated parameters over the study period (Brown et al., 1975). Overall, these diagnostic tests provide additional support for the validity of the ARDL model and help ensure that the short-run and long-run findings are not driven by model misspecification.

Stability Check

Analyzing the behavior of Public Debt necessitates consideration of several macroeconomic and external factors that significantly influence debt. Stability tests, such as CUSUM and CUSUMQ, ensure stability of the model's regression coefficients and the robustness of the estimates. These tests effectively identify minor deviations from average value, potentially signaling structural changes in the model over time.

Analyzing the cumulative sum lines in relation to the lower and upper critical bounds allows for identifying potential structural breaks within the studied period. The findings from the CUSUM and CUSUMQ tests, as shown in Figure 3 and Figure 4, indicate that the coefficients in the model remain stable from 1974 to 2023. The estimates are robust, showing no evidence of instability in the regression model for Malaysia's Public Debt performance.

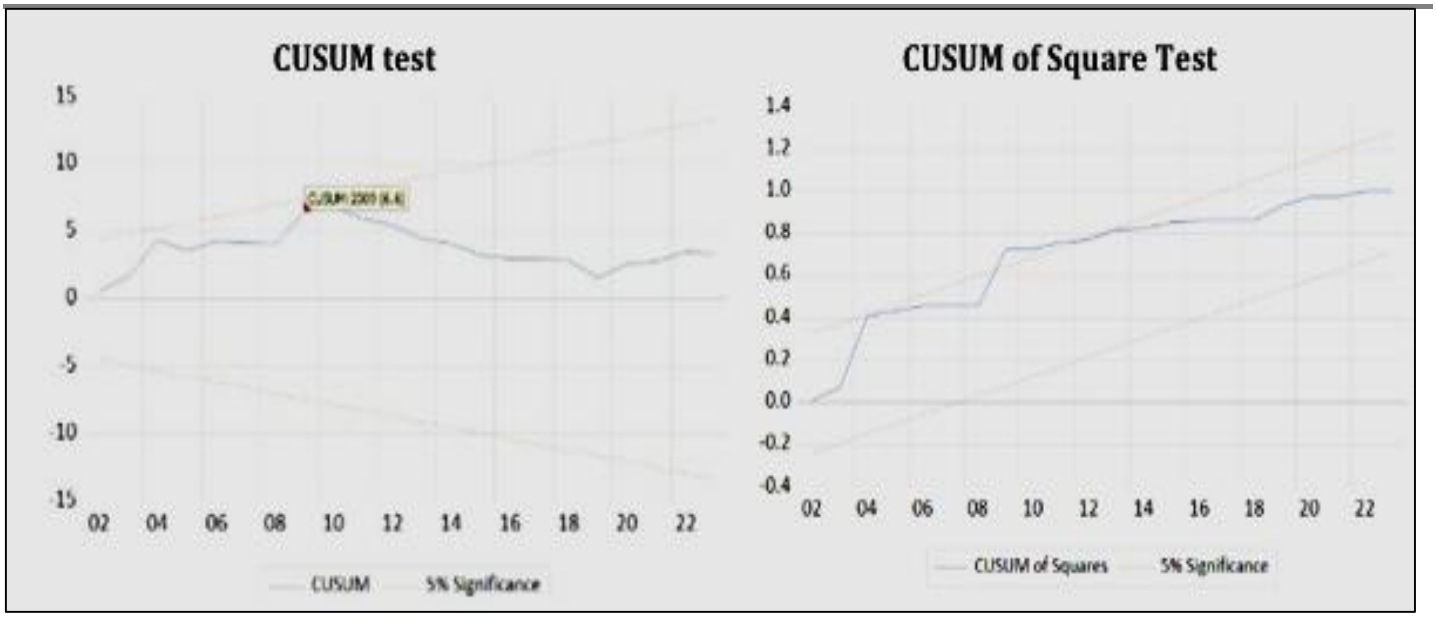

Figure 3: Plot of CUSUM and CUSUM Square Test for Coefficient Stability of ARDL model. Source: Authors' Estimation

CONCLUSION

This study examined the short-run and long-run determinants of public debt in Malaysia using the ARDL approach with annual data from 1974 to 2023. The findings show that Malaysia's public debt is shaped by different macroeconomic forces across time horizons. In the short run, domestic savings, globalization, government expenditure, inflation, and interest rates significantly influence public debt, while trade does not show an immediate effect. In the long run, only domestic savings and trade remain significant, indicating that sustainable debt management depends more on structural financing capacity and external-sector strength than on temporary macroeconomic adjustments.

Theoretically, the findings support a time-horizon interpretation of public debt. The short-run effects are broadly consistent with Keynesian adjustment mechanisms, where fiscal, monetary, and external conditions influence debt movements. Meanwhile, the long-run significance of domestic savings and trade aligns with the Two-Gap Model and Classical fiscal sustainability logic, suggesting that stronger domestic resource mobilization and trade performance can reduce reliance on borrowing over time. This confirms that public debt should not be interpreted only as a fiscal deficit issue, but as a broader macroeconomic outcome linked to savings capacity, trade competitiveness, and policy adjustment.

From a policy perspective, the results suggest that Malaysia's debt strategy should go beyond short-term fiscal correction. Policies that strengthen domestic savings, improve expenditure efficiency, deepen productive investment, and enhance trade competitiveness are more likely to support long-term fiscal sustainability. Trade policy should also focus not only on openness, but on export quality, value-added production, industrial competitiveness, and resilience against external shocks.

This study has several limitations. First, the analysis focuses only on Malaysia, which limits direct generalization to other economies. Second, the ARDL model assumes a linear relationship among the variables, although public debt may respond differently during periods of crisis, fiscal stress, or economic expansion. Third, the use of annual data may not fully capture short-term fiscal shocks or within-year policy responses. Future research may extend this study by applying nonlinear models such as NARDL, QARDL, threshold ARDL, or structural-break models to examine asymmetric debt responses under different macroeconomic and fiscal regimes. Comparative studies across ASEAN economies would also provide useful evidence on whether similar debt dynamics exist in other emerging economies.

Future research should extend this study by applying nonlinear models such as Nonlinear ARDL (NARDL) and

threshold regression. This is important because the current ARDL model assumes a linear relationship between public debt and its macroeconomic determinants, although debt may respond differently during periods of fiscal stress, economic expansion, inflationary pressure, or external shocks. NARDL would allow future studies to examine whether positive and negative changes in variables such as domestic savings, trade, inflation, interest rates, and government expenditure produce asymmetric effects on public debt. Meanwhile, threshold regression could identify whether the impact of these determinants' changes after certain macroeconomic or fiscal thresholds are reached.

REFERENCES

1. Barro, R. J. (1974). Are government bonds net wealth? Journal of Political Economy, 82(6), 1095–1117.
2. Betz, T., & Pond, A. (2025). Governments as borrowers and regulators. The Review of International Organizations, 20(1), 189–218.
3. Blanchard, O., & Perotti, R. (2002). An empirical characterization of the dynamic effects of changes in government spending and taxes on output. The Quarterly Journal of Economics, 117(4), 1329–1368.
4. Bonam, D., Ciccarelli, M., Gomes, S., Aldama, P., Bańkowski, K., Buss, G., & Renault, T. (2024). Challenges for monetary and fiscal policy interactions in the post-pandemic era. https://doi.org/10.2866/640912
5. Breusch, T. S. (1978). Testing for autocorrelation in dynamic linear models. Australian Economic Papers, 17(31), 334–355. https://doi.org/10.1111/j.1467-8454.1978.tb00635.x
6. Breusch, T. S., & Pagan, A. R. (1979). A Simple Test for Heteroscedasticity and Random Coefficient Variation. Econometrica, 47(5), 1287–1294. https://doi.org/10.2307/1911963
7. Brown, R. L., Durbin, J., & Evans, J. M. (1975). Techniques for Testing the Constancy of Regression Relationships Over Time. Journal of the Royal Statistical Society: Series B (Methodological), 37(2), 149–163. https://doi.org/10.1111/j.2517-6161.1975.tb01532.x
8. Budianto, H. (2025). Impact of Inflation and Interest Rate Volatility on Corporate Capital Structure Decisions. Jurnal Informatika Ekonomi Bisnis, 399–403.
9. D'Andrea, S. (2025). Does debt boost or limit economic growth? Evidence from a meta-analysis. Journal of Economic Studies, 52(7), 1352–1370.
10. Dawood, M., Feng, Z. R., Li, M., Tunio, F. H., Mutai, N. C., & Li, Z. H. (2026). Foreign Debt and Economic Growth: The Role of Institutional Quality and Financial Development in Asian Developing Countries. Economics of Transition and Institutional Change, 34(1), 161–182. https://doi.org/10.1111/ecot.70005
11. Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association, 74(366a), 427–431.
12. Engle, R. F., & Granger, C. W. J. (1987). Co-integration and error correction: representation, estimation, and testing. Econometrica: Journal of the Econometric Society, 251–276.
13. Gordon, R. J. (1990). What is new-Keynesian economics? Journal of Economic Literature, 28(3), 1115–1171.
14. Gygli, S., Haelg, F., Potrafke, N., & Sturm, J. E. (2019). The KOF globalisation index--revisited. The Review of International Organizations, 14(3), 543–574.
15. Herndon, T., Ash, M., & Pollin, R. (2014). Does high public debt consistently stifle economic growth? A critique of Reinhart and Rogoff. Cambridge Journal of Economics, 38(2), 257–279.
16. Ibañez Martín, M. M., Rojas, M. L., & Dabús, C. (2024). Debt, economic growth and threshold effects: Evidence from developing countries. EconomiA, 25(1), 92–108.
17. Jarque, C. M., & Bera, A. K. (1980). Efficient Tests for Normality, Homoscedasticity and Serial Independence of Regression Residuals. Economics Letters, 6(3), 255–259. https://doi.org/10.1016/0165-1765(80)90024-5
18. Khémiri, W., & Noubbigh, H. (2021). Joint analysis of the non-linear debt-growth nexus and capital account liberalization: New evidence from sub-Saharan region. The Quarterly Review of Economics and Finance, 80, 614–626. https://doi.org/10.1016/j.qref.2021.04.009
19. Lowe, A. (1954). The classical theory of economic growth. Social Research, 127–158.
20. MacKinnon, J. G. (1996). Numerical distribution functions for unit root and cointegration tests. Journal of Applied Econometrics, 11(6), 601–618.

21. Mahmood, Y., Ali, M., & Muhammad, T. (2025). Fiscal Policy and Public Debt: Evidence from Pakistan. Inverge Journal of Social Sciences, 4(4), 45–55.
22. Manasseh, C. O., Abada, F. C., Okiche, E. L., Okanya, O., Nwakoby, I. C., Offu, P., & Nwonye, N. G. (2022). External debt and economic growth in Sub-Saharan Africa: Does governance matter? PLOS ONE, 17(3), e0264082. https://doi.org/10.1371/journal.pone.0264082
23. Ndoricimpa, A. (2020). Threshold effects of public debt on economic growth in Africa: a new evidence. Journal of Economics and Development, 22(2), 187–207. https://doi.org/10.1108/JED-01-2020-0001
24. Omotosho, B. S. (2024). Monetary and fiscal policy interactions in resource-rich emerging economies. Macroeconomics and Finance in Emerging Market Economies, 17(2), 249–270. https://doi.org/10.1080/17520843.2022.2089938
25. Osuma, G., & Nzimande, N. P. (2024). Exploring the dynamic link between trade openness, external debt, and economic growth in Sub-Saharan Africa: Challenges and considerations. Economies, 12(11), 283.
26. Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. Journal of Applied Econometrics, 16(3), 289–326.
27. Phillips, P. C. B. (1987). Time series regression with a unit root. Econometrica: Journal of the Econometric Society, 277–301.
28. Reinhart, C. M., & Rogoff, K. S. (2010). Growth in a Time of Debt. American Economic Review, 100(2), 573–578.
29. Shi, H., Song, D., & Ramzan, M. (2025). Institutional quality, public debt, and sustainable economic growth: Evidence from a global panel. Sustainability, 17(14), 6487.
30. Wang, Y. (2026). China's debt after the global financial crisis: a review. Journal of Chinese Economic and Business Studies, 1–42.
31. Xiaolei, Z. (2025). Two-Gap Model. In Dictionary of Contemporary Chinese Economics (pp. 674–675). Springer Nature Singapore.
32. Yahaya, O. A. (2026). Public Debt and Macroeconomic Stability in Nigeria: A Time Series Analysis. International Journal of Accounting and Economics.
33. Ye, F., & Guo, Y. (2025). The public debt sustainability and its determinants in Sub-Sahara African countries. Kybernetes, 54(9), 5357–5377. https://doi.org/10.1108/K-11-2023-2048