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Research Article

An Empirical Study on the Impact of External Debt and Savings on Economic Growth in Vietnam

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Abstract: This study analyzes the relationship between external debt, debt service obligations, and gross savings on Vietnam's economic growth during 1996 – 2023 by applying an autoregressive distributed lag model combined with cointegration tests. The results indicate that in the long term, external debt has a positive impact on growth, confirming its role as a financial resource for development when effectively managed and utilized. In contrast, debt service obligations exhibit a negative effect, reflecting fiscal pressure and the risk of investment crowding out. Although gross savings have a positive influence on growth, the effect remains relatively unclear, suggesting that this potential should be more strongly leveraged and promoted in long-term development strategies. Notably, debt service obligations have a positive impact on national income in the short term, possibly stemming from improved market confidence and national creditworthiness following timely debt repayments. The findings of this study are compared with previous domestic and international research, thereby highlighting the similarities, differences, and specific policy implications for Vietnam. Consequently, this study contributes additional empirical evidence for the formulation of sustainable fiscal policies and strategic mobilization of resources to support future economic growth.

Keywords: external debt; debt service; gross savings; gross national income; ARDL Model

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1. Introduction

In the context of increasingly deep international economic integration, developing economies, such as Vietnam, often face challenges related to public finance and external debt management. One key macroeconomic objective is to promote sustainable economic growth. The macroeconomic indicator commonly used in research to represent a country's economic growth is gross domestic product (GDP), an important economic metric that measures the total value of all final goods and services produced within a country's territory over a specific period. GDP is not only influenced by domestic business and production activities but is also significantly affected by external financial factors such as external debt, debt services, and gross savings.

According to neoclassical theory and endogenous growth theory, savings serve as an internal resource that promotes investment and thereby influences GDP growth (Solow 1956; Romer 1990). A high level of savings contributes to capital accumulation, enhances labor productivity and production capacity, and thus improves GDP in the long run. Simultaneously, the level of savings also affects a country's debt repayment capacity, which in turn influences financial costs and the ability to mobilize borrowed capital.

Conversely, external debt plays a dual role in an economy. When effectively utilized, external borrowing can supplement the capital shortfall for development investment, especially during the early stages of industrialization and modernization (Chenery & Strout, 1966). However, if it exceeds safe thresholds or is poorly managed, external debt may increase the debt repayment burden, place pressure on the national budget, and reduce the country's GDP due to debt services (Krugman 1988). Debt services directly reflect the burden of debt on the portion of national income retained for reinvestment or public consumption.

For Vietnam, external debt has long served as a vital resource for financing public investments and infrastructure development. However, the rising debt service burden poses challenges to fiscal sustainability, and domestic savings remain insufficient to meet long-term

investment demands. Therefore, examining the relationship between these variables and economic growth is essential to providing empirical evidence that can inform appropriate economic and fiscal policy decisions, particularly as Vietnam pursues sustainable growth and deeper integration into the global financial system.

Building on these considerations, this study assesses the impact of external debt, debt services, and gross savings on economic growth in Vietnam. Based on these findings, this study proposes relevant fiscal and public debt policy implications to ensure stable growth and safeguard national financial stability.

2. Literature Review

External debt is regarded as an important financial source that enables developing economies to offset capital shortages and invest in infrastructure, education, and technological innovations. Using panel data from 50 countries during 1997-2015, Kikuchi and Tobe (2021) found that external debt is positively associated with economic growth through the investment channel, particularly in countries within the organization for economic cooperation and development that exhibit low default risk. This suggests that external debt, if properly managed, can drive national economic growth.

However, the risks associated with debt services are far from being negligible. Using the autoregressive distributed lag model for Ghana, Adubofour, Mangudhla, and Mensah (2021) find that debt service exerts a significantly negative impact on both private and total investment, reflecting a crowding-out effect on long-term capital formation. Similarly, Asghar, Sultana, Ullah, and Arshad (2024), employing the ARDL approach in the Asian context, reported that while external debt often supports growth, debt services reduce economic efficiency due to repayment pressure on fiscal balances.

Furthermore, studies in African economies such as Nigeria (Muhammad & Abdullahi, 2020) also indicate that debt service negatively affects long-term growth yet may provide short-term stimulus by improving liquidity and market creditworthiness. Conversely, in the case of Zambia, Edo, Osadolor, and Dading (2020) find that an excessively high level of external debt leads to a decline in economic growth, consistent with the debt Laffer curve model (Claessens, 1990). In summary, high-level policymakers must strike a careful balance between the benefits of borrowing and the burden of debt repayment to avoid financial instability.

According to Solow's (1956) model and endogenous growth theory (Romer 1990), gross savings play a pivotal role in capital accumulation, thereby fostering economic growth. A global study of 130 countries from 1980 to 2013 by Brueckner, Kikuchi, and Vachadze (2023) documented that national savings are positively associated with growth rates, particularly in low- and middle-income countries. This underscores the consistent role of domestic savings in the promotion of sustainable development.

Using the ARDL approach in Zimbabwe, Kondo, Mutsvanga, and Kanyekanye (2025) demonstrate that gross savings have a clear long-term impact on economic growth. Additionally, Granger causality tests reveal a bidirectional short-run relationship, indicating that economic growth also stimulates household savings. Hussain and Saaed (2018) examined the relationship between domestic savings and economic growth in the United Arab Emirates, showing that savings exert a significant influence in both the short and long run. These findings suggest that higher savings create more favorable conditions for investment and growth.

In East African economies such as Uganda, Nagawa, Wasswa, and Bbaale (2020) identified economic growth and foreign direct investment (FDI) as two key factors supporting medium- and long-term savings. However, the bidirectional relationship between savings and growth remains unclear, implying the need for a deeper analysis of domestic financial structure.

In the case of Vietnam, studies on the impact of external debt and savings on economic growth are still limited, and the existing findings are mixed. Dao and Oanh (2017) argue that external debt has a positive effect on long-term growth, but there appears to be an optimal debt threshold beyond which debt becomes a burden.

A notable study by Le and Tran (2022) applied the non-linear ARDL model to examine the relationship between public debt and economic growth in Vietnam. The findings reveal that public debt has a positive impact on GDP growth, but this effect is only observed within a certain threshold. Specifically, when public debt increases to a reasonable level, government borrowing contributes to public investment, generating spillover effects across the economy.

However, once public debt exceeds a certain limit, its positive impact gradually diminishes and becomes negative. This is primarily due to rising debt servicing costs, which place pressure on the state budget, reduce fiscal space, and constrain the development investment capacity. This study confirms the existence of a non-linear relationship between public debt and growth and highlights the importance of maintaining a safe debt threshold to ensure long-term macroeconomic stability.

A recent study in Southeast Asia employed the Fourier ARDL approach to examine the long-term effects of external debt on economic growth. Specifically, Triatmanto, Bawono, and Wahyuni (2023) applied this method to four countries – Indonesia, Thailand, Vietnam, and the Philippines – over the period 2000-2020. The findings reveal that in the case of Vietnam, external debt has a negative impact on GDP growth, particularly when the investment structure is inefficient and capital allocation across economic sectors is suboptimal. This result contrasts with previous studies that suggest that external debt could support growth if effectively utilized, highlighting the critical importance of investment quality and the efficiency of debt management.

Regarding savings, a report by Amro (2022) indicates that although domestic savings in Vietnam have consistently increased (exceeding 30% of gross national income (GNI), these funds have not been effectively translated into public investment. In addition, the World Bank (2019) report highlights that Vietnam is yet to establish a sufficiently robust monetary market mechanism to absorb savings, thereby diminishing its positive impact on long-term economic growth.

Building on the theoretical and empirical foundations presented in the literature review, this study constructs a model to analyze the extent to which external debt, debt services, and gross savings influence economic growth, with GNI serving as the representative variable for Vietnam. In this context, external debt is considered an important financial resource that supports development investment; however, it is also accompanied by debt service obligations that may place pressure on the national budget and negatively affect growth. According to growth theories, such as Solow (1956) and Romer (1990), savings are a key factor in promoting capital accumulation and long-term economic growth. However, when debt service exceeds a country's repayment capacity, it can lead to a crowding-out effect on private investment and constrain the fiscal space.

To clarify these impact mechanisms, the autoregressive distributed lag (ARDL) model was employed. By incorporating both borrowing and repayment factors, the model provides a more comprehensive reflection of the costs and benefits associated with mobilizing external capital. The ARDL approach allows for the examination of both short- and long-term effects, making it well suited to the characteristics of Vietnam's macroeconomic data. This offers empirical evidence to support the formulation of effective fiscal policies and debt management strategies.

In this study, GNI was selected as the primary indicator instead of GDP, which is commonly used in international research, to more accurately reflect the country's actual growth capacity. GNI not only measures the total value of goods and services produced domestically, but also includes net income from abroad, such as remittances, dividends, and investment returns, which are particularly significant for highly open economies such as Vietnam. Thus, the GNI provides a more comprehensive representation of the national resources available for consumption, savings, and debt repayment. The use of GNI also ensures consistency when analyzing indicators such as gross savings (% of GNI) or debt service (% of GNI), which are metrics recommended by the International Monetary Fund and the World Bank for assessing fiscal strength. Furthermore, in the context of Vietnam's high level of FDI, GDP figures may be inflated due to profit repatriation by foreign-invested enterprises, whereas GNI excludes this income outflow, offering a more accurate reflection of domestic economic capacity (ADB, 2022).

The GNI is also widely used in fiscal sustainability analyses and public debt assessment frameworks by the IMF, thereby enhancing the practical relevance of this study. In recent quantitative models, GNI has increasingly been preferred for analyzing savings, external debt, and economic growth (Brueckner et al. 2023; Chudik et al. 2020), further supporting the appropriateness and suitability of selecting GNI as the core indicator in this research.

3. Materials and Methods

Based on the aforementioned literature review and building upon the empirical studies discussed, this study proposes the following model for the case of Vietnam:

$$GNI_t = \alpha_0 + \alpha_1 EDS_t + \alpha_2 GSA_t + \alpha_3 TDS_t + \varepsilon_t \quad (1)$$

This study employs a time-series dataset for Vietnam covering 1996 to 2023 with four key variables. The dependent variable is the growth rate of GNI, which represents the country's economic growth and reflects the increase in total income generated by the nation's residents, both domestically and abroad. The three independent variables include external debt stock (EDS), which measures the debt burden relative to the size of the economy; gross savings (GSA), which captures the portion of disposable income not used for final consumption; and total debt service (TDS), indicating the periodic debt repayment pressure on GNI. These indicators are used to analyze the relationship between public debt, domestic savings, and the growth performance of the Vietnamese economy in both the short and long run. Table 1 summarizes the study variables.

Table 1. Description of variables.

Acronyms	Description	Sources
GNI	GNI growth (annual %)	https://databank.worldbank.org/source/world-development-indicators#
EDS	External debt stock (% of GNI)	
GSA	Gross savings (% of GNI)	
TDS	Total debt service (% of GNI)	

Source: author's compilation.

The ARDL model is selected because of its notable advantage in simultaneously assessing both short- and long-run relationships among variables in time-series data. This feature is particularly suitable for macroeconomic data that are often unstable and subject to fluctuations over time. Unlike classical regression methods, which require all variables to be stationary in the same order, the ARDL approach allows for the inclusion of variables integrated at different orders I(0) and I(1), provided that none are integrated at the second order I(2). This flexibility broadens the applicability of the model, particularly in the analysis of real-world macroeconomic time series.

The ARDL model was developed by Pesaran, Shin, and Smith (2001) and has since been widely applied in empirical research to analyze the interactions among macroeconomic indicators. One of the key advantages of the ARDL approach is its ability to test for cointegration among variables using the bounds test, even when variables are not integrated in the same order. This is a significant strength when working with Vietnam's macroeconomic data, where variables often exhibit nonstationary properties and may be integrated in different orders.

Moreover, the ARDL model is an unrestricted dynamic model in which the dependent variable is expressed as a function of its own lagged values and those of independent variables. This structure allows the model to flexibly capture the influence of past economic shocks on current outcomes, thereby providing reliable estimates for both short- and long-term relationships. In addition, the ARDL approach can be applied to both large and small sample sizes, while maintaining estimation accuracy, even in the presence of endogeneity in some independent variables (Menegaki, 2019). The quantitative analysis using the ARDL method is carried out through the following steps: first, determine the optimal lag length for the model using information criteria such as the Akaike Information Criterion (AIC), Schwarz Criterion (SC), HQ, Likelihood Ratio (LR), and Final Prediction Error (FPE); second, test the stationarity of the variables using the Correlogram Analysis method; and third, conduct the bounds test for cointegration among the variables. If the F-statistic exceeds the upper critical bound I(1), it provides evidence for the existence of a long-run relationship; Fourth, estimate the ARDL model is estimated based on the selected lag structure, and the Error Correction Model (ECM) is applied to assess the speed of adjustment back to long-run equilibrium following short-run shocks, following the methodology of Engle and Granger (1987); and finally, post-estimation diagnostic tests are performed to evaluate the reliability and robustness of the regression results.

Overall, the ARDL model offers a robust and flexible methodological framework for analyzing complex relationships in macroeconomics. It is particularly well suited to datasets characterized by heterogeneous stationarity properties and limited sample sizes, as is the case for Vietnam.

Based on Equation (1), the ARDL regression model employed in this study is as follows:

$$DGNI_t = \beta_0 + \sum_{i=>1} \beta_1 DGNI_{t-i} + \sum_i \beta_2 DEDS_{t-i} + \sum_i \beta_3 DGSA_{t-i} + \sum_i \beta_4 DTDS_{t-i} + \lambda_1 GNI_{t-1} + \lambda_2 EDS_{t-1} + \lambda_3 GSA_{t-1} + \lambda_4 TDS_{t-1} + \varepsilon_{it} \quad (2)$$

The model for assessing long-term impact is defined:

$$GNI_t = \beta_0 + \lambda_1 GNI_{t-1} + \lambda_2 EDS_{t-1} + \lambda_3 GSA_{t-1} + \lambda_4 TDS_{t-1} + \varepsilon_{1t} \quad (3)$$

And the model for assessing short-term impact is specified:

$$DGNI_t = \beta_0 + \sum_{i=>1} \beta_1 DGNI_{t-i} + \sum_i \beta_2 DEDS_{t-i} + \sum_i \beta_3 DGSA_{t-i} + \sum_i \beta_4 DTDS_{t-i} + \varepsilon_{2t} \quad (4)$$

Evaluation of the ECM based on the model:

$$DGNI_t = \beta_0 + \sum_{i=>1} \beta_1 DGNI_{t-i} + \sum_i \beta_2 DEDS_{t-i} + \sum_i \beta_3 DGSA_{t-i} + \sum_i \beta_4 DTDS_{t-i} + \psi ECM_{t-i} + \varepsilon_{3t} \quad (5)$$

The ECM model is an important econometric tool used to analyze the dynamic relationships among economic variables in the short run while accounting for the influence of an established long-run equilibrium through cointegration. One of the key components of ECM is the error correction coefficient, which is commonly denoted as ψ. This parameter reflects the speed at which the dependent variable returns to long-run equilibrium following a short-term deviation.

Specifically, if the value of ψ is negative and statistically significant, this indicates the presence of a self-correcting mechanism within the system. When the dependent variable is affected by short-term shocks and deviates from its equilibrium path, it gradually returns to long-run equilibrium at a speed determined by the magnitude of ψ. The larger the absolute value of ψ, the faster is the adjustment process, suggesting that the system has a strong capacity to recover from short-run disturbances. Conversely, if ψ is not statistically significant or is non-negative, it implies that the dependent variable lacks a tendency to revert to equilibrium; hence, the long-run relationship among the variables in the model may not be stable. The ECM is therefore regarded as a bridge between theory and empirical analysis, enabling researchers to assess both short- and long-run adjustment dynamics in macroeconomic relationships, particularly in contexts where time series data are non-stationary but exhibit cointegrated relationships.

4. Results

In the section, table 2 presents the descriptive statistics for the four variables used in the research model.

Table 2. Descriptive statistics of variables.

	GNI	EDS	GSA	TDS
Mean	6.691786	43.38896	31.69664	3.466357
Median	6.965000	37.91350	32.87450	3.112000
Maximum	16.72900	107.6440	36.79600	6.959000
Minimum	-1.154000	27.55000	21.38400	1.321000
Std. Dev.	3.268611	19.93916	4.026067	1.789749
Skewness	0.487498	2.079858	-1.209588	0.517730
Kurtosis	5.202185	6.072419	3.785534	1.977517
Sum	187.3700	1214.891	887.5060	97.05800
Sum Sq. Dev.	288.4632	10734.40	437.6488	86.48641
Observations	28	28	28	28

Source: Calculated by the author using EViews.

The average GNI growth rate was 6.69%, with values ranging from 1.15% to 16.73%. A standard deviation of 3.27 indicates a moderate level of volatility. This variable exhibits slight

positive skewness (skewness = 0.49) and relatively high kurtosis (kurtosis = 5.20), suggesting the presence of a few years with exceptionally high growth rates.

For EDS, the average EDS accounts for 43.39% of the GNI, ranging from 27.55% to 107.64%, with a high standard deviation (19.94), reflecting significant fluctuations over time. The distribution of this variable was strongly right-skewed (skewness = 2.08) and sharply peaked (kurtosis = 6.07), indicating a concentration around the mean with a few unusually high observations.

The GSA variable records an average gross savings rate of 31.70% of the GNI, with a standard deviation of 4.03. Its distribution is left-skewed (skewness = –1.21) with a kurtosis of 3.79, indicating a relatively concentrated distribution with a tendency toward lower average values over several years.

Finally, TDS has an average value of 3.47% of GNI, ranging from 1.32% to 6.96%, and the smallest standard deviation among the four variables (1.79), indicating relative stability over the years. The distribution of TDS was fairly symmetric (skewness = 0.52) and had a kurtosis close to 2, reflecting an approximately normal distribution structure. Table 3 presents the correlation matrices for the variables used in the research model.

Table 3. Correlation coefficients of variables.

	GNI	EDS	GSA	TDS
GNI	1.000000	-0.008598	-0.012890	-0.152765
EDS	-0.008598	1.000000	-0.826669	0.079439
GSA	-0.012890	-0.826669	1.000000	0.144688
TDS	-0.152765	0.079438	0.144688	1.000000

Source: Calculated by the author using EViews.

The results indicated that the correlations among the variables were relatively low, except for the relationship between EDS and GSA. Specifically, the correlation coefficients between GNI and the independent variables were all very small and negative, with GNI weakly correlated with EDS (r = 0.0086), GSA (r = -0.0129), and TDS (r = -0.1528). This suggests that external debt, savings, and debt service obligations do not exhibit significant linear relationships with GNI growth in the sample. Notably, the correlation coefficient between EDS and GSA was − -0.8267, indicating a strong inverse relationship between these two variables. This implies that, in periods of rising external debt, the gross savings rate tends to decline substantially. This may reflect the financial burden and high debt service obligations that reduce the portion of national income available for savings. Meanwhile, the correlations between TDS and the other variables were all relatively low: TDS - GNI at -0.1528, TDS - EDS at 0.0794, and TDS - GSA at 0.1447. These values suggest that the total debt service does not have a clearly defined linear relationship with other macroeconomic variables, although further testing within the regression models is warranted. In summary, according to Mukaka (2012), the correlation matrix in Table 3 shows that most variables do not exhibit high linear intercorrelations (with the exception of EDS-GSA), thereby minimizing the risk of severe multicollinearity in the regression model and facilitating the estimation process in the subsequent quantitative analysis.

Table 4 provides the results of the optimal lag length selection for the model based on statistical criteria such as the LR, FPE, AIC, SC, and Hannan–Quinn Criterion (HQ).

Table 4. Optimal lag selection.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-277.7962	NA	30493.75	21.67663	21.87019	21.73237
1	-229.2127	78.48107*	2535.378*	19.17021*	20.13798*	19.44889*
2	-215.6975	17.67375	3391.901	19.36135	21.10333	19.86297

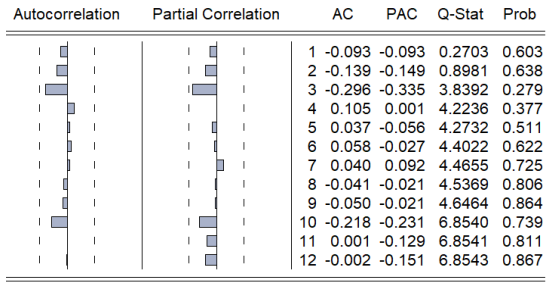
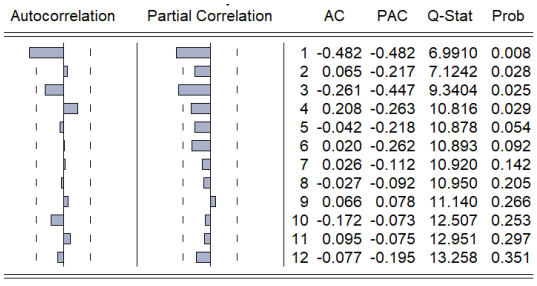
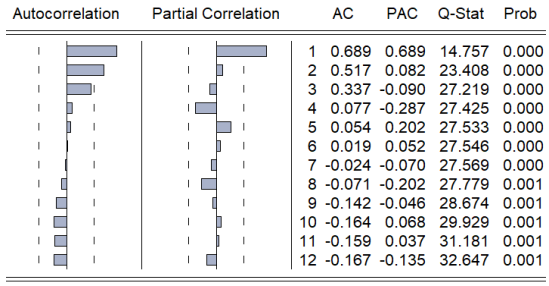
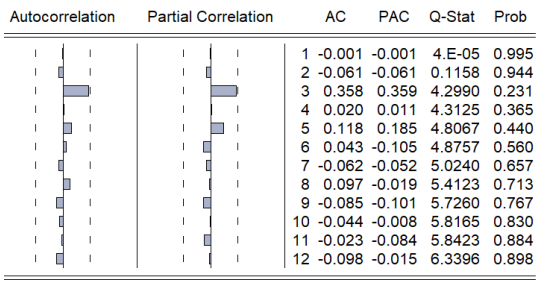
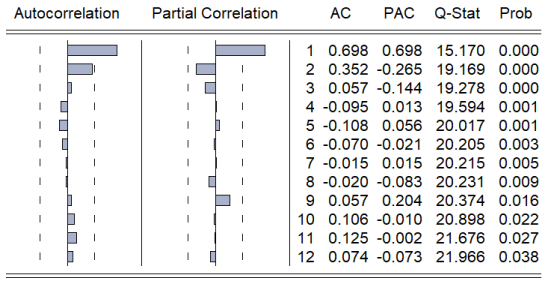
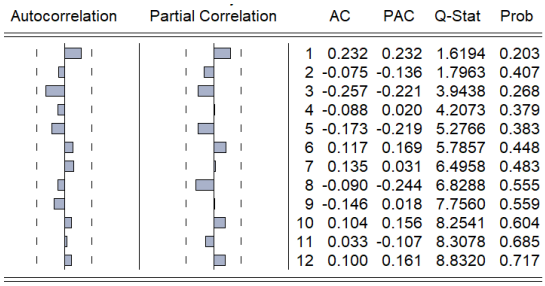
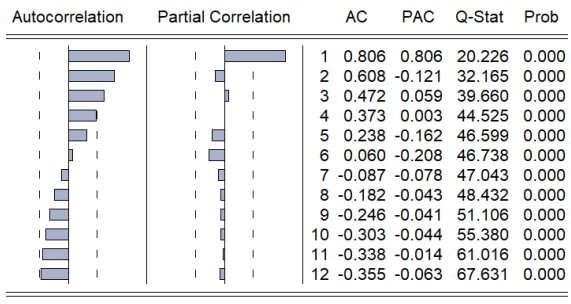
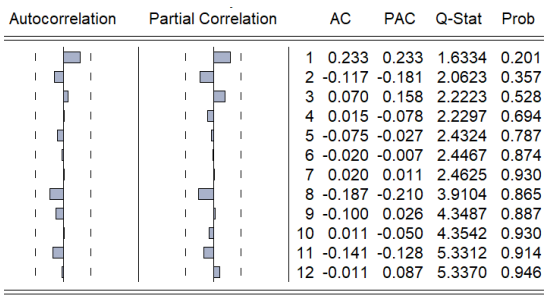
Source: Calculated by the author using EViews.

The results show that at lag length 1, most of the statistical criteria reach their optimal (minimum) values: LR = 78.48107*, FPE = 2535.378*, AIC = 19.17021*, SC = 20.13798*, and HQ = 19.44889*. Asterisk (*) denotes the optimal value for each criterion. Therefore, the optimal lag length selected is 1, which ensures a good model fit while avoiding over-parameterization. Determining the appropriate lag length is essential to ensure the estimation efficiency and reliability of the subsequent diagnostic tests in the ARDL model.

When applying the ARDL bounds testing approach, stationarity testing of the variables

must first be conducted as a prerequisite for examining the degree of integration among the observed time series. The stationarity of the variables was assessed using Correlogram Analysis. According to table 5, the GNI variable is stationary at level I(0), whereas the remaining three variables are stationary at first difference I(1). These integration properties confirm the suitability of the ARDL method, as it allows for the inclusion of variables integrated at different orders (I(0) and I(1)) and enables the analysis of both long- and short-run relationships among variables within the model.

Table 5. Results of unit root tests for variable stationarity.

Variables	I(0)	I(1)
GNI		
EDS		
GSA		
TDS		

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	1	-0.093	-0.093	0.2703	0.603
2	2	-0.139	-0.149	0.8981	0.638
3	3	-0.296	-0.335	3.8392	0.279
4	4	0.105	0.001	4.2236	0.377
5	5	0.037	-0.056	4.2732	0.511
6	6	0.058	-0.027	4.4022	0.622
7	7	0.040	0.092	4.4655	0.725
8	8	-0.041	-0.021	4.5369	0.806
9	9	-0.050	-0.021	4.6464	0.864
10	10	-0.218	-0.231	6.8540	0.739
11	11	0.001	-0.129	6.8541	0.811
12	12	-0.002	-0.151	6.8543	0.867

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	1	-0.482	-0.482	6.9910	0.008
2	2	0.065	-0.217	7.1242	0.028
3	3	-0.261	-0.447	9.3404	0.025
4	4	0.208	-0.263	10.816	0.029
5	5	-0.042	-0.218	10.878	0.054
6	6	0.020	-0.262	10.893	0.092
7	7	0.026	-0.112	10.920	0.142
8	8	-0.027	-0.092	10.950	0.205
9	9	0.066	0.078	11.140	0.266
10	10	-0.172	-0.073	12.507	0.253
11	11	0.095	-0.075	12.951	0.297
12	12	-0.077	-0.195	13.258	0.351

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	1	0.689	0.689	14.757	0.000
2	2	0.517	0.082	23.408	0.000
3	3	0.337	-0.090	27.219	0.000
4	4	0.077	-0.287	27.425	0.000
5	5	0.054	0.202	27.533	0.000
6	6	0.019	0.052	27.546	0.000
7	7	-0.024	-0.070	27.569	0.000
8	8	-0.071	-0.202	27.779	0.001
9	9	-0.142	-0.046	28.674	0.001
10	10	-0.164	0.068	29.929	0.001
11	11	-0.159	0.037	31.181	0.001
12	12	-0.167	-0.135	32.647	0.001

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	1	-0.001	-0.001	4.E-05	0.995
2	2	-0.061	-0.061	0.1158	0.944
3	3	0.358	0.359	4.2990	0.231
4	4	0.020	0.011	4.3125	0.365
5	5	0.118	0.185	4.8067	0.440
6	6	0.043	-0.105	4.8757	0.560
7	7	-0.062	-0.052	5.0240	0.657
8	8	0.097	-0.019	5.4123	0.713
9	9	-0.085	-0.101	5.7260	0.767
10	10	-0.044	-0.008	5.8165	0.830
11	11	-0.023	-0.084	5.8423	0.884
12	12	-0.098	-0.015	6.3396	0.898

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	1	0.698	0.698	15.170	0.000
2	2	0.352	-0.265	19.169	0.000
3	3	0.057	-0.144	19.278	0.000
4	4	-0.095	0.013	19.594	0.001
5	5	-0.108	0.056	20.017	0.001
6	6	-0.070	-0.021	20.205	0.003
7	7	-0.015	0.015	20.215	0.005
8	8	-0.020	-0.083	20.231	0.009
9	9	0.057	0.204	20.374	0.016
10	10	0.106	-0.010	20.898	0.022
11	11	0.125	-0.002	21.676	0.027
12	12	0.074	-0.073	21.966	0.038

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	1	0.232	0.232	1.6194	0.203
2	2	-0.075	-0.136	1.7963	0.407
3	3	-0.257	-0.221	3.9438	0.268
4	4	-0.088	0.020	4.2073	0.379
5	5	-0.173	-0.219	5.2766	0.383
6	6	0.117	0.169	5.7857	0.448
7	7	0.135	0.031	6.4958	0.483
8	8	-0.090	-0.244	6.8288	0.555
9	9	-0.146	0.018	7.7560	0.559
10	10	0.104	0.156	8.2541	0.604
11	11	0.033	-0.107	8.3078	0.685
12	12	0.100	0.161	8.8320	0.717

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	1	0.806	0.806	20.226	0.000
2	2	0.608	-0.121	32.165	0.000
3	3	0.472	0.059	39.660	0.000
4	4	0.373	0.003	44.525	0.000
5	5	0.238	-0.162	46.599	0.000
6	6	0.060	-0.208	46.738	0.000
7	7	-0.087	-0.078	47.043	0.000
8	8	-0.182	-0.043	48.432	0.000
9	9	-0.246	-0.041	51.106	0.000
10	10	-0.303	-0.044	55.380	0.000
11	11	-0.338	-0.014	61.016	0.000
12	12	-0.355	-0.063	67.631	0.000

Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob
1	1	0.233	0.233	1.6334	0.201
2	2	-0.117	-0.181	2.0623	0.357
3	3	0.070	0.158	2.2223	0.528
4	4	0.015	-0.078	2.2297	0.694
5	5	-0.075	-0.027	2.4324	0.787
6	6	-0.020	-0.007	2.4467	0.874
7	7	0.020	0.011	2.4625	0.930
8	8	-0.187	-0.210	3.9104	0.865
9	9	-0.100	0.026	4.3487	0.887
10	10	0.011	-0.050	4.3542	0.930
11	11	-0.141	-0.128	5.3312	0.914
12	12	-0.011	0.087	5.3370	0.946

Source: Calculated by the author using EViews.

Table 6 illustrates that the F-statistic value from the Bound Test is 6.988058, which exceeds the upper-bound critical values (I(1)) at all significance levels (10%, 5%, 2.5%, and 1%). With three explanatory variables (k = 3), this result allows us to reject the null hypothesis of no cointegration among variables. Therefore, it can be concluded that a long-run

relationship exists between GNI, EDS, GSA, and TDS within the ARDL model. This finding justifies the subsequent estimation of both short- and long-run coefficients, as well as the use of the ECM to analyze the adjustment mechanism toward long-run equilibrium.

Table 6. Bound test results.

F-bounds test		Null hypothesis: No levels relationship		
Test statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.988058	10%	2.72	3.77
k	3	5%	3.23	4.35
		2.5%	3.69	4.89
		1%	4.29	5.61

Source: Calculated by the author using EViews.

Table 7 reports the regression results based on the ARDL model and the corresponding ECM.

Table 7. Estimation results.

Variables	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
The dependent variable: GNI. Long-term estimation results				
EDS	0.014265	0.044543	0.320245	0.0425
GSA	0.246908	0.196652	1.255563	0.2253
TDS	-0.731115	0.284949	-2.565774	0.0194
The dependent variable: D(GNI). Short-term estimation results				
C	0.414862	0.609290	0.680894	0.5046
D(GNI(-1))	0.320090	0.183601	1.743401	0.0983
D(TDS)	-0.487492	0.807939	-0.603377	0.5538
D(TDS(-1))	2.532032	0.807968	3.133828	0.0057
CointEq(-1)*	-1.620732	0.283811	-5.710599	0.0000
R-squared	0.705717			
Adjusted R-squared	0.649664			
F-statistic	12.58999			
Prob(F-statistic)	0.000022			

Source: Calculated by the author using EViews.

In the long run, the regression results revealed that the relationship between GNI and the three explanatory variables (EDS, GSA, and TDS) was heterogeneous in both magnitude and statistical significance.

Specifically, the EDS variable had a positive regression coefficient of 0.014265 and was statistically significant at the 5% level ($p = 0.0425$). This implies that, in the long run, a 1% increase in external debt is associated with an average increase of approximately 0.0143% in GNI. Although the coefficient is relatively small, the result suggests that external debt can play a positive role in promoting national income growth if it is effectively managed and allocated to investment, production development, or the enhancement of economic infrastructure.

In contrast, the GSA variable has a positive coefficient of 0.246908, reflecting potential savings to improve national income. However, the associated p-value of 0.2253 exceeds the conventional significance levels (10%), indicating that the effect of savings on GNI in the long term is not statistically significant. This may be due to inefficiencies in translating savings into productive investment, or structural constraints within the economy that limit its capacity to absorb increased savings.

On the other hand, TDS exhibited a significantly negative effect on GNI in the long run, with a coefficient of -0.731115 and statistical significance at the 5% level ($p = 0.0194$). This confirms that a high debt service burden negatively impacts national income, as interest and principal repayments divert financial resources away from productive investments or domestic consumption. The result highlights the critical need to manage debt service obligations effectively, particularly when borrowing is not accompanied by efficient capital utilization, as this could pose a long-term constraint on economic growth.

In sum, the long-run regression model reveals a complex relationship between debt, savings, and financial obligations and national income, underscoring the importance of prudent fiscal and debt policies aimed at optimizing the use of national resources.

In the short run, the regression results further clarify the adjustment dynamics of GNI in response to the explanatory variables and confirm the existence of a mechanism that restores the long-run equilibrium. The constant term (C) has a positive coefficient (0.414862), but is not statistically significant (p = 0.5046), indicating that the baseline influence on short-term GNI fluctuations is negligible.

The lagged dependent variable D(GNI(-1)) has a coefficient of 0.320090 and is statistically significant at the 10% level (p = 0.0983), implying that previous period changes in GNI continue to influence current outcomes. This reflects the persistence and inertia of national income adjustments.

With regard to debt service, while the contemporaneous change in debt service, D(TDS), is not statistically significant (p = 0.5538), the one-period lag, D(TDS(-1)), shows a strongly positive effect, with a coefficient of 2.532032 and high statistical significance at the 1% level (p = 0.0057). This suggests that, in the short term, debt service may lead to a rebound or compensatory effect, potentially due to resource reallocation or improved economic expectations following large debt repayments, thereby contributing to an increase in GNI.

Most notably, the error correction term, CointEq(-1), has a coefficient of -1.620732 and is highly statistically significant (p = 0.0000). The negative sign and large absolute value of this coefficient indicate a strong adjustment mechanism, with a speed of convergence to the long-run equilibrium of approximately 162% per period. This implies that any deviation from the long-run GNI equilibrium is corrected rapidly by the system. Furthermore, the model exhibited a good fit, with an R-squared value of 0.705717 and a highly significant F-statistic (p = 0.000022), reinforcing the model's explanatory power in capturing short-term variations in GNI.

Based on these findings, it can be concluded that, in the short run, GNI fluctuations are significantly influenced by dynamic (lagged) effects and financial obligations, while the economy demonstrates a very rapid tendency to restore macroeconomic stability following disturbances.

Table 8 summarizes the results of the regression model diagnostic tests, including the four key tests used to assess the reliability and adequacy of the model.

Table 8. Diagnostic test results.

Test	P-Value	Results
Normality test	0.5097	The residuals follow a normal distribution.
Breusch-Godfrey Serial Correlation LM Test	0.3913	No autocorrelation
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.5636	No heteroskedasticity
Ramsey Reset Test	0.1171	No need for additional variables

Source: Calculated by the author using EViews.

First, the Normality test yielded a p-value of 0.5097, which is greater than the significance level of 0.05. This indicates that the residuals of the model follow a normal distribution, thereby satisfying the key assumption of linear regression and validating the subsequent statistical inferences. Second, the Breusch-Godfrey Serial correlation LM test produces a p-value of 0.3913, which also exceeds the threshold of 0.05. This result leads to the rejection of the null hypothesis of serial correlation, implying that the residuals are not autocorrelated, which supports the independence of observations and reliability of the estimated coefficients. Third, the Heteroskedasticity Test (Breusch-Pagan-Godfrey) returns a p-value of 0.5636, well above the 5% level, suggesting that the residuals exhibit constant variance (homoscedasticity). This ensures that the estimators are efficient and the standard errors are robust. Finally, the Ramsey Reset Test yields a p-value of 0.1171, which again exceeds the significance level of 0.05. This suggests that there is no evidence of omitted variable bias or functional form misspecification, indicating that the model is correctly specified. In summary, all diagnostic tests support the fundamental assumptions of the regression model, confirming its reliability, the absence of specification errors, and appropriateness for statistical inference and policy analysis.

Finally, figure 1 presents the results of the CUSUM and CUSUM of Squares tests, which are two commonly used methods for assessing the stability of regression coefficients over time.

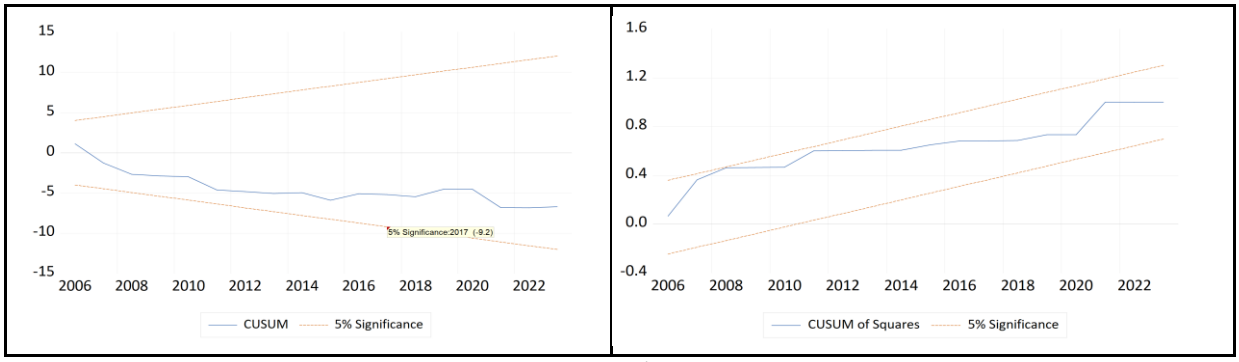


Figure 1. CUSUM test results.
Source: Calculated by the author using EViews.

The left-hand graph displays the CUSUM line, while the right-hand graph shows the CUSUM of the square line. The blue line represents the computed test statistics and the two red dashed lines indicate the 5% confidence bounds (critical limits). The results reveal that both the CUSUM and CUSUM of square lines remained within the 5% boundaries throughout the observation period. This indicates the structural stability of the model and that there is no evidence of structural breaks or unexpected changes in the relationships among the variables over time. In other words, the estimated parameters of the ARDL model are stable, thereby enhancing the reliability of the model's conclusions in both the short and the long run.

5. Discussion and Conclusions

The regression results clarify the relationship between EDS, total debt service, gross savings, and Vietnam's GNI. Quantitative analysis shows that, in the long run, external debt has a positive impact on GNI. This finding is consistent with that of Kikuchi and Tobe (2021), who highlight the growth-enhancing role of public debt through the investment channel when properly managed. However, this contrasts with the study by Triatmanto et al. (2023), who argue that external debt in Vietnam has a negative effect on GDP growth due to suboptimal investment structures. This discrepancy may stem from the current study's use of GNI rather than GDP, which offers a more accurate reflection of net national income by excluding the repatriated income of the FDI sector.

Notably, debt service obligations have a statistically significant negative impact on GNI in the long run, indicating that fiscal pressure from repaying both the principal and interest may undermine economic development potential if it exceeds the economy's tolerance threshold. This result aligns with the findings of Asghar et al. (2024) and Adubofour et al. (2021), both of which emphasize the "crowding-out" effect on private investment caused by a heavy debt burden. However, in the short run, debt service shows a statistically significant positive effect with a positive coefficient at the 1% level, suggesting a potential psychological response in the market. For example, timely debt repayments may increase confidence in fiscal discipline or lead to improvements in a country's credit rating. This finding is also supported by Muhammad and Abdullahi (2020), who argue that short-term debt repayments can enhance creditworthiness and market liquidity.

Although gross savings exhibit a positive coefficient in the long run, this relationship is not statistically significant. This finding contrasts with those of Brueckner et al. (2023) and Hussain and Saaed (2018), who argue that savings are a strong driver of national growth in developing countries. This discrepancy may stem from the situation in Vietnam, where despite a high domestic savings rate, resource allocation efficiency and the investment absorption mechanism remain limited (Amro, 2022; World Bank, 2019). Furthermore, this outcome also reflects the challenges of translating savings into actual productive investments, particularly within the public sector.

The error correction coefficient is negative and highly statistically significant, confirming the existence of a cointegrating relationship among the variables and a rapid adjustment speed toward a long-run equilibrium following a shock. The post-estimation diagnostic tests further supported the high reliability of the estimated coefficients.

Overall, this study provides robust empirical evidence of the relationship between external debt, debt service obligations, and savings with GNI in Vietnam. The findings suggest that external debt can serve as a valuable financial instrument for promoting growth

if managed effectively, whereas debt services must be closely monitored to avoid long-term adverse effects on national income. Simultaneously, domestic savings need to be better leveraged through reforms in financial markets and public investment to play a more pronounced role in sustainable development. Compared to both international and domestic studies, the results of this study confirm several previously established trends and offer policy implications tailored to the specific economic characteristics of Vietnam in the current development context.

In the context of Vietnam's ongoing efforts to sustain economic growth and ensure fiscal stability, the empirical findings of this study indicate that external debt has a statistically significant and positive impact on GNI in the long run, whereas debt services exert a negative effect. These findings offer important insights for future macroeconomic policymaking.

First, Vietnam should continue to leverage long-term external borrowing effectively to promote economic growth. The regression results suggest that external debt contributes positively and significantly to GNI, implying that when used appropriately, international loans can generate added value for the economy. Therefore, the government should prioritize concessional loans with favorable interest rates and long maturities, and allocate borrowed capital to high-impact projects, particularly in infrastructure, education, healthcare, and digital transformation.

Second, managing debt service obligations is critical for ensuring the sustainability of growth. The long-run negative effect of debt services on GNI implies that if the repayment burden exceeds safe limits, the economy may face a decline in national income. As such, Vietnam should adopt a debt restructuring strategy, favor loans with appropriate grace periods, and strictly monitor disbursement progress to avoid borrowing for debt rollover or the inefficient use of funds.

Third, domestic savings should be promoted alongside improvements in the efficiency of transforming savings into investments. Although savings did not show statistically significant effects, the positive regression coefficient suggests its potential as a growth supporting factor. The government should enhance saving incentives through competitive interest rate mechanisms, diversify capital markets, and build public trust in the financial and banking systems.

Fourth, maintaining macroeconomic stability remains a fundamental condition for optimizing the impact of financial factors on growth. This underscores the importance of implementing flexible fiscal and monetary policies in a coordinated manner to sustain a favorable investment environment and maintain inflation within acceptable bounds.

Fifth, strengthening oversight and transparency regarding the use of external loans is essential. To maximize the positive impact of external debt, robust mechanisms must be established to evaluate the efficiency of loan utilization and ensure public disclosure throughout the public investment process. The roles of the State Audit Office, the National Assembly, and other inspection and supervisory agencies should be enhanced, along with encouraging civic and independent oversight in monitoring foreign loan-financed projects.

In conclusion, this study offers several practical policy recommendations for Vietnam to effectively mobilize and utilize international financial resources. If wisely managed and purposefully deployed, external debt can become a key driver of economic growth. Debt service obligations must be tightly controlled to prevent adverse effects on national income. These efforts should be complemented by domestic reforms such as increasing savings, maintaining macroeconomic stability, improving the efficiency of public investment, and building a safe, transparent, and sustainable national financial system for the future.

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