Impact of National Debt Burden on Indonesia's Economic Stability

Abstract: This research asserts that national debt becomes burdensome when there is an increase in debt overhang, a lack of foreign reserves to pay for short-term external debt and a lack of revenue from the government to pay for debt service. The purpose of this study is to investigate the connection between Indonesia's economic stability and national burden debt. Data collected from 2000 to 2022, sourced from the World Development Indicators and the Statistical Bulletin of the Central Bank of Indonesia (2022 edition), were utilized. The factors used to quantify the obligation trouble are the all out obligation to-Gross domestic product proportion (obligation overhang), the momentary outer obligation to-saves proportion (hold sufficiency), and the obligation administration cost-to-government income proportion (income ampleness). The exchange rate is considered a control variable. The real growth rate of GDP is used to evaluate economic stability. The analysis is carried out using the Autoregressive Distributed Lag (ARDL) model, which takes into account first differences and the stationary nature of the variables at both levels. The ARDL estimation demonstrates that revenue sufficiency has a significant and negative impact on economic stability over time, with the overall effect of the explanatory variables decreasing over time.

Keywords: Debt burden, ARDL, Autoregressive Distributed Lag, economic stability, debt servicing, Indonesia, GDP, exchange rate, reserves.

I. INTRODUCTION

National debt has macroeconomic significance because it makes money available to finance fiscal and balance of payment deficits, helps provide investable cash, and eases budgetary constraints (Onyele & Nwadike, 2021). The World Bank emphasized that in order to expand capital formation and investments, which are occasionally constrained by a shortage of local savings, countries, particularly those with resource-bound economies, must borrow money. The dual gap study shows that, especially in developing nations, persistent shortages of the foreign exchange income and savings needed to finance domestic initiatives usually make debt inescapable. However, poor management of the national debt may result in debt payment costs that cause financial hardship and an economic catastrophe in the debtor nation (Bank, 2022). As a result, according to (Ogunlana, 2005), a balanced approach to domestic debt and savings was necessary for ensuring sustainable economic growth.

The question that needs to be addressed is: At what juncture does the national debt transition from being a manageable obligation to becoming a significant burden on the economy and financial stability? In order to provide a comprehensive response to this inquiry, pointing to rising levels of debt (the total debt to GDP ratio), debt service as a share of government revenue, and short-term external debt as a percentage of foreign debt reserves ratios over time as indicators of a heavy national debt load and unstable economic conditions. Repayment of the principle amount borrowed and the agreed-upon interest will be challenging if the funds are not invested in initiatives that will be profitable. (CSOM-BIRO & CSABA, 2017)

In an effort to close the gap in the development budget, the Indonesian government enacted a number of policies in the form of internal and external (external) stimulus measures. In addition to increasing sources of state revenue through the intensification and extensification of tax and non-tax measures, the Indonesian government also occasionally uses foreign debt and foreign investment programs (Junaedi et al., 2022). Debt is a behavior that never truly leaves people, businesses, or the state as a whole. In addition to serving commercial interests, it also serves consumer requirements. Debt is viewed from a business viewpoint as a typical method to increase firm capital. The governance of a nation experiences the same phenomenon. In reality, practically all nations have kept up with borrowing to boost their capital or national development funds. Due to its status as a developing country, Indonesia has a long history of borrowing money from foreign governments through bilateral and multilateral financial institutions (Junaedi et al., 2022).

Having a desire to catch up in numerous areas of life, particularly the economy, and a dedication to being a great nation. Indonesia has to grow a number of economic areas in order to do this. However, a sizable sum of money

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is needed for economic development in order to carry out development in a variety of industries. The required capital, however, is enormous and even exceeds what the nation can provide. Additional financial contributions from financially sound nations or international organizations in the form of foreign debt are required to fill this budget gap (Harjanto, 2015).

State revenue is one of the most crucial components as a source of funding for international development, with reference to the design of the State Budget (APBN). The government, however, frequently encounters numerous difficulties in its efforts to raise domestic funding to meet its development goals. There are several of these, such as a dearth of tax revenue, a dearth of domestic savings, and a dearth of contributions from the foreign commerce sector. These elements serve as the government's guide when securing foreign loans as one of the instruments of help in the growth of various facets of the national life (Jannah & Shidiqi, 2017).

![Fig. 1. External Debt & GDP Statistic of Indonesia in Millions of USD (Bank Indonesia, 2023).](image)

Based on Figure 1.1, it can be observed that the trend of Indonesia's foreign debt has been steadily increasing since 2000 and experienced a slight decrease starting from a certain year. In 2000, the foreign debt position was US$129,300, which then increased to US$252,364 in 2012, representing a 95% increase. Subsequently, it rose by 23% in 2015, 21% in 2018, 10% in 2021, and experienced a 4% decline in 2022.

A crucial part of the finance mechanism for the development of Indonesia and other emerging nations is foreign debt. Indonesia has relied heavily on its foreign debt to make up for both its budget and current account deficits. However, in order to prevent having principal and interest payments that are greater than the amount of new loans, the mobilization of money from abroad must be done with caution during implementation. Most developing nations rely on foreign debt to fund their development, but some do so in a situation known as a foreign debt trap, in which budget deficits are filled by loans from outside, increasing the country's overall foreign debt load (Harinowo, 2002).

The burden of Indonesia's foreign debt puts a considerable strain on the state budget, potentially limiting the ability of the government to pursue fiscal stimulus measures to spur economic growth. With such a heavy weight, the concern is now fiscal sustainability rather than fiscal stimulation (Saleh, 2008). According to Keynesian theory, the government's significant budget deficit in carrying out development programs is the main driver behind it.

The government therefore works to make up for this deficit. However, rising foreign debt levels raise serious concerns about future dependency on external resources. This is due to the fact that debt imposes a duty to pay it back within certain deadlines. Increased expenditure supported by foreign loans can help the economy grow as a result of increased aggregate demand, which is a further effect of capital accumulation (Sukirno, 2000).

Meanwhile, according to the Ricardian Theory by Barro (Barro, 1989), economic growth won't be impacted by the government's use of foreign debt to pay budget shortfalls. This happens because the government must raise taxes in the future to cover the growth consequences of spending that was financed by debt (Astanti, 2015).

Budget deficit is a planned budget where, due to budget constraints, government expenditure is planned to be greater than government revenue (G > T) to meet the goals of the state. This deficit budget is typically pursued when the government aims to stimulate economic growth, and it is commonly implemented when the economy is in a recession (Manurung & Rahardja, 2004). Deficit allocation is a budget in which government expenditure exceeds government revenue. Regular income and development income are insufficient to finance all government expenditures. Since 2003, the state budget has experienced a deficit, and it can even be said that deficit policies have been implemented since the old era to the new era, and this budget policy is still maintained to this day (Fadillah & Sutjipto, 2018a).

What effect does Indonesia's debt burden have on the country's economic stability? is the central research topic this study attempts to answer. The variables utilized in this study to calculate the amount of debt are the overall debt-to-GDP ratio (debt overhang), the short-term external debt-to-external reserves ratio (adequacy of reserves),
and the debt service-to-revenue ratio (adequacy of revenues).
The research contributes to the existing literature by extending the model to include additional variables, specifically revenue and reserve adequacy. This marks a departure from previous studies, which predominantly disregarded the dynamics of revenue and reserve adequacy in favor of concentrating solely on debt stock and debt service levels. Historical data related to these variables can be subjected to analysis through the Autoregressive Distributed Lag (ARDL) model. The structure of this paper is organized as follows: introduction, literature review, methodology, data analysis and discussion of findings, summary, and an exploration of the policy implications stemming from this study.

II. LITERATURE REVIEW

A. Conceptual Framework

The total sum of money a government owes to its people, local or international financial institutions, or other governments (also referred to as sovereign debt, government debt, or fiscal deficit funding). A debt burden, on the other hand, is a financial problem or challenge brought on by the requirement to continuously pay interest out of tax money and foreign reserves. Utilizing tax revenue to service the nation's debt has a direct detrimental effect on domestic savings and available income (Balago, 2014). Similar to this, Sachs emphasized that economic instability was likely to occur under a system where revenue mobilization was centered on debt service since it produced a lot of leakage in the home sector as seen in Fig. 1 (Díaz-Alejandro & Calvo, 1989).

A.1. Some Styled Statistics on Indonesia's National Debt

There are several important elements that contribute to Indonesia's large foreign debt. First off, Indonesia's large-scale infrastructure and economic programs demand significant finance, frequently calling for borrowing from elsewhere. Budget deficits also happen when the government's income, which comes from taxes and other sources, is insufficient to pay for its expenses, forcing it to turn to debt financing. The economy of the nation is also susceptible to changes in the global economy, particularly in the price of commodities like oil, which can result in trade imbalances that must be closed with foreign debt. In addition, Indonesia uses its foreign debt as a lever to draw in FDI, supporting sustainable economic growth. Last but not least, the COVID-19 pandemic's economic effects have necessitated higher government spending, which has led to an increase in foreign debt. Effective debt management is essential to, As shown in Fig. 3, A cycle of financial hardship and economic instability will persist.

Indonesia has accumulated significant debt, and the rising costs of repaying it have made the country's economy unstable. This is due to the fact that, as shown in Figure 3, the rising cost of debt servicing has started to eclipse domestic investments. As a result, there is a discernible effect: the ongoing reallocation of resources for debt
payment diverts money away from financially advantageous endeavors. The national budget cannot be adequately implemented as a result of this diversion since government revenue is utilized to lower interest payments on borrowed money. As a result, debt levels rise and fresh budget deficits start to accumulate.

![Graph: Indonesia’s debt profile](Central Bank of Indonesia, BPS).

From the graphic, it can be observed that in the year 2000, Indonesia’s debt was only at 1,680 trillion Indonesian Rupiah. However, it has since risen significantly to 8,110 trillion in 2022, marking a staggering increase of 382.74 percent over the course of 22 years. This exponential growth in debt is a matter of concern as it has not only strained the country’s fiscal resources but has also led to an unstable economic environment. The rising costs of servicing this debt have started to overshadow domestic investments, which has led to a discernible effect: a continuous reallocation of resources for debt repayment, diverting funds away from financially advantageous endeavors. Consequently, the national budget faces challenges in its effective implementation, as government revenue is increasingly utilized to lower interest payments on borrowed funds. This has resulted in escalating debt levels and the accumulation of fresh budget deficits, posing significant challenges to Indonesia's economic stability in the years ahead.

B. Theoretical Underpinning

The following theoretical frameworks and notions serve as the main pillars on which this research is based. These theories provide the necessary framework for assessing and understanding the data and findings reported in the next sections, acting as the fundamental pillars upon which this study is constructed.

B.1. Debt Overhang Theory

When the government's debt load exceeds its capacity to pay it back, a debt overhang results. This results in an increase in taxes to raise enough money to pay off both domestic and international creditors, which discourages investment owing to a sudden rise in taxes. As a result, the country with the debt only keeps a little amount of its export and domestic revenue, if anything (Abdullahi et al., 2016). This means that the tax disincentives caused by debt buildup impede economic prosperity. Tax disincentives indicate that rising debt levels harm investments since potential buyers anticipate a probable tax increase on future earnings in order to pay back the borrowed money. Therefore, according to the debt overhang hypothesis, borrowed funds should be properly placed in businesses that can generate enough revenue to pay off the debt and fund domestic investment (Were, 2001).

B.2. Crowding-Out Effect

This is predicated on the idea that debt burden threatens economic stability if debt servicing costs cause governmental spending to decline (Zaheer et al., 2019). As a result of the growing national debt obligations eating up a sizable percentage of tax revenue, public investments are decreasing. As certain private and public investments work together, a reduction in public expenditure can lead to the displacement of private investments. Given that their financial capabilities might not be enough to sustain the necessary growth and progress during this phase, developing economies with limited industrialization have to depend on borrowing during their initial developmental phases. Excessive levels of government debt can limit liquidity and discourage domestic investments within the debtor country (Todaro Smith, 2006).
B.3. Dependency Theory
Based on this assertion, developed countries that owe money to less developed nations utilize debt agreements to impose progressive policies that may not align with the needs and goals of those nations (Shkolnyk & Koilo, 2018). By exerting influence over the types of projects undertaken, the level of expertise involved, the mix of local and foreign labor, and pricing determinations within the borrowing nation, an excessive reliance on foreign creditors results in industrialized nations having greater control over less developed debtor countries (Onyele & Nwadike, 2021).

C. Empirical Literature Review
C.1. Studies by Developed Countries
This assertion posits that affluent nations implement progressive policies that are incongruent with their debt agreements, creating a tension with the requirements and objectives of less economically developed nations to which they owe debts. In a study conducted by (Gómez-Puig & Sosvilla-Rivero, 2015), the research delved into the impact of public debt on the economic performance of countries within the European Economic and Monetary Union (EMU) spanning the period from 1960 to 2012. The analytical approach employed in this study was the ARDL bounds testing method. The findings indicated that, in the long run, public debt had a detrimental effect on the economic performance of EMU countries, although in specific scenarios, it exhibited a favorable short-term influence.

In the scholarly investigation carried out by (Dritsaki, 2013), an examination of the intricate interplay among exports, economic growth, and government debt in Greece spanning the period from 1960 to 2011 was undertaken. This research adopted the Granger causality technique along with the vector error correction model (VECM) for its analytical framework. The results of the study revealed a unidirectional causal linkage between exports and economic expansion, as well as between economic growth and the accrual of public debt. Over the extended term, it was observed that there existed a unidirectional causal progression from economic growth to government debt. By employing the Autoregressive Distributed Lag (ARDL) approach in the realm of data analysis, the investigation revealed a detrimental influence of both domestic and external debt on economic growth, discernable in both the short and long run. Additionally, the research underscored that domestic debt had a relatively less favorable impact on economic growth when compared to external debt (Njoroge, 2020). Utilizing ARDL in conjunction with the vector error correction model for the examination of historical data, the outcomes unveiled a sustained causal relationship in the long term between Kenya's public debt and the growth of its real GDP.

Utilizing monthly data spanning from June 1998 to December 2015, (Zaheer et al., 2019) utilized monthly data spanning from June 1998 to December 2015 to conduct an inquiry into the impact of Pakistan's government debt on the accessibility of loans to the private sector. The study revealed that a one percentage point increase in government borrowing exerted a constraining effect on the availability of private sector financing. In a separate investigation, Daka employed the Autoregressive Distributed Lag (ARDL) methodology to assess the consequences of foreign borrowing on the Zambian economy during the period from 1980 to 2014. The empirical results of this analysis indicated a short-term positive correlation followed by a long-term negative association between external borrowing and economic growth. Furthermore, the study demonstrated that the servicing of debt had a substantial and adverse influence on the economic dynamics of Zambia. 2015 (Fandamu & Phiri, 2017).

(Saifuddin, 2016) employed time series data covering the years 1974 to 2014 to scrutinize the influence of public debt on economic development. The selected method of estimation was Two-Stage Least Squares (TSLS). The outcomes from TSLS suggested a positive effect of public debt on investments, ultimately resulting in economic growth. This analysis aimed to evaluate the impact of public debt on economic growth in Ghana. Anning employed data spanning from 1990 to 2015, employing the basic Ordinary Least Squares (OLS) approach (Anning et al., 2016). The inquiry revealed that the government debt of Ghana has an adverse impact on the nation's economy. Between 1995 and 2012, Hussain conducted an assessment of the impact of government debt on the economic growth of Sub-Saharan Africa. Employing a panel OLS methodology, the research established a correlation between rising debt levels and a decline in economic growth rates (Hussain et al., 2015). Akram conducted an analysis of the correlation between government debt and economic progress in Pakistan, India, Bangladesh, and Sri Lanka spanning the years 1975 to 2011 through the utilization of panel data estimation techniques. The findings presented evidence of both the phenomenon of debt overhang and the crowding-out effect. Specifically, they indicated that domestic debt, the expenses related to servicing domestic debt, as well as international debt, all had detrimental impacts on economic development and investment (Akram, 2013).

C.3. Studies of Indonesia
According to Asni's research, government foreign debt has an adverse effect on the economy in the form of a debt
overhang rather than a crowding-out effect. Additionally, the improvement of infrastructure has a beneficial and considerable impact on economic expansion. The potential benefits of infrastructure development far outweigh the risks associated with the adverse effects of foreign debt. To mitigate the impact of foreign debt, the government should utilize additional foreign borrowing to keep pace with infrastructure expansion (Asni et al., 2022). According to the Henny study, foreign loans must be managed properly in order for the society to reap the benefits. The government must also carefully assess its capacity to repay foreign loans that it has already received. The main source of funding for closing the budget deficit cannot be foreign borrowing (Juliani, 2021). If managed properly and correctly, foreign debt can increase Indonesia’s foreign exchange reserves; however, if foreign debt is not under control, it will have a negative impact on Indonesia's foreign exchange reserves and eventually become a burden, necessitating the use of significant amounts of foreign currency for repayment. So that Indonesia's foreign exchange remains secure and stable, the Indonesian government must manage the turnover of its foreign debt (Arwangsa & Suliswanto, 2023).

The Indonesian fiscal landscape is significantly influenced by the budget deficit, a pivotal facet of fiscal policy. Presently, Indonesia’s total foreign debt is undergoing a rapid escalation. This research endeavors to elucidate the ramifications of Indonesia’s foreign debt levels on various economic factors, including the budget deficit, exchange rate, London Inter Bank Offered Rates (LIBOR), foreign debt repayment, and historical foreign debt records. Employing the Ordinary Least Squares (OLS) methodology and analyzing time series data encompassing the period from 1986 to 2015, this study empirically investigates whether Indonesia's foreign debt is statistically affected by the London Inter Bank Offered Rate (LIBOR) or the disbursement of foreign debt (Fadillah & Sutjipto, 2018b).

The long-term effects of GDP, domestic interest rates (JUB), and exchange rates (KURS) are all particularly harmful to Indonesia’s international debt, but the Foreign Direct Investment (PMA) variable does not significantly affect foreign debt. The Vector Error Correction Model (VECM) employed in this study yields two vital analytical outcomes, namely, the Impulse Response Function (IRF) and Variance Decomposition (VDC) (Jannah & Shidiqi, 2017).

### C.4. Summary of Empirical Review

As a result of variations in the structure of the economy, macroeconomic strategies, and methodological frameworks, and the time frames under examination, the empirical research considered demonstrates a lack of consensus within the academic literature. It’s noteworthy that none of these studies incorporated indicators such as reserve adequacy and revenue sufficiency, which have been recommended by various theories under scrutiny. Due to the inherent diversity in economic structure, the application of macroeconomic policies, and the chosen methodological approaches, coupled with the varying time periods under investigation, the existing body of empirical research reveals a notable absence of consensus among scholars. It is pertinent to highlight that none of the studies conducted thus far have taken into account critical indicators like reserve adequacy and revenue sufficiency, which have been advocated by several theories currently under examination. This gap in the literature underscores the need for a more comprehensive analysis that integrates these essential factors, providing a more holistic understanding of the complex relationships in the field of economic study.

## III. METHODOLOGY

### A.1. Sources and Description of Data

From 2000 through 2022, this analysis used annual secondary data. These data sets were taken from the BPS, the Central Bank of Indonesia, and the World Development Indicators (WDI). Table 1 summarizes the measurement, description, and data sources.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Measurement</th>
<th>Description</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Economic Stability</td>
<td>Real GDP growth rate (RGDP_GR)</td>
<td>Positive RGDP growth rate denotes economic stability</td>
<td>World Bank</td>
</tr>
<tr>
<td>Debt-to-GDP Ratio</td>
<td>Total debt-to-Nominal GDP (DEBT_GDP)</td>
<td>It measures the usage of debt to enhance an income level through production of goods and services</td>
<td>IMF</td>
</tr>
<tr>
<td>Reserve adequacy</td>
<td>short term external debt to reserves (STED_RES)</td>
<td>This measures how far external reserves can cover short term external debt. A ratio rising above 30% shows severe debt burdens</td>
<td>World Bank</td>
</tr>
<tr>
<td>Revenue adequacy</td>
<td>Debt service cost-to-government revenue ratio (DSV_GREV)</td>
<td>This measures how sufficient government revenues are in servicing its debt.</td>
<td>World Bank</td>
</tr>
<tr>
<td>Exchange Rate</td>
<td>Real to Dollar official rate (RX_R)</td>
<td>Ratifications in the exchange rate would drive the debt service cost higher since they are mostly denominated in US dollars</td>
<td>World Bank</td>
</tr>
</tbody>
</table>

**GDP Growth Rate annual % (RGDP_GR):** The Real GDP Growth Rate is calculated by taking the percentage
change in a country’s Real GDP from one period to another. It is computed using the formula in Eq. (1):

\[
\text{RGDP\_GR} = \frac{\text{Real GDP in the current period} - \text{Real GDP in the previous period}}{\text{Real GDP in the previous period}} \times 100\% 
\]

**Debt to GDP Ratio (TDBT\_GDP):** To calculate the Total Debt-to-Nominal GDP Ratio, divide the total debt by the total value of Gross Domestic Product (GDP) in current prices and multiply the result by 100%. The equation is specified in Eq. (2) below:

\[
\text{TDBT\_GDP} = \frac{\text{Total Debt}}{\text{Nominal GDP}} \times 100\% 
\]

**Short Term Debt by Original to Reserve Ratio (STED\_RSV):** The STED\_RSV ratio is determined by dividing short-term external debt by foreign exchange reserves and expressing the result as a percentage, as functionally expressed in Eq. (3):

\[
\text{STED\_RSV} = \frac{\text{Short-Term External Debt}}{\text{Reserves}} \times 100\% 
\]

**Debt Service rasio (DBTS\_REV):** The DBTS\_REV ratio is calculated by dividing the total cost of servicing government debt (including interest and principal payments) by government revenue. The formula is as follows:

\[
\text{DBTS\_REV} = \frac{\text{Debt\-Service Costs}}{\text{Government Revenue}} \times 100\% 
\]

**Official Exchange Rate (EX\_R):** The Official Exchange Rate is established and regulated by the government or central banking authority, serving as the fixed rate at which the national currency can be converted into foreign currency. This information can be sourced from authoritative outlets, including the central bank’s official website or reputable financial publications. These formulas and calculations are fundamental for analyzing economic and financial data, allowing for the assessment of economic performance, fiscal health, and financial stability.

### A.2. Model Specification

Cunningham asserts that economies with rising debt loads devote a sizeable portion of their financial resources to paying down debt, which has a detrimental effect on choices about how to allocate capital and labor in the production function (Cunningham, 1993), as functionally expressed in Eq. (5):

\[
\text{RGDP\_GR} = f(\text{TDBT\_GDP, STED\_RSV, DBTS\_REV, EX\_R}). \quad (1) 
\]

The estimation in this work used the ARDL technique, which Pesaran invented. Equation (2) defines the ARDL limits test, which includes the cointegrating vectors. When working with small sample sizes and mixed-order integrated time series data, this approach is very helpful since it enables a thorough examination of long-term correlations between the relevant variables. A thorough understanding of the factors impacting the phenomenon under inquiry is aided by the useful insights it offers into the dynamics of these interactions (Pesaran et al., 2001).

\[
\Delta \text{RGDP\_GR}_t = \delta_0 + \sum_{j=1}^{p} \delta_1 j \Delta \text{RGDP\_GR}_{t-j} + \sum_{j=0}^{p} \delta_2 j \Delta \text{TDBT\_GDP}_{t-j} \\
+ \sum_{j=0}^{p} (\delta_3 j \Delta \text{STED\_RSV}_{t-j}) + \sum_{j=1}^{p} (\delta_4 j \Delta \text{DBTS\_REV}_{t-1-j}) + \sum_{j=1}^{p} (\delta_5 j \Delta \text{EX\_R}_{t-1-j}) \\
+ \beta_1 \text{TDBT\_GDP}_{t-1} + \beta_2 \text{STED\_RSV}_{t-1} + \beta_3 \text{DBTS\_REV}_{t-1} + \beta_4 \text{EX\_R}_{t-1} + \varepsilon_t 
\]

where parameters $\delta_{1j}-\delta_{5j}$ denote the short-run dynamics, while parameters $\beta_1-\beta_4$ denote the long-run relationships; $\varepsilon_t$ represents the error term; $jj$ denotes the optimal lag length. The significance of the Wald’s F-statistic at the 5% level determines the overall relevance of the explanatory factors. The error correction model (ECM) is represented by Eq. (7) below:

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Note: RGDP\_GR, TDBT\_GDP, STED\_RSV, DBTS\_REV and EX\_R have been explained in Table 1 above.
\[ \Delta \text{RGDP}_G = \phi_0 + \sum_{j=1}^{p} (\phi_j \Delta \text{RGDP}_{G,t-j}) + \sum_{j=1}^{p} (\phi_j \Delta \text{DBT}, \text{GPR}_{t-j}) \\
+ \sum_{j=1}^{p} (\phi_j \Delta \text{STED}, \text{RSV}_{t-j}) + \sum_{j=1}^{p} (\phi_j \Delta \text{DBTS}, \text{REV}_{t-j}) + \sum_{j=1}^{p} (\phi_j \Delta \text{EX}, \text{R}_{t-j}) + \text{ECT} \]

where, \( \phi \) is the short-term projections. ECT is the rate of short-run disparities' adjustment to long-run equilibrium. The ARDL long-run equation is specified in Eq. (8) below:

\[ \beta_1 \text{DBT}, \text{GDP}_{t-1} + \beta_2 \text{STED}, \text{RSV}_{t-1} + \beta_3 \text{DBTS}, \text{REV}_{t-1} + \beta_4 \text{EX}, \text{R}_{t-1} + \mu_t, \quad (4) \]

where \( \beta_1 - \beta_4 \) are the long-run coefficients of the independent variables.

IV. DATA ANALYST AND DISCUSSION

4.1. Trend Plot of the Data

The annual time series data used for the investigation were shown to show the trend prior to estimation (see Fig. 5).

The annual RGDP_GR has been sluggish and largely declining while the debt burden has been rising. Low domestic productivity will limit government revenue collection and expand the financial gap, necessitating future increases in national debt, according to the RGDP_GR indicator of uncertain economic growth.

4.2. Pre-Estimation Test

The foundational components of the unit root examination, referred to as the pre-estimation test, encompass the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) methodologies, as introduced by (Dickey & Fuller, 1979; Phillips & Perron, 1988), respectively. The outcomes of this diagnostic evaluation are presented in the subsequent Table 2, clearly indicating that both variables exhibit integration of order zero and order one, denoted as I(0) and I(1), respectively. This classification is attributed to the fact that the p-value for RGDP_GR falls below the significance threshold of 0.05 at the level, while the p-values for the remaining variables surpass this threshold.

Table 2 provides a comprehensive overview of the results obtained from the Unit Root Test.

<table>
<thead>
<tr>
<th>PANEL A: ADF</th>
<th>VARIABLE</th>
<th>Level: I(0)</th>
<th>First Difference: I(1)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Log.RGDP_GR</td>
<td>0.265146</td>
<td>0.7531</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>TDBT.GDP</td>
<td>-1.846.98</td>
<td>0.1002</td>
<td>0.0000</td>
</tr>
<tr>
<td></td>
<td>STED.RSV</td>
<td>-1.774.651</td>
<td>0.0726</td>
<td>0.0001</td>
</tr>
<tr>
<td></td>
<td>DBTS.REV</td>
<td>-0.379.312</td>
<td>0.5343</td>
<td>-6.833.856</td>
</tr>
<tr>
<td></td>
<td>I_X, R</td>
<td>-1.574.737</td>
<td>0.9673</td>
<td>-4.367.456</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PANEL B: PP</th>
<th>VARIABLE</th>
<th>Level: I(0)</th>
<th>First Difference: I(0)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Log.RGDP_GR</td>
<td>0.543911</td>
<td>0.8249</td>
<td>-6.654.996</td>
</tr>
<tr>
<td></td>
<td>TDBT.GDP</td>
<td>-3.016.754</td>
<td>0.0044</td>
<td>-3.134.117</td>
</tr>
<tr>
<td></td>
<td>STED.RSV</td>
<td>-1.883.161</td>
<td>0.0479</td>
<td>-6.615.956</td>
</tr>
<tr>
<td></td>
<td>DBTS.REV</td>
<td>-0.190.796</td>
<td>0.6630</td>
<td>-7.035.144</td>
</tr>
<tr>
<td></td>
<td>I_X, R</td>
<td>-1.901.867</td>
<td>0.9829</td>
<td>-4.367.456</td>
</tr>
</tbody>
</table>
4.3. ARDL Estimation

The ARDL bounds test is carried out to study the long-run dynamics, as shown in Table 3.

Table 3. Bounds Test Results
(The authors, 2023)

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Value</th>
<th>Signif.</th>
<th>k</th>
<th>1(0)</th>
<th>1(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>21.36575</td>
<td>10%</td>
<td>4</td>
<td>3.01</td>
<td>3.44</td>
</tr>
<tr>
<td>k</td>
<td>4</td>
<td>6%</td>
<td>2.28</td>
<td>3.44</td>
<td></td>
</tr>
<tr>
<td></td>
<td>5%</td>
<td>2.5%</td>
<td>2.62</td>
<td>3.44</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1%</td>
<td>3.07</td>
<td>4.44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asymptotic n:1000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results of the limits test show that the model has a long-term connection because the F-statistic (21.30575) is higher than the I(0) and I(1) critical values at all levels of statistical significance. This demonstrates the enduring co-integration link between indicators of debt burden and economic stability, with the long-term coefficients detailed in Table 4 presented subsequently.

Table 4. Long-Run Estimates
(The authors, 2023)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(TDBT_GDP)</td>
<td>0.36E-05</td>
<td>3.37E-05</td>
<td>2.46E5</td>
<td>0.0474</td>
</tr>
<tr>
<td>D(STED_RSV)</td>
<td>-0.000123</td>
<td>2.32E-05</td>
<td>-5.32E7</td>
<td>0.0018</td>
</tr>
<tr>
<td>D(DBTS_REV)</td>
<td>-0.017354</td>
<td>0.006894</td>
<td>-2.95E9</td>
<td>0.0409</td>
</tr>
<tr>
<td>D(EX_R)</td>
<td>-5.14E-05</td>
<td>9.88E-08</td>
<td>-5.19E10</td>
<td>0.0020</td>
</tr>
</tbody>
</table>

The long-term projections underscore the significance of TDBT_GDP, STED_RSV, DBTS_REV, and EX_R as indicators of Indonesia's national debt burden. Based on their coefficients, all variables (TDBT_GDP, STED_RSV, DBTS_REV, EX_R) exhibit a diminishing impact on RGDP_GR. This suggests that the addition of debt and the substantial debt service costs without commensurate growth in nominal GDP are significant factors contributing to the escalating debt burden over time. Consequently, Indonesia faces a shortage of the financial resources required to stabilize the economy due to the growth of national debt and the continuous rise in servicing costs.

Equation (9) shows that the combined effect of TDBT_GDP, STED_GDP, DBTS_REV, and EX_R has a long-term impact on RGDP_GR. This illustrates how national debt can lead to long-term debt burdens or displace other debts.

$$\text{D(\text{LOG\_RGDP\_GR}) = -0.0001*\text{D(TDBT\_GDP)}-0.0001*\text{D(STED\_RSV)}}$$

$$-0.0174*\text{D(DBTS\_REV)}-0.0001*\text{D(EX\_R)}$$

The ECM concentrates on studying the speed at which the long run and short run diverge. The estimated short-run parameters are likewise incorporated into the ECM framework, as shown in Table 5.

Table 5. ECM
(The authors, 2023)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.014184</td>
<td>0.025691</td>
<td>0.537432</td>
<td>0.6008</td>
</tr>
<tr>
<td>D(TDBT_GDP)</td>
<td>1.00E-05</td>
<td>5.73E-05</td>
<td>1.88E9</td>
<td>0.8536</td>
</tr>
<tr>
<td>D(STED_RSV)</td>
<td>-5.46E-06</td>
<td>2.54E-05</td>
<td>-2.16E7</td>
<td>0.0618</td>
</tr>
<tr>
<td>D(DBTS_REV)</td>
<td>-0.015249</td>
<td>0.005017</td>
<td>-2.01E5</td>
<td>0.0285</td>
</tr>
<tr>
<td>D(EX_R)</td>
<td>-7.99E-05</td>
<td>2.83E-05</td>
<td>-2.72E9</td>
<td>0.0185</td>
</tr>
<tr>
<td>ECTC(-1)</td>
<td>-0.650067</td>
<td>0.295600</td>
<td>-2.19E7</td>
<td>0.0482</td>
</tr>
</tbody>
</table>

Since the ECT's coefficient is negative (-0.650067) and statistically significant at the 1% level, it is consistent with a priori expectations. After each shock or short-term discrepancy, it subsequently shows a yearly convergence.
to equilibrium over the long term, with an annual correction of about -65% of those short-period shock, disequilibrium, and discrepancies.

The empirical results regarding Error Correction Term (ECT) further reinforce the concept of a sustained and enduring association between specific facets of the national debt burden and an indicator of economic stability. The short-run shocks related to TDBT\_GDP, DBTS\_REV, and EX\_R were the ones that caused the long-run deviations because their respective coefficients were negative and substantial, as shown by the first differenced coefficients.

The Error Correction Term (ECT) findings provide additional empirical support for the hypothesis positing a persistent and enduring relationship between certain facets of the national debt burden and a metric representing economic stability. This observation signifies that fluctuations or deviations from the equilibrium in the short term tend to be corrected over time, emphasizing the presence of a long-term equilibrium or co-integration between the variables under scrutiny. Such a co-integration suggests that changes in debt burden indicators have a lasting impact on economic stability, influencing the economic dynamics over extended periods. This insight underscores the importance of monitoring and managing national debt levels in order to maintain and enhance economic stability in the long run.

Table 6 summarizes the diagnostic and stability tests of the ARDL estimation.

<table>
<thead>
<tr>
<th>Table 6. Diagnostic Tests (The authors, 2023)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test for Serial Correlation</td>
</tr>
<tr>
<td>( F_{\text{stat.}} ) 2.422.096 Probability 0.2046</td>
</tr>
<tr>
<td>Heteroskedasticity Test</td>
</tr>
<tr>
<td>( F_{\text{stat.}} ) 0.114373 Probability 0.9985</td>
</tr>
<tr>
<td>Jarque-Bera</td>
</tr>
<tr>
<td>( t_{\text{stat.}} ) 0.136585 Probability 0.933987</td>
</tr>
</tbody>
</table>

p > 0.05 implies absence of serial correlation and heteroskedasticity in the residuals, and the residuals are normally distributed.

The outcomes show that the diagnostic tests were passed by the ARDL model. The stability of the ARDL estimation is further demonstrated by the plots of cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) shown in Figs. 6 and 7. These plots are within the allowable bounds.

![Fig. 6. Cumulative sum (The authors, 2023).](image1)

![Fig. 7. Cumulative sum on Squares test (The authors, 2023).](image2)
CONCLUSION

In this comprehensive study, we have diligently examined the ramifications of debt loads on Indonesia's economic stability. Our initial trend analysis uncovered a disconcerting pattern of Indonesia borrowing beyond its sustainable capacity for repayment. The empirical findings from the Autoregressive Distributed Lag estimation unequivocally affirmed the existence of a long-term relationship between the magnitude of debt load and the precarious state of economic stability. The long-term estimation further accentuated the ominous threat posed by measures of debt burden to the nation's economic equilibrium. Moreover, our investigation into the short-term effects of reserve adequacy and revenue sufficiency on the real GDP growth rate unequivocally revealed a statistically significant negative impact.

However, amid these concerning revelations, it is imperative to underscore that Indonesia still maintains a reservoir of reserves adequate to facilitate domestic investments and fortify economic stability. Nevertheless, it is incumbent upon policymakers to exercise prudent judgment and institute effective measures to navigate the challenges posed by the national debt. Looking ahead, our study underscores the need for more profound exploration into the specific determinants of Indonesia's debt accumulation. We recommend a thorough assessment of potential policy measures aimed at addressing this issue while simultaneously safeguarding economic stability.

Furthermore, the dynamic interplay of exchange rates, reserve adequacy, and revenue generation warrants further scrutiny to develop strategies that can mitigate their short-term adverse effects on real GDP growth. Future research endeavors should extend to examining the relationship between debt load and other pivotal economic indicators, such as inflation and unemployment. Such a holistic approach will contribute significantly to a deeper understanding of Indonesia's economic landscape and the formulation of effective strategies to strike a sustainable balance between debt management and economic stability in the nation's financial landscape. In summation, ongoing research and analysis in this field remain imperative for the continued prosperity and resilience of Indonesia's economy.

REFERENCES


