

THE RELATIONSHIP BETWEEN MACROECONOMIC VARIABLES AND GOVERNMENT DEBT: EVIDENCE FROM MALAYSIA

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Abstract. This conceptual paper investigates the relationship between selected macroeconomic variables name-ly inflation, investment, interest rates, exchange rates, and gross domestic product (GDP), and government debt in Malaysia. Guided by the Fiscal Theory of the Price Level (FTPL), Crowding-out Effect, and Modern Monetary Theory, it aims to develop a theoretical framework to understand how these factors influence government debt levels. A review of existing literature highlights the diverse impacts of these variables across different economies, emphasizing the importance of context-specific analysis for Malaysia. The study proposes employing an Autoregressive Distributed Lag (ARDL) model using annual data spanning between 2002 and 2024. The paper does acknowledge the potential for a crowding-out effect, wherein more government borrowing might limit private investment. Since higher debt levels may impede economic growth, a negative correlation between GDP and government debt is anticipated. Finally, because large budget deficits increase interest rates and the cost of debt repayment, it is anticipated that interest rates and government debt will have a positively significant association. The expected findings may suggest that the relationship between selected macroeconomic variables and government debt is multifaceted with inflation, investment, interest rates, exchange rates, and GDP all playing critical roles. In conclusion, policymakers must navigate these debt dynamics carefully to promote economic stability and sustainable debt levels.

Keywords: *government debt, inflation, crowding-out effect, GDP, interest rate*

Introduction

Government debt, also known as public debt, is a liability for the government that indicates the total amount it owes its creditors through the issuance of treasury securities, such as bonds and notes, which are assets for bondholders, including private investors (Leclaire, 2024). High amounts of government debt can restrict fiscal flexibility and increase reliance on monetary policy, which can lead to inflation (Durré and Smets, 2011). The relationship between debt and interest rates is crucial for the agency's budget and economic forecasts, particularly long-term forecasts, as well as for dynamic analyses of fiscal policy, where the sensitivity of interest rates to shifts in debt levels is crucial and growing government debt can have an indirect impact on GDP, mainly by discouraging private investment, which affects the long-term stock of private capital (Gamber and Seliski, 2019). The increase in interest rates and high debt tends to increase the crowding-out investment. To maintain the economy stability, policymakers need to decide critically by monitoring exchange rates (Shahabadi et al., 2026). Thus, from 2002 to 2024, this study examines the impact of selected macroeconomic factors on Malaysian government debt, including inflation, investment, interest rate, exchange rate and GDP.

Research background

The Malaysian government debt has demonstrated a strong long-term correlation with economic growth between 1970 and 2015. Government spending was found to have a beneficial impact on GDP per capita. However, an increase in the debt ratio was linked to a decrease in GDP per capita, indicating possible inefficiencies in the use of debt (Yoong et al, 2020; Burhanudin et al., 2017). Malaysia's government debt has been increasing in recent years, raising questions about its sustainability and possible financial consequences. This tendency is consistent with rising public debt around the world, especially in developing countries (Siyang, 2024). Research has revealed conflicting results about the impact of public debt on Malaysia's economic expansion. However, several studies show that both short-term and long-term sustainable economic growth have been helped by government debt (Burhanudin et al., 2017). Other research indicates that excessive debt levels could discourage private investment and have a negative impact on economic performance (Lau et al., 2019). To prevent negative consequences on private investment and economic stability, policymakers are advised to keep public debt at manageable levels and must keep public debt within ideal bounds to find a balance between the risks of excessive debt and its growth-promoting benefits. Therefore, while others look into those macroeconomics variables separately from before and after COVID-19, this study aims to bridge this gap by examining the primary effects of macroeconomic factors on government debt from 2002 to 2024.

Problem statement

Malaysia's ambition to become a high-income nation has yet to be accomplished. Since 2009, Malaysia's national debt has steadily increased, with the debt-to-GDP ratio above 50% (Yoong et al., 2020). Currently, government debt in Malaysia is above 60% since 2020 until 2024 based on the comparison of government debt graph between Malaysia and Thailand graph in *Figure 1* as stated in World Development Index where Thailand managed to keep the government debt below 40% from 2002 to 2019 while Malaysia's government debt is keep increasing above 50% since 2009. The Malaysian government has relied on borrowing to pay for budget deficits. When expenses exceed revenues, these deficits arise. Even if these deficit-financed expenditures result in short-term economic growth, they may still fail to produce long-term and sustainable growth if they are not carefully managed (Zuraida et al., 2023, Burhanudin et al., 2017). A decrease in GDP per capita has been associated with the growth of public debt, which may worsen economic problems and increase public dissatisfaction with living expenses (Yoong et al, 2020). However, even if they eventually contribute to GDP growth, government spending has changed over time due to ineffective fiscal management (Zuraida et al., 2023). This might destroy public trust in the government's capacity to successfully handle economic issues due to Malaysia's high cost of living as households are now financing their consumption through debt rather than income (Khan et al., 2016). This trend may increase people's frustration with governmental decisions and is a reflection of larger economic pressures. Therefore, addressing public concerns requires targeted government investment and effective debt management. Studies highlight the importance of allocating government finances wisely in order to avoid fiscal risks and to prioritize economic growth (Burhanudin et al., 2017). The more recent research highlights the complex and context-dependent relationship between macroeconomic variables and government debt. This study therefore investigates the relationship between selected macroeconomic variables namely inflation, investment, interest rate, exchange rate, and GDP, on government debt.

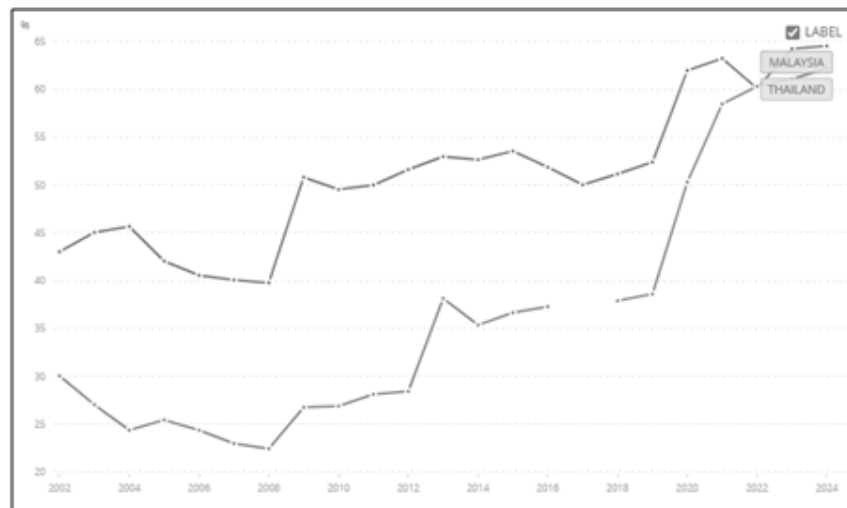


Figure 1. Comparison of government debt between Malaysia and Thailand (2002-2024).

Literature review

There is a limited number of studies that simultaneously looks at the combined effects of inflation, investment, interest rates, exchange rates, and GDP on government debt in Malaysia. For example, some research focuses on government debt and GDP (Yoong et al., 2020; Tan and Chin, 2017). While other studies investigate inflation or investment separately (Mehmeti and Deda, 2022, Lau et al., 2019). Therefore, this study investigates the relationship between selected macroeconomic variables such as inflation, investment, interest rate, exchange rate, and GDP, on government debt.

The effects of inflation on government debt

When government debt is high can caused an inflation since high debt levels can limit fiscal flexibility and increase reliance on monetary (Durré and Smets, 2011). Therefore, effective governance and fiscal discipline are needed to reduce the harmful impacts of high debt on inflation (Meyer and Neethling, 2025). Besides, government debt plays a critical role to define fiscal policy for all countries and utilized particularly during economic downturns or crises to finance essential expenditures like infrastructure, health care, and education (Javier Cifuentes-Faura, 2024). Inflation is a concept when there is an increase in the general price of goods and services over period of time that influenced by monetary policy and structural breaks in the economy (Schwartz, 2009). An unhealthy cycle of rising borrowing and inflation can result from persistently high inflation, which can threaten economic stability. This situation may make future policy responses more difficult by undermining public confidence in monetary and fiscal institutions (Barro and Bianchi, 2026). For instance, both Frequentist and Bayesian methods have shown that inflation persistence in the United States has dramatically decreased over the previous 60 years (Gamber et al., 2016). The relationship between government debt and inflation, which plays a significant role in the current study, is typically used to keep discussions on the factors that contribute to government debt. According to (Ali et al., 2025), the negative effects of public debt on

economic growth are exacerbated in developing nations by inflation above specific thresholds (e.g., 14.03% for the general sample), suggesting that excessive inflation can destabilize economies rather than reduce debt loads. The major gap on most studies is it might not completely measure threshold effects or nonlinearities, which are common with the link between debt and inflation.

The effects of investment on government debt

Ogunjimi (2019) uses the ARDL model to examine the effects of government debt components on different types of investment in Nigeria over the years between 1981 and 2016, both in the short and long term. The empirical findings demonstrated that domestic debt increases both public and private investment over the short and long terms. In other words, domestic debt crowds in both types of investment but does not draw foreign direct investment. The findings also demonstrated that external debt crowds out state investment, crowds in private investment over the long and short terms, and has no effect on foreign direct investment. A study by Baoshi and Boyuhao (2026) examines the causes of corporate inefficient investment and how local government debt affects it in China. The result shows that corporate over-investment is the main way that the growth of local government debt exacerbates corporate inefficient investment. This paper's mechanism analyses show that the expansion of local government debt increases public investment and amplifies corporate inefficient investment through the fiscal investment multiplier effect. Additionally, local government debt raises corporate financialization, which partially mitigates inefficient investment, and simultaneously lowers tax burdens for businesses, which reinforces corporate inefficient investment. Both studies show the same result which is an increase in government debt, it tends to an increase in public investment. When compared to private sector investment, government debt typically has the biggest negative impact on public sector investment (De Mendonça and Brito, 2021; Turan and Iyidogan, 2023).

The effects of interest rate on government debt

Based on study Gamber and Seliski (2019), the authors investigate the relationship between government debt and interest rates for the long-term effects of growing federal debt and deficits on interest rates in the United States. According to the study, across different specifications and sample periods, an increase of two to three basis points in the estimated long-term real interest rate is often correlated with a percentage point increase in the forecast debt-to-GDP ratio. This is in line with a basic neoclassical production function model and previous research. Another finding by Di Domenico et al. (2024) also find that the cost of servicing government debt increases when central banks raise interest rates, which may result in increased debt accumulation relative to GDP. If the economy's capital intensity declines as a result of shifts in relative pricing, this effect is especially noticeable. These study found the same result when central bank increase interest rate that have a positive relationship with GDP.

The effects of exchange rate on government debt

A study by (Ouhibi and Hammami, 2020) employing a dynamic panel data model estimated by the Generalized Method of Moments (GMM) for the period between 1990 and 2017 across four panels of countries including MENA countries, sub-Saharan region, southern Mediterranean countries, and European countries that showed

important regional variations in the impact of exchange rates on government debt. Based on the findings of four panel countries, government debt in the sub-Saharan region was negatively and statistically significantly impacted by the actual exchange rate. In particular, there was a 0.178% drop in government debt for every 10% increase in the actual exchange rate. Despite this study focus on exchange rates and government debt, to address more in exchange rates and government debt, another researcher have begun to explore more on exchange rates. A study by Oppong et al. (2026) that investigate the relationship between Ghana's economic growth and state debt, exchange rates, and credit ratings. In contrast to previous studies, the study used the Time-Varying Parameter Vector Autoregression (TVP-VAR) framework to jointly model these four variables in order to investigate how these factors relate to economic growth from a time and frequency viewpoint. This paper discovered that the exchange rate is the primary shock transmitter in both the time and frequency domains. This demonstrates its crucial significance in Ghana's economically fragile external environment, where currency swings have a quick impact on budgetary sustainability. Inflation pass-through effects, foreign pressures, local currency depreciation, interest rate volatility, and higher external debt payment costs are all common ways that exchange rate shocks spread.

The effects of GDP on government debt

Fiscal sustainability is widely acknowledged as a key component of macroeconomic stability since it indicates a government's capacity to fulfill its current and future responsibilities without turning to excessive debt accumulation or harming long-term growth (Buiter, 1985). The primary indicator of fiscal sustainability is the debt-to-GDP ratio. The study of Mutai, et al. (2026) provide conflicting during COVID-19 evidence about the sustainability of debt. The study offers recent data on how fiscal authorities react to growing debt in a variety of macroeconomic situations and high debt levels reduce fiscal responsiveness, especially during times of crisis. These results generally indicate that it is not possible to assume consistent compliance with the intertemporal budget constraint across all Eurozone nations. According to Alshaikh, et al. (2026) that focuses on supply shocks which is oil prices in long and short term show that revenue mobilization capacity and the rate of fiscal adjustment are increasingly tied to fiscal outcomes rather than only oil-linked revenue cycles. This study found no evident of long-term correlation between the fiscal balance and government debt. This is explained by Saudi Arabia's historically low debt levels and cautious post-2016 debt management, which have kept debt from causing long-term financial burden. Both studies focuses on crisis and supply shock. In order to appropriately capture both systematic behaviors and national variability, both studies emphasize the significance of combining panel-based reasoning with evidence at the country level.

Conceptual framework

This study focuses on the relationship between selected macroeconomics variable such as inflation, investment, interest rate, exchange rate, GDP and government debt. The conceptual framework in *Figure 2* aims to help policymakers understand the relationship between macroeconomics variables and government debt using ARDL to examine short-run and long-run dynamics to maintain economic growth. The macroeconomics variable such as inflation, investment, interest rate, exchange rate,

GDP are referred to as the independent variable (IV) that indicate factors which affect the dependent variable (DV) which is government debt that will show the impact on economic growth. Within this framework, the theory of Fiscal Theory Price Level (FTPL), Crowding-out Effects and Modern Monetary Theory acts as a core theory to define and test the relationship between IVs and DV. The theory known as FTPL is used to analyze how fiscal policy such as government debt affects inflation under various monetary regimes. For example, under some fiscal and monetary policy scenarios, the increased government debt may result in inflationary pressures (Urquhart, 2022). According to MMT, as long as inflation is kept under control, sovereign governments can issue a limitless quantity of money to finance government debt without facing the risk of default. It challenges established assumptions regarding fiscal sustainability and highlights how monetary policy affects interest rates on government debt (Brady, 2020). Crowding-out effects, in which government borrowing decreases private investment by restricting the availability of loanable funds and raising interest rates that are linked to high government debt-to-GDP ratios (Comin, 2026; Mwakalila, 2025).

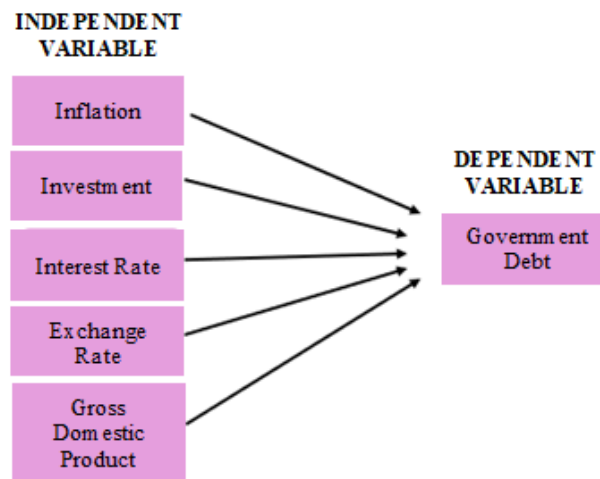


Figure 2. Proposed conceptual framework.

Materials and Methods

This conceptual paper will investigate the relationship between the dependent and independent variable using Autoregressive Distributed Lag (ARDL). It is proposed to employ an annual time-series dataset for Malaysia ranging between 2002 and 2024 (23 observations). The data provided will be gathered from several reliable sources, such as the Central Bank of Malaysia, Department of Statistics Malaysia (DOSM), World Bank, and International Monetary Fund (IMF). The extended period includes a number of significant macro-fiscal situations, including the global financial crisis of 2008, the COVID-19 pandemic, and the subsequent post-pandemic fiscal adjustments. The ARDL approach is appropriate to handle mixed integration orders, estimate both short-run dynamics and long-run cointegration, and enable explicit modeling of structural breaks (Behera and Dash, 2020; Akinkunmi, 2016; Pesaran et al., 2001). Even in situations when the stationarity characteristics of variables are unclear, the ARDL limits test is a reliable technique for identifying cointegration (Kripfganz et al., 2023).

The dependent variable is the government debt that is measured using the total central government debt (% of GDP) where the Gross Domestic Product (GDP), which is the total revenue received from the production of goods and services in an economic territory over an accounting period. Meanwhile, the independent variable's indicator used for inflation is Consumer Price Index (CPI). The annual percentage change in the average consumer's cost of purchasing a basket of goods and services, which may be set or altered at predetermined intervals such as annually that reflected in inflation as determined by the consumer price index. The lending interest rate that has been adjusted for inflation using the GDP deflator is known as the real interest rate that can be used as an indicator for interest rate. The real effective exchange rate is the nominal effective exchange rate, which compares a currency's value to a weighted average of many foreign currencies acts as an indicator for exchange rate. Net FDI is proposed to be used as investment indicator in this model. Since this indicator is given in current prices, price fluctuations over time have not been taken into considerations. Finally, GDP is measured by using GDP percentage annual growth which is the entire amount of money made each year from the production of products and services in an economic region.

Results and Discussion

The expected results are based on the relationship between macroeconomic variables and government debt that were investigated in previous studies. In line with rising government debt worldwide, Malaysia's government debt has been growing in recent years as well, causing concerns about its sustainability and possible financial consequences (Siyang, 2024). In some findings, there may be a statistically significant negative correlation between government debt and the actual exchange rate, according to one study included in the previous paper. This particular negative significance is not directly supported or explained by the theoretical frameworks including FTPL, crowding-out effect and modern monetary theory that are specifically covered in the paper but the empirical finding based on sub-Saharan region revealed that the real exchange rate had a negative and statistically significant influence on state debt (Ouhibi and Hammami, 2020). The IVs that will be used are the macroeconomics variables including inflation, exchange rate, interest rate, investment and GDP. The expected result of inflation is a positive relationship between debt and inflation. Depending on variables like fiscal policy and governance, government debt typically has a positive impact on inflation, especially in developing or heavily indebted economies (Nguyen, 2022a). Interest rates and government debt are frequently found to be positively correlated by using ARDL model research. For instance, a stable positive correlation between real interest rates and public debt in Malaysia, Indonesia, and the Philippines shows how growing borrowing costs can raise debt levels, supporting the Fisherian argument that higher interest rates raise the cost of debt servicing.

Winter (2017) has found Some research has indicated that a rise in interest rates is linked to an increase in government debt relative to GDP. According to another study, the second IV which is the real exchange rate is positively impacted by external government debt. This is due to the possibility of currency appreciation pushed on by increased debt levels, which would make domestic goods less competitive in global markets (Okoh et al., 2021). Meanwhile, investment commonly has a negative relationship with government debt. This is frequently explained by the crowding-out effect, which occurs when the amount of money available for private investment

decreases due to increased government borrowing (Nguyen (2022b), De Mendonça and Brito (2021), Turan and Iyidogan, (2023). The final variable is GDP that frequently shown to be negatively correlated by Ordinary Least Squares (OLS) analysis towards government debt. Lower GDP growth rates can result from higher amounts of government debt, especially when debt exceeds specific thresholds (Miftari, 2022).

Table 1. *Expected relationship between macroeconomic variables and government debt.*

Variable	Expected Relationship with Government Debt
Inflation	Positive Significant
Investment	Positive Significant
Interest Rate	Positive Significant
Exchange Rate	Negative Significant
GDP	Negative Significant

Conclusion

This conceptual paper is proposing for researchers to look into the connection between macroeconomic factors and Malaysian government debt. Using annual time-series data for Malaysia from 2002 to 2024, the study used the Autoregressive Distributed Lag (ARDL) approach to investigate the effects of inflation, investment, interest rates, exchange rates, and GDP on government debt. The results are meant to assist decision-makers in better understanding the factors that contribute to government debt and how it affects future initiatives. The findings are expected to show that government debt and exchange rates are expected to have a negatively significant relationship. The expected findings may suggest that the relationship between selected macroeconomic variables and government debt is multifaceted with inflation, investment, interest rates, exchange rates, and GDP all playing critical roles. In conclusion, policymakers must navigate these debt dynamics carefully to promote economic stability and sustainable debt levels.

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Conflict of interest

The authors confirm that there is no conflict of interest involved with any parties in this research study.

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